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Paper-1

NARAYAN CHANGDER

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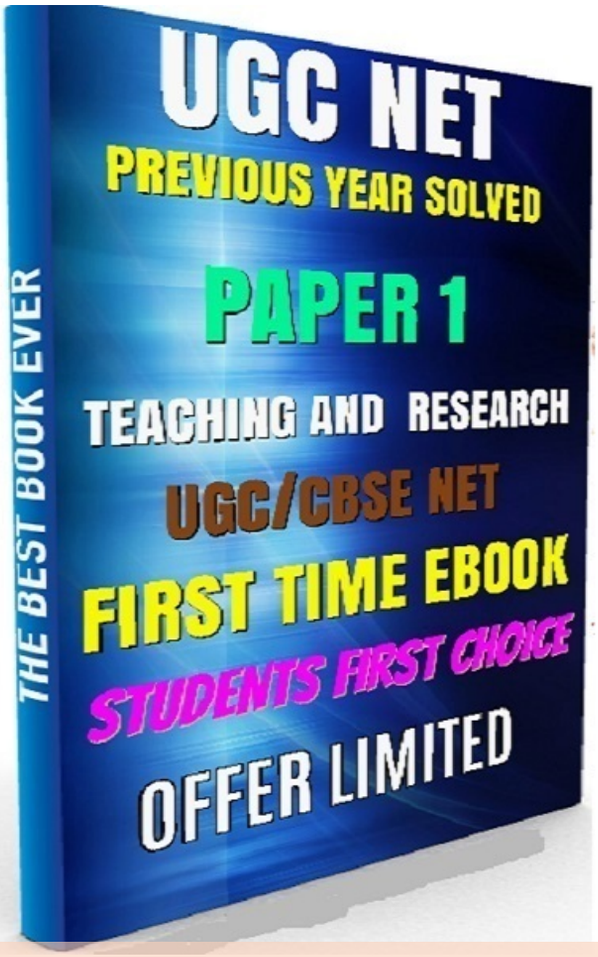


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Preface

In order to determine eligibility for lectureship and to award Junior Research Fellowship (JRF) and to ensure minimum standards for the entrants in the teaching profession and research, National Eligibility Test (NET) is conducted in Humanities (including languages), Social Sciences, Forensic Science, Environmental Sciences, Computer Science and Electronic Science. This time Central Board of Secondary Education (CBSE) on behalf of UGC is holding the National Eligibility Test (NET). This is conducted twice in a year in the months of June and December. Junior Research Fellowship (JRF) is for candidates who desire to pursue research. The JRFs are awarded to the meritorious candidates from among the candidates qualifying for eligibility for lectureship in the NET. JRFs are restricted to only those candidates who opt for it in their application.



This notes presents teaching and research-based related topic with multiple choice questions . These strategies are based on the theory of multiple topic and brain-storming MCQ for each chapter, which can be usefull in examination like UGC/CBSE NET, SET, B.ED and other competitive examinations. No matter what the subject or grade level. Finally, its my request to reader for valuable suggestion to improve this notes, you can contact me below address

My facebook profile https://www.facebook.com/narayan.changder. Also i maintain dedicated facebook group for NET paper I (https://www.facebook.com/groups/ugccbse/). You can acess more MCQ from below website too. http://www.gatecseit.in/ugcnet/.

Paper I: consists of General paper on Teaching and Research aptitude. This paper aims to assess your capabilities in these prime areas which are foundation for Higher education teacher. Some cognitive abilities are expected from teachers and they are tested through this paper which consists of 100 marks. It contains Objective type questions from Teaching aptitude, Research aptitude, Reading Comprehension, Communication, Mathematical and logical Reasoning, Data Interpretation, ICT, People and environment, Higher Education System-Governance, Polity and Administration. Sixty (60) multiple choice questions of two marks are set in this paper, out of which you would be required to answer any fifty (50). If you attempt more than fifty questions, the first fifty questions attempted would be evaluated. For passing NET examination, you must require 40% marks in Paper I that is at least 20 questions in this paper should be correct. If you belong to OBC (Non creamy layer)/ PWD/SC/ST class than you need 35% to pass this paper I.

Note: If you get any wrong answer , please message me for further improvement of this notes. If you think any topic, which is not included in this notes , message me about it.

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Chapter 1

Teaching aptitude



1.1 Introduction

Aptitude of any student is the internal ability or talent of the student which makes the difference with other student. One simply cannot cultivate aptitude rather aptitude of the student is totally depends on the practices. To be a strong in the aptitude , student must have enormous interest in the area in which they are interested. Teaching aptitude is totally depends on individual's interest towards teaching. To be a good teacher, one must have combination of behavioural characteristics as well as cultural characteristic. The person with real teaching aptitude must be curious, open-minded and obviously he/she must have in-depth knowledge of the subject, including love and faith for student.

1.2 What is teaching?

Teachers are the backbone of every society and they plays a vital role in nurturing the mind of the young child. The best teacher always gives knowledge and skills in very effective ways to young students. Teaching basically means interaction of teacher and students in an interactive way where both of them participate for their mutual benefits. Both the students and teacher can have their own objective and target. Throughout the world there are many great teachers defines teaching in different ways.

One word definition of teaching

The one word definition of teaching is just to train the students such that they can stands on their own foot in our modern society.

In teaching, three main aspects are as follows.

- Teacher
- students
- education

A true teacher is one with the following qualities

1. Teacher must identify the weak student in the class
2. Teacher live with the students mentally
3. Teacher must love the students
4. Teacher must identify knowledge of student and build the student on what they have

5. Teacher must give his own shoulder to his student for nurturing such that students can grow mentally and physically
6. Teacher must be friendly with his student up to a certain limit inside the classroom.
7. Teacher must be humorous inside classroom and as well as he/she must have capabilities to control the classroom.
8. A good teacher must have in-depth knowledge of the subject.

1.3 Role of a teacher

Teachers are the backbone of any society. There are several roles a teacher plays to make our society stronger. The way a teacher can lead students is varied from teacher to teacher. Teachers can plays the role in variety of ways either formally or informally. The following 10 roles are used by many of the teachers frequently to improve the students mentally, physically and socially. It is not only the case the teacher can be a human beings, a teacher can be any one for example nature can be a teacher for you if you learn something from the nature. Your mother is the best teacher for you because you learnt everything in childhood from your mother.

Role of a great teacher

Following are the role of a teacher.

1. **Resource provider**
2. **Instructional specialist**
3. **Curriculum specialist**
4. **Classroom supporter**
5. **Learning facilitator**
6. **Mentor**
7. **School leader**
8. **Data coach**
9. **Catalyst for change**
10. **Learner for lifelong**

1. **Resource provider :** a teacher must help their students and colleagues by sharing instructional resources. The instructional resources might include websites, any instructional documents, any new idea's, or other resources to use with the students.
2. **Instructional specialist :** an instructional specialist always helps colleagues to implement effective teaching strategies in the institution. For example if your students submits new laboratory reports written in very poor English-language, you invite some English teachers to recommend the strategies for writing the instruction in laboratory reports.
3. **Curriculum specialist :** Curriculum specialist must understand the standard of content in the syllabus, how various subjects of the curricula links together and how to use the curriculam such that students can understand better?.
4. **Classroom supporter :** Classroom supporters work inside classrooms to help teachers implement new ideas, often by demonstrating a lesson, co-teaching, or observing and giving feedback.
5. **Learning facilitator** Facilitating professional learning opportunities among staff members is another role for teacher leaders. When teachers learn with and from one another, they can focus on what most directly improves student learning. Their professional learning becomes more relevant, focused on teachers' classroom work, and aligned to fill gaps in student learning. Such communities of learning can break the norms of isolation present in many schools.
6. **Mentor:** Serving as a mentor for novice teachers is a common role for teacher leaders. Mentors serve as role models; acclimate new teachers to a new school; and advise new teachers about instruction, curriculum, procedure, practices, and politics. Being a mentor takes a great deal of time and expertise and makes a significant contribution to the development of a new professional.
7. **School leader:** Being a school leader means serving on a committee, such as a school improvement team; acting as a grade-level or department chair; supporting school initiatives; or representing the school on community or district task forces or committees. A school leader shares the vision of the school, aligns his or her professional goals with those of the school and district, and shares responsibility for the success of the school as a whole.

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8. **Data coach:** Although teachers have access to a great deal of data, they do not often use that data to drive classroom instruction. Teacher leaders can lead conversations that engage their peers in analyzing and using this information to strengthen instruction.

9. **Catalyst for change:** Teacher leaders can also be catalysts for change. Teachers who take on the catalyst role feel secure in their own work and have a strong commitment to continual improvement. They pose questions to generate analysis of student learning.

10. **Learner for lifelong:** Among the most important roles teacher leaders assume is that of learner. Learners model continual improvement, demonstrate lifelong learning, and use what they learn to help all students achieve.

Roles for all Teacher's exhibit leadership in multiple, sometimes overlapping, ways. Some leadership roles are formal with designated responsibilities. Other more informal roles emerge as teachers interact with their students. The variety of roles ensures that teachers can find ways to lead that fit their talents and interests. Regardless of the roles they assume, teacher leaders shape the culture of their schools, improve student learning, and influence practice among their peers.

1.4 Teachers and their tasks

Teaching is a great profession throughout the world. The person who chooses teaching as a profession must believe that all the necessary qualities he must possesses to become an effective teachers. Moreover it is also mandatory that they must enjoy working with young kids and at the same time convinced that there effort will lead to betterment of society by nurturing the young kids. It is not a matter of fact that wherever the teacher is teaching, the teacher may teach in kinder garden or in universities. Teacher is typically confronted with the following task

1. Preparing students for learning new topic
2. Presenting learning activities
3. Asking questions to student
4. Monitoring the students learning
5. Giving the students feedback
6. Reviewing the students
7. Identifying the weak student
8. Re-teaching already taught topic
9. Taking the tutorial classes
10. Preparing the students notes
11. Preparing question banks

Task of a teaacher

In short the task of a good teacher outlined above encompasses the following points.

1. To bring the desired change in the learners behavior
2. To bring desired change in learners mind
3. To give the students sufficient knowledge about the subject
4. To enhance the skill of the student
5. Motivate the students to participate in social activities
6. Motivate the students to ask for any doubt in their mind
7. Motivate the students that they should not fear from teachers but rather they must be interactive and friendly up to a certain limit.

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1.5 Characteristics of a Great/Good Teacher

It is an accepted fact that teachers are usually not born but made. Good teachers nurture their knowledge and skills through constant and deliberate efforts. One of the prerequisite to be good teacher is to understand the teaching learning process in more depth.

Greatness in teaching is just as rare as greatness in medicine, dance, law, or any other profession.Teaching is all about hard work and in this profession some teachers become a great teacher and they became the idol of their students and other teachers never grow to be anything better than mediocre. The great teachers, however, work endlessly to create a challenging, nurturing environment for their dear students. A great teaching seems to have less to do with the knowledge and skills than with our attitude towards our students, subjects, our work. Although this list is certainly not all-inclusive, i have narrowed down the many characteristics of a great teacher to those i have found to be the most essential, regardless of the age of the learner.

1. **A great teacher respects students:** a great teacher inside classroom must be friendly such that every student ideas and opinions are valued equally. Students must feel safe to express their thoughts and feelings and learn to respect and listen to others students. In a single word a great teacher classroom must be a welcoming learning environment for all the students.

2. **A great teacher creates a sense of community and belonging in the classroom :** A great teacher creates a small important community inside the class room. There must be a mutual respect in the classroom which provides a supportive and collaborative environment. In this small environment there are rules to follow and each student must be aware that they are important integral part of the group. A great teacher lets students know that they can depend not only on teacher, but also on the entire class.

3. **A great teacher sets high expectations for all students :** Student expectation must be hardly been a great teacher's classroom. Teachers must know that students generally ask questions or any doubt present in their mind.

4. **A great teacher has his own love of learning :** A great teacher always inspires his student with his passion for education and for the course material. Teacher constantly renews themselves as a professional to provide student with the high quality of education possible. Great teacher should not have any kind of fear of learning new teaching strategies for incorporating new technologies inside classroom.

5. **A great teacher is a skilled leader :** Different from administrative leaders, effective teachers focus on shared decision-making and teamwork, as well as on community building. This great teacher conveys the sense of leadership to students by providing opportunities for each of them to assume leadership roles

6. **A great teacher can "shift-gears":** A great teacher can "shift-gears" and is flexible when a lesson isnt working. This teacher assesses his teaching throughout the lessons and finds new ways to present material to make sure that every student understands the key concepts

7. **A great teacher collaborates with colleagues on an ongoing basis:** Rather than thinking of himself/herself as weak because he/ she asks for suggestions or help, this teacher views collaboration as a way to learn from a fellow professional. A great teacher uses constructive criticism and advice as an opportunity to grow as an educator.

8. **A great teacher maintains professionalism in all areas:** From personal appearance to organizational skills and preparedness for each day. His/ Her communication skills are exemplary, whether she is speaking with an administrator, one of her students or a colleague. The respect great teacher receives because of his/ her professional manner is obvious to those around him/her.

Nature and characteristics of teaching

1. The main character of teaching is to provide guidance and training.
2. Teaching is interaction between teacher and students.
3. Teaching is an art to give knowledge to students in effective way.
4. Teaching is a science to educate fact and causes of different topics of different subjects.
5. Teaching is continues process .
6. Teacher can teach effectively, if he has full confidence on the subject.

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7. Teaching encourages students to learn more and more.
8. Teaching is formal as well as informal
9. Teaching is communication of information to students. In teaching , teacher imparts information in interesting way so that students can easily understand the information .
10. Teaching is a tool to help student to adjust himself in society and its environment.

1.6 Method of teaching

Teaching is a very complex process which brings socially desirable behavioural change in a person. Teaching process takes place between teacher and learner. It is an interactive process which is initiated by the teacher where learner is the acceptor. In the process of teaching it is required to bring certain changes in a syudent according to the needs of the society where student is living. Teaching is dynamic in nature that's why it is called as a process. Teaching is both the science as well as art. In the process of teaching the main motive of the teacher is to develop the student mind. Effective teaching is mostly depend on the teacher. It is believed that a good teacher is born but not made. Training and research also can make a good teacher better and a better teacher best. Teacher must have the following qualities.

1. In-depth knowledge of the subject
2. Good knowledge of the pedagogical skills to teach the subject
3. Understand the learners preparedness with the knowledge

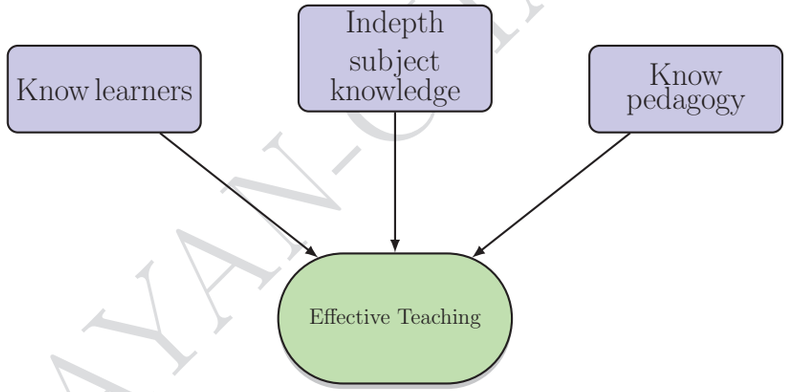


Figure 1.1: Teaching environment

Teacher should follow various methods of teaching devised from time to time. A teacher encourages the practice of thinking among students. Teacher should give to the students the freedom and opportunity to express their ideas.

The complete process of education must contain four common factors

1. Educator (teacher)
2. Educand (Student)
3. Subject matter
4. Context (setting).

1.6.1 Pedagogy paradigms

Pedagogy is the science and art of education. The aim of pedagogy is to develop the human beings up to the skill acquisition. The teaching is a professional artistry which requires a teacher to efficiently plan the objective and give the students meaningful knowledge in teaching-learning process. In the process of teaching, every teacher evolved themselves every day and they also develop their unique teaching style based on multiple encounters with their students. In teaching, every day teacher faced challenges and they loop for solution to those challenges. Pedagogical environment of teaching helps the teacher to understand the teaching-learning process and different

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teaching strategies. The job of teaching is a complex process which is executed in a sophisticated phases. More or less there are four phases.

1. planning
2. execution
3. assessment
4. reflection

The entire process starting from planning to reflection is totally depends on the teachers choice and beliefs in the learning paradigm on how students learn. A teacher is able to change their learning plan if they use some teaching model to organize and implement teaching strategies. There are various methods of teaching as suggested by stewards in education system.

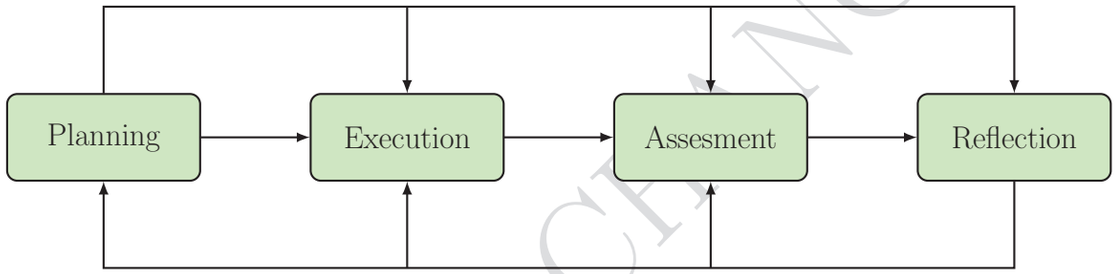


Figure 1.2: Executed sequence of phases

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1.6.2 Recent trends in pedagogy Paradigm's

To be a successful teacher, a teacher must have to follow a model of teaching. A model of teaching is basically a plan or scheme prepared by teacher to organize instructional material which helps to implement teaching method and to achieve the goal of the curriculum. According to G.E. Miller "teaching method which plays learners in active learning situation are more likely to be effective than those which do not". There are various teaching methods available in the literature. The below table shows the central idea of the teaching method as described by various theorists.

In recent development of higher education, it is strongly believe that the process of learning is different from school to universities because students develop the intellectual power for learning. In the higher education, students become more autonomous and resourcefull, as a result in the higher education, students becomes experience learner. In the higher education, students becomes an independent learner by developing their positive learning habit and ultimately they becomes masters in their own learning process. Education is basically the process of developing some capabilities into an individuals. Though it is a fact that abilities are always inborn quality, but it is also a fact that these abilities can be nurtured and developed in an learner through various means by an educator. Education must also be relieved and useful from source site's point of view in which the learner is living. The productivity of education can be classified as qualitative and quantitative.

Current trends in Pedagogy paradigm's

Learner	Teacher	Teaching	Learning
All learners are different and unique	teacher is not a giver of the knowledge	teaching is an active engagement between learner and teacher	learning is an active discourse on the part of learner
all learners can learn	teacher is a facilitator who helps the learner to construct knowledge	teaching is a creative endeavor that requires flexible organization, modification and adjustment throughout the teaching-learning process	learning is fully experimental
learners construct their own knowledge	teachers personal beliefs, attitude and experiences affect the choice and style of teaching method	teaching has to differentiate in terms of choice of content, instruction, study materials and assessment to meet the diverse learning needs of the student	learning can be strengthened and maximized through appropriate scaffolding and by providing sufficient challenge
learners personal background, priority experience, interlaced and motivation contribute significantly to voice their ability to learn	teacher has to be a learner himself/herself to grow as a teacher and evolve themselves	teaching is successful in a stress-free, emotionally secure learning environment	learning can be an enriching experience in a collaborative setting where all learners are part of a learning community who are working together to achieve a common goal.

For better and effective education system both the qualitative and quantitative productivity is required. Here quality means the excellence in textbook, teaching aids, facilities and teachers. The following are the basic components of an effective teaching environment.

1. knowledge of the teacher and love of subject teacher is teaching
2. teacher must have the knowledge and love with affection for the students
3. there must be planning, preparation and organisation of the teaching method
4. teacher must be enthusiastic for teaching
5. teacher must have ability to stimulate the learner thought and interest.

There are total 150 teaching methods available in the literature suggested by theorists. Teaching methods can be classified into three broad categories

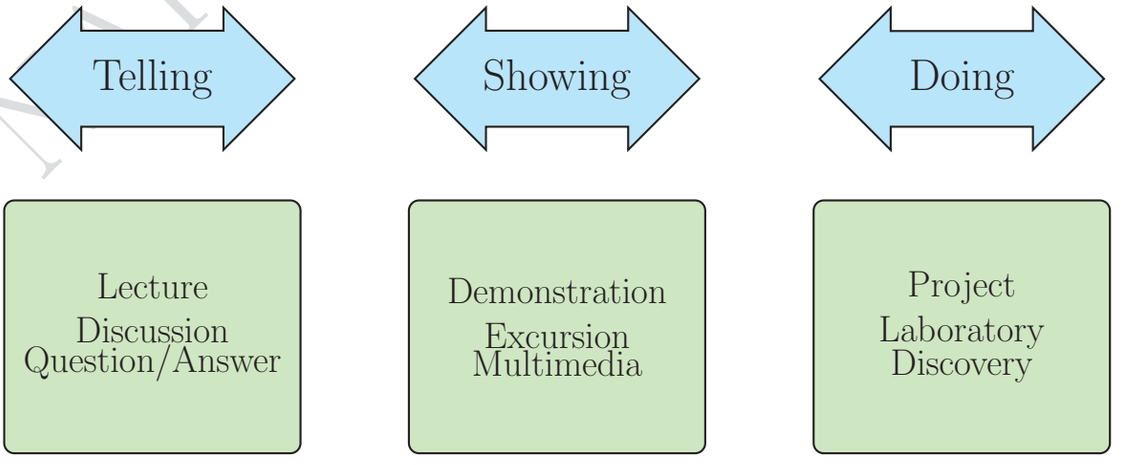


Figure 1.3: Methods of teaching

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1.7 Traditional teaching method

In the ancient teaching method, the teacher was the sender or the source, the educational material was the information or message and students or learner was the receiver of that information. The educator deliver the message by using the chalk- and- talk method or by using overhead projector. Basically, the teacher controls the total instructional process, the content is delivered to the entire classroom at the teacher tends to emphasise factual knowledge. In this process, the teacher delivers the lecture content and the learner listened to the lecture. The main drawback in this method is the method is totally passive and the learners play a little role in the teaching-learning process. Some limitation which may prevail in traditional teaching methods are as follows.

1. Teaching in classroom using chalk and talk is "one way flow" of information.
2. Teachers often continuously talk for an hour without knowing students response and feedback.
3. The material presented is only based on lecturer notes and textbooks.
4. Teaching and learning are concentrated on "plug and play" method rather than practical aspects.
5. The handwriting of the lecturer decides the fate of the subject.
6. There is insufficient interaction with students in classroom.
7. More emphasis has been given on theory without any practical and real life time situations.
8. Learning through memorization but not understanding.
9. Marks oriented rather than result oriented.

1.8 Modern teaching method

Modern day choice of teaching method or methods to be used depends largely on the information or skill that is being taught, and it may also be influenced by the aptitude and enthusiasm of the students.

1.8.1 Lecture method

Lecture method is the most ancient method as prescribed by the theorists. Lecture method is still nowadays frequently used by teachers where a little or no participation from the learner side. A Lecture method will be effective if the teacher is experience and he is the master of the subject, explain all the points and can answer all the question raised by student. In this method student can ask questions anytime if they need any clarification. Efficiency of Lecture method totally depends on quantity of information, style of presenting information, clarity of information, active listening skills on the part of learners and supplementary material to provide a roadmap for the Lecture.

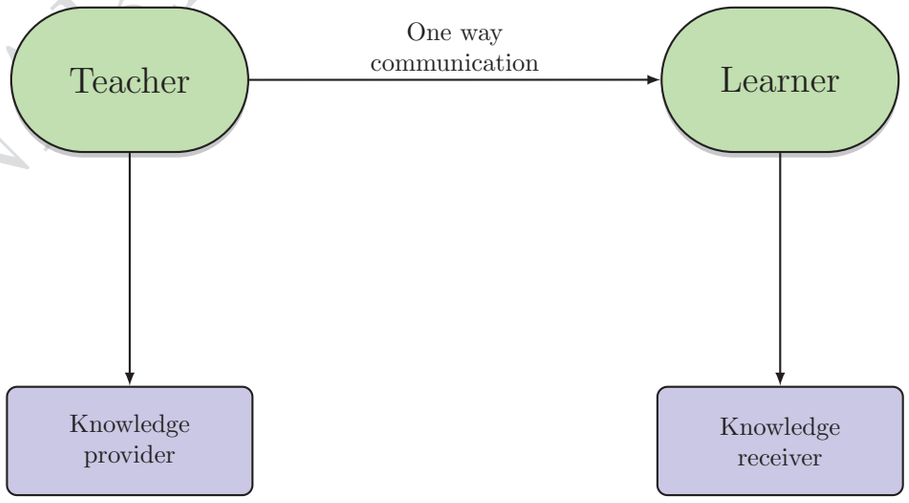


Figure 1.4: Teaching environment in lecture method

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1.8.1.1 Advantage of lecture method

In the teaching-learning process following points are advantages of lecture method.

1. lecture method always good for large classroom and it also raise new ideas.
2. in lecture method students can ask questions anytime if they need any clarification about some particular topic.
3. in lecture method, a good teacher always explain all the points
4. teacher discusses old topic and complete the curriculam on time.
5. students can give their opinion at the end of each lecture
6. teacher can control and maintain the direct flow of the information with great interest.
7. it also stimulates the students interests by giving advanced knowledge of the topics
8. lecture method is useful because in this method a large amount of information can be provided to learner in a very short period of time.

1.8.1.2 Disadvantage of lecture method

Lecture methods of teaching is not fully armed with advantages. It has also some drawbacks

1. lecture method is totally undemocratic. In democratic country every person have some opinion to give by means of voting system. In the lecture method, if the teacher is rude, students don's feel safe to ask questions for clarification.
2. sometimes the learner becomes a silent receiver of information provided by teacher
3. lecture sometimes can be boring and unproductive if it is not organised properly.

1.8.1.3 Strategy to make lecture method more interesting

A teacher can make his lecture method interesting to the learners in different ways. Following are the different ways to make lecture method more interesting.

1. Give a roadmap or flowchart by using pointers and also indicates each and every point scale learners follow.
2. all the sequence of information must be rationally sound and logical from learners point of view
3. in any lecture method there must not be any communication gap between teacher and learner. So the language of the lecture should be clear and sharp.
4. for each and every topic there must be suitable example from real world problem.
5. lectures would start from brainstorming session on the topic which learners have already learned

1.8.2 Demonstration method

Demonstration teaching method is the best because in this method teacher shows the proof or explain the idea by using some example or experiment. This strategy is useful in technical or training Institute where practical knowledge is required. It is used to develop skill in the student and teacher. This method is very much useful for science and technology education. In this method of teaching students can visualise what is happening.

1.8.2.1 Advantage of demonstration method

Demonstration method of teaching has several advantages as shown below

- Because demonstration method shows the example or experiment. It is easy for student to visualise the sequence of process that may be hidden in the theoretical description.
- This method is the best to prove theorem accurately.
- Student can easily learn and understand the subject
- This method makes interest in the learners and motivate them for their active participation.
- This method makes teaching-learning process Interactive one

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1.8.2.2 Disadvantage of demonstration method

Following are disadvantages of demonstration method

- This method can be used only for skills subject
- This method is totally teacher centric and mostly carried out in an laboratory
- This method is highly controllable
- To be a successful. This method requires accuracy and concentration to get the correct result

1.8.2.3 Strategies to make demonstration method more effective

- In this method, teachers would be a sincere, diligent and skilled person
- Teacher must come with the preparation of model
- Demonstration must be followed by healthy discussion
- Demonstrations would be repeated several times

1.8.3 Discussion method

Discussion is useful between a group of students or between a group of students and teacher. In teaching method, discussions involved stricter discipline and focus explanation of ideas, beliefs and understanding among a group of students on a chosen topic. Discussion Method emphasises pupil-activity in the form of discussion, rather than simply telling and lecturing by the teacher. Thus, this method is more effective.

1.8.3.1 Advantage of discussion method

- Everybody can participate in the discussion
- Democratic way of thinking is developed in the participant
- Students in the course of discussion get training in reflexive thinking
- Student can sell express themselves
- Students learn to discuss and differ with other members of the group. They learn to tolerate the views of others even if they are unpleasant and contradictory to each other's views. Thus, respect for the view points of others is developed.
- Learning is made Interesting

1.8.3.2 Limitation of discussion method

- All types of topics cannot be taught by Discussion Method.
- This method cannot be used for teaching small children.
- The students may not follow the rules of discussion.
- Some students may not take part while others may try to dominate.
- The teacher may not be able to guide and provide true leadership in the discussion.

In spite of these limitations, discussion method is a very useful and effective method for the teaching of History.

1.8.3.3 Strategies to make discussion method more interesting

- Topic of discussion must be selected from students interest point of view
- Student must come with the preparation for discussion.
- The teacher should act as an active moderator to allow discussion

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1.8.4 Programmed instruction method

It is one of the improvised method of teaching invented by B.F Skinner. In this method, the responses of the students are fully controlled by the programmer or teacher. The main aspect of this type of teaching is to change the cognitive domain of the students beaviour. In this method, the students don't have any freedom to respond. There are many computer assisted program available in different subject

Program instruction type teaching is of three types

1. **Linear programming :** this is used to teach all the subjects. It is based on five fundamental principle.

   (a) small steps
   (b) actively respond
   (c) immediate confirmation
   (d) self pace
   (e) student testing

2. **Branched programming :** this method of teaching is used in mechanical field
3. **Mathematics:** in this method chain of elements is presented. First step is the master level, while the last step is the simplest element

1.8.4.1 Advantages of program instruction

Following are the advantages of program instruction teaching strategy

1. The main emphasis is on students involvement in the process
2. There is no fixed time interval for learning. Students can learn anytime
3. Students are exposed only for the correct responses.
4. Immediate confirmation of the result is provided to the student and also feedback to the wrong answer is provided.
5. This is totally technology based

1.8.5 Disadvantages of program instruction

1. It is very difficult to develop an instructional program
2. Only cognitive objectives can be achieved
3. This process is highly mechanical
4. There is no scope to invent or explore
5. Sometimes it may be very expensive

1.8.5.1 Srategies to make program instruction method interesting

1. Programmer must have good knowledge of the content
2. This method must be used as a quiz after the class
3. It should be used in distance education learning
4. If it is applied in a classroom, teacher must be present in the class

1.8.6 Heuristic method

Heuristic method is based on the trial and error theory of psychological principle. One of the prerequisite for this method is logical and imaginative thinking. This method is economical and very faster. In this method, teacher gives the learner questions and asks them to find out the solution by using various techniques like library, laboratory. This teaching strategy is totally focused on.

1. To develop problem-solving attitude of the student
2. To develop scientific attitudes towards the problem
3. To develop power of self-expression of students

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1.8.6.1 Advantages of heuristic teaching method

Following are the advantages of heuristic teaching strategy

1. It helps in all round development of the learner
2. Students learn by self-expression means it develop self-confidence and self reliance in the students
3. It develop creativity and scientific attitude of the learners
4. Teacher always encouraged the students such that some new knowledge is discovered by the student

1.8.6.2 Disadvantages of heuristic method

1. This method cannot be used at primary education level
2. Students need higher intelligence to capture this method
3. Very few teachers have a sense to guard their students

1.8.6.3 Strategies to make heuristic method more interesting

1. One problem can have solution by using different method. So, it is totally teachers responsibility to guide the students and to select most relevant solutions of the problem
2. The problem given to the students must be related to the course and curriculam
3. There must be an eligibility criteria for distributing the problems to the student

In countries like India, Bangladesh, Nepal and Pakistan. The whole teaching examination method is totally examination oriented. Teachers don't have a sense to apply this teaching strategy and get the desired result

1.9 Teaching aid

A teaching aid is a tool used by teachers, facilitators, or tutors to help learners improve reading and other skills, illustrate or reinforce a skill, fact, or idea, and relieve anxiety, fear, or boredom.A teaching aid can be linguistic, visual , auditory or both. Teaching aid can be presented by using following rules:

1. Stimulation, role-play, drama, flim, documentary
2. Blackboard notes, PowerPoint presentation , web site resources.

The use of teaching aid in the learning process makes the teacher more resourceful, knowledgeable and versatile in his/her own style of teaching. Teaching aid can be used

1. To reinforce learning process
2. To strengthen the learning process
3. To highlight the important points in teaching-learning process
4. To enable students to visualise something which cannot be possible through regular teaching method

Classification of teaching aid

There are lots of teaching aids available in modern teaching Society. All the teaching aids can be categorised into two broad stream

1. Visual teaching aid
2. Interactive teaching aid

1.9.1 Visual teaching aids

Visual teaching aids are basically used to provide visual representation of subject matter to the learners in the form of pictures, graph, tables and photo clip. Visual teaching aids make teaching-learning process stimulating to the learners. These types of teaching aids are economic well and can be easily used by the teachers nowadays in modern societies needs.

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1.9.2 Interactive teaching aids

Interactive teaching aids provide the learner visual images or audio clips or both to respond to the queries. In today's computer world, interactive teaching aids becomes more useful. Use of computerized interactive teaching aids has revolutionized teaching-learning process.

Types of teaching aids with examples

Visual teaching aids	Interactive teaching aids
Blackboard	interactive whiteboard
Charts	interactive projector
Posters	computer software
Newspapers	video conferencing
Flash card	interactive web resources
Board magazines	Digital presentations
Projector	
PowerPoint presentation	
Television/video/radio	

1.10 Teaching-learning Objectives

Objectives are statement which describe the learning outcomes expected to be achieved as a result of the teaching-learning process. In other words, objective can be defined in terms of change in the learners behaviour according to the need of the society where learner is living. We will use some of the terms interchangeably used for objective of teaching-learning process are:

1. Instructional objectives
2. Learning objectives
3. Desirable outcomes
4. Terminal objectives
5. Educational objectives
6. Competencies and aims

It is the teacher's duty to plan and write objective of teaching-learning process to make the teaching more organized and directed. To make the learning objectives, teacher must take into account what the learner will achieve as a result of engaging in learning activity. The objectivity of teaching-learning process must contain a behaviour, content, condition and criteria so that teachers can drive, in detail what is learned and how well student can learn it.

1.10.1 Purpose of objective

The objective in teaching-learning process has some defined purpose. Following are the few purpose of teaching-learning objectives.

1. Organization of the subject matter
2. Selection of effective instructional objectives
3. Selection of it is the teaching-learning materials
4. Planning the effective evaluation criteria
5. Consistent with curriculum goals
6. Made the appropriate teaching learning process to the levels of the learners
7. At last the objective must be goal directed

1.11 How to write a lesson plan

A lesson plan is a detail layout of the curriculum a teacher teaches in a given duration of time. A lesson plan makes teachers life easy by organizing the entire teaching-learning process to make the objectivity of teaching-learning process successful. Lesson plan determines the vision, aim of the teaching activity to be carried out by the teacher.A lesson plan is a careful detail plan of instructions about how teacher will teach the subject. An effective lesson plan includes the following steps to be performed.

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1.11.1 preplanning

Preplanning means plan before teaching-learning process starts. Preplanning includes the following steps

1. Carefully scrutinize the subject matter to be taught by the teacher
2. Make a list of the important topics that teachers will teach
3. Make the topics in a sequence manner such that students feels comfortable in the whole teaching-learning process
4. Make a list of all the teaching aids that will be used in teaching-learning process
5. Clearly list all the resources and references that used in whole curriculam

1.11.2 Lesson opening

Before start the teaching, a teacher must have to start lesson opening process. Following rules are typically used.

1. Review all the materials that have been learned by learners
2. Introduced the lesson by connecting with the previous knowledge of the learners
3. State the objective of the topics such that students must know why they are learning the topics

1.11.3 Lesson layout

Lesson layout contains the following steps:

1. Provide details, step-by-step description of everything to be done
2. Detail description of the teaching strategies to be given to the learners such that they can come with the preparation
3. Plan different imaging approaches to meet the individual needs of learners. For example, one teaching method may be suitable for some students while others are not. So, a teacher must be aware of diverse teaching approaches.

1.11.4 Extended practice

To create a good lesson plan, it needs to follow the different steps that is called extended practice. Extended practice needs to follow the below steps

1. to strengthen the learning procedure, teacher needs to plan the different learning opportunities
2. Teacher must make sure that student can effectively grabs the lesson inside the classroom
3. It must give real-life context for wider application of the lesson learned

1.11.5 Closure of lesson

At the end of the day, teacher must have to review the following thing

1. Remove the key points of the lesson
2. Give learner pace to draw conclusions from the lesson
3. There must be some feature learning opportunities in lesson plan

1.12 Evaluation system

In any education system evaluation is a critical part. Evaluation basically means the judgement about the student by the teacher, but these judgement is really, really tough. Evaluation is an interwoven activity in the process of teaching and learning. Nowadays evaluation by using the multiple-choice questions type is better than the broad question.

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1.12.1 Principles of evaluation

Student evaluation in the teaching-learning processes must be well planned, goal oriented and continuous. One piece of paper cannot evaluate a students abilty . So it is better that evaluation must be done inside the classroom throughout the semester. Following are some rules regarding evaluation.

- The process of evaluation should be informed properly to all the student
- Evaluation must be continuous process.
- Evaluation shuld be sensitive to learners and must not be biased .
- At the end of the day evaluation must be reliable judgement to student

1.12.2 Difference between evaluation and assessment

In teaching-learning process. The terms evaluation and assessment are used interchangeably, but there is some inherent difference between these to terms.

Assessment

Assesment is a preliminary phase in the evaluation process. A student can be assessed by using the multiple sources like class test, assignment, presentations, quiz, brainstorming session.

Evaluation

Evaluation is the action in the entire process that allows teachers to make a judgement based on assessment records with reference to learning objectives. Assessment without evaluation have no purpose. Following are the different evaluation techniques.

1. Written test
2. Classroom activities
3. Assignment
4. Project tasks
5. Laboratory activities
6. Social activities

Normally, there are four types of evaluation

1. Criteria referenced evaluation:
2. Formative evaluation
3. Norm referenced evaluation
4. Summative evolution

1.12.3 Evaluation and test

Test is the most widely used technique for evaluation in the education system and other recruitment system. The questions comes in test from some predefined syllabus and students have to give the answer to those questions in a predefined timeframe. There are mainly two kinds of test

1. Teacher made test
2. Standard test

Teacher made test is totally organised by teacher and questions are also set by teacher. Whereas standard test is for very large group where questions is prepared by some central comittee.

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1.13 Solved excercises

The following questions have been designed to test the objectives identified for this chapter.

Solved Excercise

1. The most important function of a teacher is to
   - (A) facilitate learning
   - (B) manage instructional resources
   - (C) coordinate curricular activities
   - (D) provide information

2. It is popularly said that any two students are not alike. This implies that they differ in their
   - (A) physical and mental set up
   - (B) aptitude
   - (C) social status
   - (D) attitude

3. Of the following learning theories, the one that embodies the idea that the learning takes place through insight is known as
   - (A) Gestalt
   - (B) Stimulus-Response
   - (C) Connectionist
   - (D) Pragmatic

4. Which of the following is not a type of the learned motives?
   - (A) Reflexes
   - (B) Habits
   - (C) Attitude
   - (D) Interest

5. Out of the following, in which lesson, a general rule is explained first and then examples are illustrated?
   - (A) Deductive lesson
   - (B) Inductive lesson
   - (C) Cognitive lesson
   - (D) Skill lesson

6. Counseling is provided to assist an individual
   - (A) To diagnose learning deficiencies
   - (B) To understand and solve problem
   - (C) To develop insight
   - (D) To develop the personality

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7. The lowest level of Taxonomy of Educational Objectives of Cognitive Domain given by Bloom is

   (A) Knowledge

   (B) Comprehension

   (C) Application

   (D) Analysis

8. Instructional objectives are useful to

   (A) Teachers

   (B) Students

   (C) Question paper setters

   (D) All of the above

9. The objectives of a Curriculum are to be stated in terms of

   (A) Students entering behavior

   (B) Students terminal behavior

   (C) Teachers behavior

   (D) Learning process

10. Which of the following is a characteristic of a good test?

    (A) Validity

    (B) Reliability

    (C) Usability

    (D) All of the above

11. In which domain does the following objective fall? At the end of the lesson the learner should be able to hit the football using the head.

    (A) Affective domain

    (B) Cognitive domain

    (C) Psychomotor domain

    (D) A and C domains

12. During a visit to a second-grade classroom, a student teacher observed a child spending the time allotted for a worksheet either looking out the window or doodling on his paper. When the student teacher asked the child if he needed help on the assignment, he said no. When asked why he wasn't doing it, he pointed to another student and said, "She does all her work fast and when she's done, she gets more work." The boy's reaction suggests which of the following about his classroom?

    (A) A routine has been established for students who are having trouble finishing an assignment to ask the teacher for assistance.

    (B) A routine for rewarding students who finish work promptly is not in place.

    (C) Students must work alone on seatwork, without consulting other students.

    (D) Students who finish work before the whole class is finished must not interrupt the students who are still working

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13. Most important work of teacher is
    - (A) to organize teaching work
    - (B) to deliver lecture in class
    - (C) to take care of children
    - (D) to evaluate the students

14. Gifted students are
    - (A) non-assertive of their needs
    - (B) independent in their judgments
    - (C) independent of teachers
    - (D) introvert in nature

15. Assessment for learning takes into account the following except
    - (A) mistake of students
    - (B) learning styles of students
    - (C) strengths of students
    - (D) needs of students

16. Which one of the following is an example of a fine motor skill?
    - (A) climbing
    - (B) hopping
    - (C) running
    - (D) writing

17. Which would be the best theme to start with in a nursery class?
    - (A) My best friend
    - (B) My neighborhood
    - (C) My school
    - (D) My family

18. In order to install a positive environment in a primary class a teacher should
    - (A) wish each child in the morning
    - (B) narrate stories with positive endings
    - (C) allow them to make groups on their own on the basis of Sociometry during group activities.
    - (D) not discriminate and set the same goal for every child.

19. Successful inclusion requires the following except
    - (A) involvement of parents
    - (B) capacity building
    - (C) sensitization

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(D) segregation

20. The teachers and students in a school belong to a ..... system
    (A) Suprasystem
    (B) Subsystem
    (C) Interface system
    (D) Closed system

21. IQ scores are generally ..... correlated with academic performance.
    (A) least
    (B) perfectly
    (C) highly
    (D) moderately

22. An empowering school will promote which of the following qualities the most in its teachers?
    (A) tendency to experiment
    (B) memory
    (C) disciplined nature
    (D) competitive aptitude

23. A teacher should be
    (A) Honest
    (B) Diligent
    (C) Dutiful
    (D) Punctual

24. The most important objective of teaching is to
    (A) facilitate students when it comes to the construction of knowledge and understanding
    (B) cover the Syllabus timely
    (C) create a friendly environment inside the classroom or teaching-learning process
    (D) attend and takes the classes regularly and timely

25. Environmental education should be taught in schools because
    (A) it will affect environmental pollution
    (B) it is important part of life
    (C) it will provide job to teachers
    (D) we cannot escape from environment

26. The trial and error method of learning according to Thorndike could be classified as under

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(A) The principle of multiple responses

(B) The law of exercise

(C) The principle of partial activity

(D) The principle of Associative learning

27. Liberalism in education, when it was claimed by universities of the world since the 19th century, meant

(A) Freedom to be given to education from the clutches of religion

(B) Favoring liberal education as opposed to special education

(C) Academic freedom for teachers in instruction

(D) Administrative freedom to universities to run the institution

28. The term 'Evaluation' and 'Assessment' could be discriminated as follows

(A) Assessment is limited to coverage achievement whereas evaluation is qualitative in character

(B) Evaluation is concerned with the effective aspects of achievement whereas assessment judges the cognitive aspects

(C) Evaluation involves the measurement as well as diagnosis of students' attainments, whereas assessment is concerned with only scholastic attainments.

(D) Assessment is an attempt to measure the pupil as whole whereas evaluation is concerned with his achievement only

29. Planning or arranging the student's environment in order to predict the consequences of a student's behavior is referred to as

(A) Prompting

(B) Reinforcement

(C) Shaping

(D) Stimulus control

30. Naturalism in education means

(A) Introduction of physical sciences in education

(B) Giving more importance to mind than to matter

(C) Making discrimination between mind and consciousness

(D) Supporting both mind and consciousness equally

31. Navodaya Schools have been established to

(A) increase number of school in rural areas

(B) provide good education in rural areas

(C) complete 'Sarva Shiksha Abhiyan'

(D) check wastage of education in rural areas

32. For developing the language abilities of kindergartners, which of the following would be the most appropriate way to follow up the writing of a group essay?

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(A) Prepare a list of the most difficult words for the children to learn to spell.
(B) Show the children how to revise the sentences to make them longer and more complex structurally.
(C) Have the children print the essay for themselves, then practice writing it, using cursive letters.
(D) Read the essay aloud, in unison with the children, then leave it displayed where they can examine it

33. Theory of multiple intelligence implies the following except
(A) intelligence is a distinct set of processing operations used by an individual to solve problems.
(B) disciplines should be presented in a number of ways
(C) learning could be accessed through a variety of means
(D) emotional intelligence is not related to IQ

34. Smallest unit of meaning in a language is
(A) syntax
(B) morpheme
(C) pragmatics
(D) phoneme

35. A child cannot distinguish between 'saw' and 'was', nuclear' and 'unclear'. She/he is suffering from
(A) dyslexia
(B) word jumbling disorder
(C) dyslexemia
(D) dysmorphemia

36. Adolescents may experience
(A) feeling of self-actualization
(B) feeling of satiation about life
(C) anxiety and concern about themselves
(D) feeling of fear about sins committed in childhood.

37. Which theory of learning has found knowledge of internal processes crucial to the understanding of learning?
(A) Cognitive theorists
(B) Stimulus response theorists
(C) Operant conditioning theorists
(D) Classical conditioning theorists

38. A teacher can make problem-solving fun for students by doing all the following except
(A) providing open ended material
(B) giving time for free play
(C) providing endless opportunities for creative thinking
(D) expecting perfection from the students while they are trying to do things by themselves.

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39. It is said that a teacher in the classroom is a
    (A) Speaker
    (B) Leader
    (C) Friend
    (D) Thinker

40. Some students are backward in studies. What will be your attitude towards them?
    (A) Harsh
    (B) Sympathetic
    (C) Liberal
    (D) Lovable

41. For harmonious development of the personality of the child, parent should
    (A) overprotect the child.
    (B) regularly compare the child with other children.
    (C) provide conducive environment at home.
    (D) engage qualified teachers.

42. Which of the following characteristics is most essential to make you a good teacher?
    (A) Sympathy for students.
    (B) Proficiency of language.
    (C) Thoroughness of knowledge.
    (D) Effective communication.

43. You have been selected in all the four professions given below. Where would you like to go ?
    (A) Teacher
    (B) Police
    (C) Army
    (D) Bank

44. learners can learn more effectively by
    (A) listening the lecture
    (B) noting the detailed written notes from the lecture
    (C) actively participating in the lecture in interactive way
    (D) all of the above

45. Vygotsky theory implies
    (A) child will learn best in the company of children having IQ lesser than his/her own.
    (B) collaborative problem solving
    (C) individual assignments to each student

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(D) after initial explanation, do not support a child in solving difficult questions

46. Which of the following plays a broad role for guiding the selection of teaching method?
    (A) The focus of learning
    (B) the strength of the entire class
    (C) content of teaching
    (D) all of the above

47. Which combination of teaching methods listed below would encourage the learner-centered paradigm?
    (A) Individualized instruction and lecture method
    (B) Simulation and demonstration
    (C) Lecture method and experimentation
    (D) Projects and Direct experiences

48. At primary level, it is better to teach in mother language because
    (A) it develops self-confidence in children
    (B) it makes learning easy
    (C) it is helpful in intellectual development
    (D) it helps children in learning in natural atmosphere

49. Women are better teacher at primary level because
    (A) they behave more patiently with children
    (B) they are ready to work with low salary
    (C) higher qualification is not needed in this profession
    (D) they have less chances in other profession

50. inside the classroom, before explaining the importance of topic, it is too important to
    (A) maintain strict discipline in the class
    (B) get the attention of the students
    (C) ask the students few questions from the last lecture
    (D) all of the above

51. If we believe in the dualistic theory of the mind versus body nature of man, have to arrive at the consequence that
    (A) Education is mechanization in process and theoretical in development
    (B) Learning is purely a matter of material changes in the behavior of man
    (C) Learning an education should cater to observable behavior of man
    (D) Education is purely a matter of mental training and development of the self.

52. Swami Vivekananda was famous for speaking on

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(A) Vedas

(B) Medicians

(C) Gita

(D) Vedanta

53. Article 45 under the Directive Principles of State policy in the Indian Constitution, provides for

(A) Rights of minorities to establish educational institutions

(B) Free and compulsory primary education

(C) Education for weaker sections of the country

(D) Giving financial assistance to less advanced states

54. Vivekananda was a

(A) Religious guru

(B) Poet

(C) Philosopher

(D) All of the above

55. you are planning to teach human anatomy in a medical college. Which one of the following is the most suitable teaching aid?

(A) Put up a chart on human anatomy

(B) show the students model of the human body

(C) Read from the text and simultaneously explaining the topic

(D) show the presentation and videos depicting location and functions of parts of the human body

56. Which of the following teacher behavior suggests a dimension of "unsuccessful teacher behavior? A teacher who is

(A) Stimulating and imaginative

(B) Business like and friendly

(C) Aloof and routine

(D) Understanding and sympathetic

57. What is most important while writing on blackboard ?

(A) Good writing

(B) Clarity in writing

(C) Writing in big letters

(D) Writing in small letters

58. The industrial revolution that started in the West to begin with had the following effect on education

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(A) Shifting the emphasis from the lower class culture to the middle class culture
(B) Shifting the centre of gravity from the middle to the lower class culture
(C) Introduction of mass educational programmes
(D) Introduction of vocationalisation of education

59. Any deterrents are negative in character
(A) When they prevent children from doing wrong
(B) When they prevent doing wrong but do not reform children
(C) When they are administered owing to some misunderstanding
(D) When they are administered with a negative motive

60. Which of the following kinds of instruction is frequently cited as the opposite of discovery learning?
(A) Simulation games
(B) Expository teaching
(C) Mastery learning
(D) Schema training

61. Industries near the towns cause
(A) Pollution
(B) Finished material
(C) Security
(D) Employment

62. 'Gang age' period refers to
(A) Infancy
(B) Preadolescent
(C) Teen age
(D) Adult

63. If you find a child in your class who always isolates from the rest of the class, you would ...
(A) ask the child to be normal by taking example of his classmates
(B) try to understand the underlying clause
(C) leave the child alone so that the child comes out of his own
(D) inform the management that his presence may effect other students of the class.

64. All of the following can be signs that a child is gifted, except
(A) Interest in encyclopedia and dictionaries
(B) Uneasy relationships with peers.
(C) Early development of a sense of time
(D) Easy retention of facts

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65. With the frequent use of brain storming method the teacher develops

(A) Creativity

(B) Intelligence

(C) Perception

(D) Memory

66. In which stage is the Physical growth is rapid

(A) Early childhood

(B) Infancy

(C) Adolescence

(D) School age

67. The two factor theory of intelligence was proposed by

(A) Spearman

(B) Wechsler

(C) Piaget

(D) Binet

68. When a teacher ensures that students complete an exercise in mathematics and makes sure instructions are clear and specific. The teacher ensures the ..... aspect of assessment

(A) Validity

(B) Practicality

(C) Reliability

(D) Wash-back effect

69. Who said this, "Child should be treated as child."

(A) Rousseau

(B) Wechsler

(C) Binet

(D) Gagne

70. It is absurd to say that there can be

(A) A pollution due to noise

(B) Education causes pollution

(C) Transport vehicles cause pollution

(D) All of the above

71. Which of the following will not hamper effective communication in the class?

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(A) An ambiguous statement
(B) A lengthy statement
(C) A precise statement
(D) A statement which allows the listener to draw his own conclusions

72. which of the following is most suitable method of teaching if focus of learning is to increase the skills
(A) demonstration
(B) discussion
(C) learning by self-study
(D) all of the above

73. Some students send a greeting card to you on teacher's day. What will you do ? You will
(A) do nothing
(B) say thanks to them
(C) ask them to not to waste money
(D) reciprocate the good wishes to them

74. A student comes late in your class. Then you will
(A) inform to parents
(B) punish him
(C) try to know the reason
(D) not pay attention there

75. the lecture method in a classroom is an effective way to
(A) introduce new concept
(B) introduce new skills
(C) if the mind the understanding of learners
(D) stimulate participation of learners

76. Which one is accountable in cooperative learning
(A) Individual
(B) Group
(C) Both A & B
(D) None of the above

77. What type of test is most effective when trying to test memorization?
(A) True / false
(B) Multiple choices
(C) Fill in blanks
(D) B and C

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78. Cooperative learning is an alternative to
    - (A) competitive models
    - (B) Teaching models
    - (C) lesson plans
    - (D) Micro teaching

79. The number of students in cooperative learning groups are
    - (A) 3-4
    - (B) 5-6
    - (C) 8-10
    - (D) 10-15

80. The essential characteristic of cooperative learning is
    - (A) Effective learning
    - (B) Positive interdependence
    - (C) Cooperation
    - (D) Division of labor

81. The students like to spend the most of the time with
    - (A) Teachers
    - (B) parents
    - (C) Relatives
    - (D) Peers

82. Peer culture constitutes
    - (A) Socialization
    - (B) Individualization
    - (C) Both A & B
    - (D) None of the above

83. Which is not the advantage of team teaching
    - (A) Better utilization of resources
    - (B) Better planning
    - (C) Better use of teaching techniques
    - (D) Better financial benefits of teachers

84. The hypothesis underlying team teaching is
    - (A) Teachers feel bore while working alone
    - (B) Teachers are not competent
    - (C) The best teachers in schools are shared by more students

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(D) The single teacher cannot control the class

85. Classroom management research findings suggest that one of the most effective ways to maximize the amount of time elementary school children spend on academic activities is for the teacher to do which of the following?

(A) Plan for, teach, and enforce routines for transition times and classroom housekeeping tasks.

(B) Assign homework three times a week in the major subjects.

(C) Assign individual reading on new topics before discussing the topic in class.

(D) Introduce new material in a lecture followed immediately by a questioning session on the material.

86. When the students become failed, it can be understood that

(A) The system has failed

(B) The teachers failure

(C) The text-books failure

(D) The individual student's failure

87. A teacher uses a text and some pictures of fruits and vegetables and holds a discussion with her students. The students link the details with their previous knowledge and learn the concept of nutrition. This approach is based on

(A) Classical conditioning of learning

(B) Theory of reinforcement

(C) Operant conditioning of learning

(D) Construction of knowledge

88. When a student takes the same test twice it is referred to as?

(A) Post-test

(B) Pre-test

(C) Test-retest

(D) After-test

89. A child starts to cry when his grandmother takes him from his mother's lap. The child cries due to

(A) Social anxiety

(B) Emotional anxiety

(C) Stranger anxiety

(D) Separation anxiety

90. The process whereby the genetic factors limit an individual's responsiveness to the environment is known as

(A) Discontinuity

(B) Differentiation

(C) Range of reaction

(D) Canalization

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91. The term 'Mnemonics' is associated with

(A) Memory

(B) Amnesia

(C) cognitive behavior

(D) Anaemia

92. Frobels most important contribution to education was his development of the

(A) Public high school

(B) Latin School

(C) Vocational school

(D) Kindergarten

93. the learner always appreciate

(A) a concise and stimulating lecture

(B) A well researched and informative lecture

(C) a well organised and presentable lecture

(D) all of the above

94. It is advantage of giving home work that students

(A) remain busy at home

(B) study at home

(C) may be checked for their progress

(D) may develop habit of self study

95. Appetite and satiety centers of brain an present in

(A) Hypothalamus

(B) Cerebral hemisphere

(C) Cerebellum

(D) Medulla oblongata

96. The Indian Education Commission (1964-66) has recommended compulsory social service for school children as follows

(A) 20 days for the lower secondary stage and 20 days for the higher secondary stage

(B) 10 days for the primary stage and 30 days the secondary stage

(C) 30 days for the lower secondary and 20 days for the higher secondary stage

(D) 10 days for the lower secondary stage and 20 days for the higher secondary stage

97. All teachers should have a good ..... when they go into the classroom

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(A) Plan
(B) Choice
(C) Attitude
(D) Class

98. When you put a question in the class to check the knowledge of students, the best method would be to
(A) Put more than one question at a time to stimulate students
(B) Frame the question as lengthy as you can
(C) To point to intelligent students first and then put the question
(D) To pose the question to the whole class and then select somebody to answer

99. Research is
(A) Data gathering
(B) Moving from a broad area to a narrow and focused area
(C) A systematic process of finding the truth
(D) Data gathering, processing and analysis

100. The theory of learning associated with connectionism was propounded by
(A) Socrates
(B) Pavlov
(C) Thorndike
(D) Kilpatrick

101. Evaluation in education insists on the following
(A) Making tests more reliable and valid
(B) Conducting periodical tests to detect students' weaknesses
(C) Insisting on clear cut behavioral objectives of teaching
(D) Examining students objectively for selection purpose

102. The main purpose of the first degree in our universities should be to
(A) Bring students to frontiers of knowledge and from there should be research
(B) Equip students with necessary competencies for different work experiences
(C) Prepare students for social service and bring them to the threshold of knowledge
(D) Bring to the frontiers of research with necessary equipment of knowledge

103. The idea of starting girls' University in our country started in the year 1970.
(A) As an initiative of the British rulers.
(B) Through the efforts of municipalities and local fund communities
(C) With the opening of the SNDT university at Bombay
(D) With the political awakening in the country by the push given by Mahatma Gandhi

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104. In the introduction part of a lesson plan you get the student .....

(A) Assignments

(B) Previous knowledge

(C) Attention

(D) Abilities

105. A good communicator needs to be good at

(A) Speaking

(B) Listening

(C) The use of language

(D) The use of humor in speech

106. Which controls reflex action?

(A) Sympathetic nervous system

(B) Central nervous system

(C) Parasympathetic nervous system

(D) Sensory nerves

107. The National Educational Policy of 1979, recommended also about the public schools

(A) their uniquencies and traditions have to preserved the interests of the best talents of the country

(B) they should be brought under laws and regulations of the government public education system

(C) they must be allowed the autonomy that was bestowed on them by the past system of education

(D) suitable ratio has to be maintained for admission of middle class and poor student also.

108. Rama Krishna Mission was founded by

(A) Swami Dayanand

(B) Swami Vivekananda

(C) Raja Ram Mohan Roy

(D) Guru Nanak Dev

109. Annie Besant inspired the opening of schools in many cities in

(A) End of nineteenth century

(B) Early nineteenth century

(C) Early twentieth century

(D) End twentieth century

110. Critical pedagogy firmly believes that

(A) the learners need not reason independently

(B) what children learn out of school is irrelevant

(C) the experiences and perceptions of learners are important

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(D) the teacher should always lead the classroom instruction

111. Considering that all behavior occurs in context, what is the possible source of behavior of a child who refuses to interact with the teacher and peers all the time?

(A) Materials being learnt are too simple or too challenging

(B) The child has a fight with the parents

(C) The child has been rejected or ridiculed by parents and adults

(D) The child does not understand

112. A teacher, after preparing a question paper, checks whether the questions test specific testing objectives. He is concerned primarily about the question paper's

(A) content coverage

(B) typology of questions

(C) reliability

(D) validity

113. School based assessment is primarily based on the principle that

(A) teachers know their learners' capabilities better than external examiners

(B) students should at all costs get high grades

(C) schools are more efficient than external bodies of examination

(D) assessment should be very economical

114. Learners display individual differences. So a teacher should

(A) provide a variety of learning experiences

(B) enforce strict discipline

(C) increase number of tests

(D) insist on uniform pace of learning

115. Which of the following is a principle of development?

(A) It does not proceed at the same pace for all

(B) Development is always linear

(C) It is a discontinuous process

(D) All processes of development are not inter-connected

116. Human development is divided into domains such as

(A) physical, cognitive, emotional and social

(B) emotional, cognitive, spiritual and social- psychological

(C) psychological, cognitive, emotional and physical

(D) physical, spiritual, cognitive and social

117. In ancient India religions and moral aims were dominated by

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(A) Brahmnic system of education
(B) Kshatriya system of education
(C) Both A & B
(D) None of the above

118. What does the cognitive domain of Bloom's taxonomy of educational objectives affect in learners?
(A) Thoughts
(B) Emotions
(C) Skills
(D) All the above

119. The concept of totalitarian education in the West was in favor of
(A) Treating education as a binding factor of international understanding
(B) The education of the individual for development of his total personality
(C) Making the education of the individual as an instrument for realizing the ends of the state
(D) Making the state responsible to evolve education as a means of satisfying individual's needs and interests.

120. Regarding co-education at the secondary stage, the 1952-53 Education Commission has suggested that
(A) To start, resource, in several states could not afford
(B) There should be objection to extend co-educational school
(C) To maintain separate schools for boys and girls
(D) The situation in our country warrants establishment of more boys schools than co-educational school.

121. Who formed Brahmo Samaj
(A) Guru Nanak
(B) Kabir
(C) Ramanand
(D) Raja Ram Mohan Roy

122. A teacher has serious defect is he/she
(A) is physically handicapped
(B) belongs to low socio-economic status
(C) has weak personality
(D) has immature mental development

123. If a student is constantly rubbing his eyes and is inattentive during blackboard work he is having
(A) Adjustment problem
(B) Hearing problem
(C) Visual problem
(D) All of the above

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124. Play therapy is adopted in the study of children in order to

(A) Make the educational process joyful

(B) To understand the inner motives and complexes of children

(C) Make education more activity centered

(D) Highlight the importance of play activities in education

125. What is the disadvantage of the project method of teaching?

(A) It is learner-centered

(B) Learners get firsthand knowledge

(C) The learners are not well supervised

(D) The learner's interest is considered

126. The most powerful barrier of communication in the classroom is

(A) Noise in the classroom

(B) Confusion on the part of the teacher

(C) Lack of teaching aids

(D) More outside disturbance in the class room

127. Nonformal Education is

(A) Provided by family, community, religion etc.

(B) Having no fixed curriculum

(C) Not motivated for acquiring knowledge

(D) Arranged by some organised body

128. Qualities essential to success in teaching are

(A) Adaptability, patience and alertness

(B) Dependence and indecisiveness

(C) Authoritarian attitude

(D) Materialistic bent of mind

129. School is an institution which has the function of

(A) Stratification on religious basis

(B) Stratification on economic class basis

(C) Social distance

(D) Socialization

130. The human interaction within a school may be described as a

(A) Social Position

(B) Social Hierarchy

(C) Social System

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(D) Social Mobility

131. It is said that there is an urgent need of anticulation among schools and colleges, this problem of articulation is concerned with

(A) Provision of better administrative facilities

(B) Appointment of talented teachers

(C) Communication and closer relationship among teachers

(D) Better facilities for in-service training of teachers

132. The most important challenge before a teacher is

(A) To maintain discipline in the classroom

(B) To make students do their home work

(C) To prepare question paper

(D) To make teaching-learning process enjoyable

133. The idea that Basic Education is education through crafts

(A) True as far as the rural areas are concerned

(B) The whole truth of the schemes

(C) The complete truth even for urban areas

(D) True to some extent only because the concept is deeper

134. The term prejudice in a person is colored by

(A) A hasty judgment about a situation with an unfavorable

(B) Judgment and assessment of a situation without any favoritism

(C) Partial observation and acquaintance of a situation without any motives

(D) Pre-judgment of a situation with a view to settle a conflict in haste

135. The teachers should make constant efforts to situate the new information in the context of

(A) real-life experiences

(B) evaluation system

(C) previously learned information

(D) all of the above

136. Which of the following is not a characteristic of a slow learner?

(A) Limited vocabulary

(B) Short span of attention

(C) Abstract thinking

(D) Limited range of interests

137. The mean score on any class test is the result of

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(A) dividing the sum of all scores by the number of scores

(B) determining the middle score when all the scores have been listed from the highest to the lowest

(C) determining the most frequent score.

(D) Adding all the scores and dividing by the most frequent score

138. The success of teacher is

(A) high achievement of students

(B) good traits of his/her personality

(C) his/her good teaching

(D) his/her good character

139. Inclusive Education

(A) celebrates diversity in the classroom

(B) encourages strict admission procedures

(C) includes indoctrination of facts

(D) includes teachers from marginalized groups

140. Which of the following is an objective question ?

(A) Short answer question

(B) Open ended question

(C) True or False

(D) Essay type question

141. Which of the following is a feature of progressive education ?

(A) Instruction based solely on prescribed textbooks

(B) Emphasis on scoring good marks in examinations

(C) Frequent tests and examinations

(D) Flexible timetable and seating arrangement

142. A teacher used the following statement to change the behavior of a student who was a smoker. “Smoking is healthy for the nation”. This is an example of

(A) Cognitive dissonance

(B) Conceptual conflict

(C) Meaningful learning

(D) Challenge

143. A child has been admitted to your school who belongs to a back ward family/background from the cultural viewpoint. You will

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(A) Keep him in a class in which, there are many more students of backward background from the cultural viewpoint

(B) Send a teacher to know more about the backward cultural background of the child

(C) Keep him in a normal class but will make special arrangements for teaching him, keeping his special needs in view

(D) Advise him to take up vocational education

144. A Deepawali fair is being organized in your school. What would you like to do ?

(A) only to visit the fair

(B) to take part in function

(C) to take a shop to sell something

(D) to distribute free water to visitors

145. The least justifiable use of the results of a standardized reading test is to

(A) identify areas of pupil deficiency

(B) evaluate the reading instruction programme.

(C) Serve as a basis for report card marks

(D) Serve as the basis for a parent conference

146. A good teachers priority in his school shall be his

(A) Principal

(B) Secretary of the Managing Committee

(C) Colleagues

(D) Students

147. School is a social agency which

(A) Contributes to the raising of the society to a higher standard

(B) Conserves and transmits people

(C) Has certain biological endowments

(D) Isolates the good from bad

148. The academic aspects of education at school level are governed by

(A) U.G.C.

(B) N.C.E.R.T.

(C) N.E.P.A.

(D) N.C.T.E.

149. Tagore was a

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(A) Philosopher

(B) Poet

(C) Musician

(D) Both A & B

150. The topic method in education should be interpreted

(A) a method of development of the syllabus in a subject

(B) a concentric approach of teaching the classroom

(C) a substitute for the project method of teaching

(D) a method suited better for arts subjects as compared to science subjects.

Probable answer key.

If you get any wrong answer please mail me at narayan.changder@gmail.com. I am still working on answer key. Dont only criticise, rather report right answer at above email or you can message me in facebook

Answers

1. A	2. A	3. A	4. A	5. A	6. B	7. A	8. D	9. B	10. D	11. C	12. B	13. A	14. B	15. A	16. D
17. D	18. D	19. D	20. B	21. C	22. D	23. C	24. A	25. B	26. B	27. C	28. C	29. D	30. A		
31. B	32. D	33. D	34. B	35. B	36. A	37. A	38. D	39. B	40. B	41. C	42. A	43. A	44. C		
45. B	46. D	47. D	48. D	49. A	50. B	51. D	52. D	53. B	54. C	55. D	56. C	57. A	58. D		
59. B	60. B	61. A	62. B	63. B	64. B	65. A	66. B	67. A	68. A	69. A	70. B	71. C	72. A		
73. B	74. C	75. A	76. C	77. D	78. A	79. A	80. B	81. D	82. A	83. D	84. C	85. A	86. D		
87. D	88. C	89. D	90. C	91. A	92. D	93. D	94. D	95. C	96. C	97. A	98. D	99. D	100. C		
101. C	102. A	103. C	104. C	105. C	106. C	107. D	108. B	109. A	110. C	111. C	112. D				
113. A	114. A	115. A	116. C	117. C	118. A	119. C	120. A	121. D	122. D	123. C	124. B				
125. C	126. B	127. B	128. A	129. D	130. C	131. C	132. D	133. D	134. A	135. C	136. C				
137. A	138. C	139. A	140. C	141. C	142. A	143. C	144. B	145. C	146. D	147. A	148. B				
149. D	150. C														

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Chapter 2

Research methodology

Research basically means an art of scientific investigation. The definition of research varies according to different researchers. One such definition of research, according to Redman and Mory is *" research is a systematized effort to gain new knowledge"* This basically means Research is a walking from known thing towards unknown thing. It is basically a systematized process of discovery.

According to John W. Best *"research is considered to be the more formal, systematic intensive process of carrying on the scientific method of analyses. It involves a more systematic structure of investigation, usually resulting in some sort of formal record of procedure and a report of results or conclusions"*. The meaning of research is totally confined inside the word RESEARCH. If we analyze letter by letter, we will get

R : Rational way of thinking

E : Expert and exhaustive

S : Search for solution

E : Exactness

A : Analytical analyses of adequate data

R : Relationships of facts

C : Careful recording, critical observation and constructive attitude

H : Honesty

Definition of research

Here are some different definition of research given briefly

1. Research is an attitude of new discovery
2. Research is an attempt to redefine the facts.

3. Research is a scientific method
4. Research is friendly, welcoming attitude towards a change
5. Research is investigating something from known to unknown
6. Research means establishing new facts from known facts

2.1 Meaning and characteristics of research

Research characteristics Research is defined as the scientific investigation of phenomena which includes collection, presentation, analysis and interpretation of facts. In the book entitled " *research in education*" John W. Best and James says *"research is a more systematic activity that is directed towards discovery and the development of an organized body of knowledge. Research may be defined as the systematic objective analysis and the recording of control observation that may lead to the development of generalizations, principles, or theories, resulting in prediction and possibly ultimate control of events*"

The characteristics of research according to John W. Best and James V. Kahn are

1. Research is directed toward the solution of a problem.
2. Research emphasizes the development of generalizations, principles, or theories that will be helpful in predicting future occurrences. Research usually goes beyond the specific objects, groups, or situations investigated and infer characteristics of a target population from the sample observed. Research is more than information retrieval, the simple gathering of information.
3. Research is based upon observable experience or empirical evidence. Certain interesting questions do not lend themselves to research procedures because they cannot be observed.
4. Research demands accurate observation and description. Researchers may choose to use quantitative measuring devices when possible. When this is not possible or appropriate to answer the researchers question, they may choose from a variety of qualitative, or non quantitative, descriptions of their observations. Good research utilizes valid and reliable data gathering procedures.
5. Research involves gathering new data from primary or first-hand sources or using existing data for a new purpose. The students are expected to read a number of encyclopedias, books, or periodical references and to synthesize the information in a written report. Merely reorganizing or restating what is already known and has already been written, valuable as it may be as a learning experience, is not research. lt adds nothing to what is known.
6. Although research activity may at times be somewhat random and unsystematic, it is more often characterized by carefully designed procedures that apply rigorous analysis.
7. Research requires expertise. The researcher knows what is already known about the problem and how others have investigated it. He or she has searched the related literature carefully and is also thoroughly grounded in the terminology, concepts, and technical skills necessary to understand and analyze the data gathered.
8. Research strives to be objective and logical, applying every possible test to validate the procedures employed, the data collected, and the conclusions reached. The researcher attempts to eliminate personal bias. There is no attempt to persuade or to prove an emotionally held conviction. The emphasis is on testing rather than on proving the hypothesis.
9. Research involves the quest for answers to unsolved problems. However, previous important studies are deliberately repeated, using identical or similar procedures, with different subjects, different settings, and at a different time. This process is replication, a fusion of the words repetition and duplication. Replication is always desirable to confirm or to raise questions about the conclusions of a previous study.
10. Research is characterized by patient and unhurried activity. It is rarely spectacular, and researchers must expect disappointment and discouragement as they pursue the answers to difficult questions.
11. Research is carefully recorded and reported. Each important term is defined, limiting factors are recognized, procedures are described in detail, references are carefully documented, results are objectively recorded, and conclusions are presented with scholarly Caution and restraint. The written report and accompanying data are made available to the scrutiny of associates or other scholars. Any competent scholar will have

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the information necessary to analyze, evaluate, and even replicate the study. Research sometimes requires courage. The history of science reveals that many important discoveries were made in spite of the opposition of political and religious authorities. The Polish scientist Copernicus (1473- 1543) was condemned by church authorities when he announced his conclusion concerning the nature of the solar system-. His theory, in direct conflict with the older Ptolemaic theory, held that the sun, not the earth, was the center of the solar system. Copernicus angered supporters of prevailing religious dogma, who viewed his theory as a denial of the story of creation as described in the book of Genesis. Modern researchers in such fields as genetics, sexual behavior, and even business practices have aroused violent criticism from those whose personal convictions, experiences, or observations were in conflict with some of the research conclusions

The chief characteristics of educational research as described by Lulla, Murty and Taneja in their book *"Essentials of Educational Research"* are presented below:

1. Educational research is highly purposeful, dealing with the problems of immediate and remote concern to the teachers and educationists.
2. Educational research follows a systematic process of investigation as precisely, objectively and scientifically as possible;
3. Educational research involves determination of the problem to be studied, formulation of hypotheses, gathering of information and necessary data from the concerned sources and using different tools of investigation;
4. Educational research employs scientific methods, objective procedures, logical arguments and inductive reasoning;
5. Educational research attempts to organize the data in quantitative or qualitative terms to arrive at statistical inference;
6. Educational research emphasizes the discovery of new facts or interpretation of known facts in a new perspective;
7. Educational research has some underlying philosophic theory;
8. Educational research depends on the ability, ingenuity and experience of the research for its conclusions and interpretations;
9. Educational research demands interdisciplinary approach to solve many of its problem;
10. Educational research demands subjective interpretation and deductive reasoning in some cases; and,
11. Educational research uses class-rooms, schools and departments of education as the laboratories for conducting experiments studies and surveys.

Characteristics of Research

Following are few important characteristic of any research

- **Empirical:** Research is based on direct experience or observation by the researcher.
- **Logical:** Research must be based on valid procedures and principles.
- **Cyclical:** Research is a cyclical process because it starts with a problem and ends with a problem. The result of research can be negative, positive or even nil.
- **Analytical:** Research utilizes proven analytical procedures in gathering the data, whether historical, descriptive, and experimental and case study.
- **Critical:** Research exhibits careful and precise judgment.
- **Methodical:** Research is conducted in a methodical manner without bias using systematic method and procedures.
- **Reliability:** The research design and procedures are replicated or repeated to enable the researcher to arrive at valid and conclusive results.

2.2 Qualities of a Good Researcher

To be a good researcher, one must have the following qualities.

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1. Research-oriented
2. Efficient
3. Scientific
4. Effective
5. Active
6. Resourceful
7. Creative
8. Honest
9. Economical

2.3 Characteristics of the Researcher

To be a good researcher, one must have more or less the following characteristic.

1. **Intellectual Curiosity:** The researcher must take care of deep thinking and enquiry about the things and situation around the world
2. **Prudence:** The researcher is careful to conduct his research study at the right time and at the right place wisely, efficiently, and economically.
3. **Healthy Criticism:** The researcher is always doubtful as to the truthfulness of the results.
4. **Intellectual Honesty:** An intelligent researcher is honest to collect or gather data or facts in order to arrive at honest results.
5. **Intellectual Creativity:** A productive and resourceful investigator always creates new researches.

2.4 Classification of research

We can classify category of research in the following major groups. John W. Best and James V. Kahn have mentioned three different types of purposes of research. These are:

1. Fundamental research
2. Applied research
3. Action research

Educational research is further classified following four categories

1. Historical research
2. Quantitative descriptive research
3. Qualitative descriptive research
4. Experimental research

John W. Best and James V. Kahn say "Any attempt to classify types of educational research poses a difficult problem".

1. **Fundamental or basic research:** Fundamental research is also known as basis research. If the goal of the research is to find out the basic truth or principles, it is called as fundamental or basic research. This type of research is carried out in a laboratory or other sterile environment, sometimes with animals also. Examples of fundamental research is

   (a) Boyle's Law
   (b) Charle's Law
   (c) Archimede's Principle
   (d) Hooke's Law
   (e) Newton's Law

2. **Applied research:** most of the characteristics of fundamental research is found in applied research. This type of research involves finding new applications of scientific knowledge to the solution of a problem such as development of the new system, new device or new methods or tools in order to solve the problem. Mind it, most of the educational research falls under the category of applied research.
3. **Action research:** action research is used to solve an immediate application, not on the development of theory or general application. If the researcher finds any problem at time of his fields, investigation and observation, the researcher applies action research at that time
4. **Educational research:** According to John W. Best and James V. Kahn *"it should be noted that the system of classification is not important in itself but only has value in making the analysis of research processes more comprehensible"*. Educational research is directed towards the development of science of behavior in education situations .Practically, all studies fall under one, or a combination, of the following types.

   (a) **Historical research:** Historical research talks about the past. In this type of research we need investigation, recording, analyzing and interpreting the events of the past for the purpose of discovering generalization.

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(b) **Quantitative descriptive research:** This method is used to describe what is being described, recording, analyzing, and interpreting conditions that make this around ours. It is used to discover the relationship between non-manipulated existing variables.

(c) **Qualitative descriptive research:** This type of research use non-quantitative methods. This method of research is used to discover non-quantified relationship between existing variable.

(d) **Experimental research:** It describes "what will happen" in the future if certain variables are carefully controlled and manipulated. Main focus of this kind of research is to find out the relationship between variables

2.5 Steps of research

To do a research one have to keep in mind the research goal and its purposes. The technique of research needs different tools and instrument for gathering the data. Following are the steps to do research

1. Select the topic of candidate interest.
2. Exhaustive literature study
3. Formulation of the problem
4. Definition of the problem
5. Create own method/ Algorithm
6. Selection of the sample data
7. Data Collection, Data Processing, and Analysis
8. Correctly interpretation of the data
9. Testing the Hypotheses; Answering the Research Questions
10. Throwing of inferences or conclusions
11. Reporting of the research done that means the research report

2.6 What research can do in human life?

Research is an important part of today's modern human society. Without research, we cannot live our life with luxury. Following are the important points, which research can play in our daily life

1. Improvement of the quality of life is depends on the research
2. Any dream of students is achieved by research
3. Research improves the teachers Competency
4. Research reduces the man work power
5. Research satisfies needs of human being
6. Research improves the country's economy

2.7 The variable

Variable is defined as a quantity which is fluctuated its value under different conditions. In this section we will discuss different types of variable

1. **Independent and dependent variable:** Independent variable is chosen by the researcher to predict the relationship with observed phenomena. In an experiment, the independent variable is the variable that is varied or manipulated by the researcher, and the dependent variable is the response that is measured. An independent variable is the presumed cause, whereas the dependent variable is the presumed effect.
2. **Moderator variable:** this is a secondary or special type of independent variable chosen by the researcher to determine if it changes or modifies the relationship between the independent and dependent variables.

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3. **Control variable:** This is the variable that is controlled by the investigator in which the effects can be neutralized by eliminating or removing the variable.
4. **Intervening variable:** This is a variable which interferes with the independent and dependent variables, but its effects can either strengthen or weaken the independent and dependent variables.

2.8 Standard of good research

Research activity is set to be standard or good if it satisfies some criteria as shown below

1. The skeleton of the research process must be carefully planned to get the output of the research.
2. A researcher should be frank to discuss things among colleagues.
3. The concepts used in research should be common
4. the purpose of the research must be clearly designed
5. For further advancement of research, one must give details about their research.
6. Careful attention must be needed to check the method of analysis
7. The analysis of data would be sufficiently adequate to reveal its significance in the research.

2.9 How to find the research problem

To find a good research problem, we must have to consider five factors to check whether the problem is researchable or not. The five factors are as follows.

1. All the existing problem in country or in the world, which don't have any known solution
2. Whether the solution can be obtained by using the statistical tools and techniques
3. There are lots of solutions available, but they are not yet tested physically
4. To conclude a solution, problem need scientific investigation.
5. Emergency needs or problems of the mankind where it demands research

2.10 Characteristics of any research problem

Not all the problem arises in universe a research problem. A research problem must have some characteristics. Following are the characteristics of a research problem. If any problem posses all these properties, then it is said to be a research problem.

1. **Specific:** The problem must be specifically tested
2. **Measurable:** The problem is easy to measure by using some research tool or equipment
3. **Achievable:** The data needs to do the research must be achievable using correct tools to get the final result
4. **Realistic:** The final result must be realistic and must reflect in the real world
5. **Time bound:** In all the activities of the research, there must be time bound because if the time span to complete an activity is smaller then it is obviously better

2.11 Sources of research problem

Though it is true that there are lots of research problem available in our world, but sometimes students failed to find a good research problem. Finding out the research problem is a big task for a researcher specifically, student. Following are important points, which must kept in mind to find out a research problem.

1. Specialization of the researcher(one have to take care about the specialization of the student)
2. what are the current scenarios in research and what have been done in past on that topic
3. One can take recommendation from previous theses or research reports.
4. Look after all the problems in the locality or in nation.

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2.12 Criteria of a good research problem

Some research problem is said to be good, some are moderate and others not at all fits in current scenario. The research problem is said to be good if it has the following properties.

1. **Interesting:** research problem must be interested such that it attracts the students
2. **Innovative:** problem must be innovative, so that students can apply innovative idea in that problem to get the result.
3. **Cost-effective:** a good research problem must be economical
4. **Releavency:** Research problem must be relevant to the needs of people
5. Research problem must be relevant to the government, nation, and mankind.
6. **Timeliness:** An unbounded research problem is not feasible. There must be time bound in a good research problem.

2.13 Hypothesis

A proposition that can be verified to determine its reality is a hypothesis. A hypothesis may be defined as a logically conjectured relationship between two or more variables, expressed in the form of a testable statement. Relationship is proposed by using a strong logical argumentation. This logical relationship may be part of theoretical framework of the study. For example,

- Officers in my organization have higher than average level of commitment (variable).
- Level of job commitment of the officers is associated with their level of efficiency.
- Level of job commitment of the officers is positively associated with their level of efficiency.
- The higher the level of job commitment of the officers the lower their level of absenteeism.

There are different types of hypothesis which are as follows

1. Descriptive Hypothesis
2. Relational Hypothesis
3. Correlational hypotheses
4. Explanatory (causal) hypotheses
5. Null Hypothesis
6. Alternative Hypothesis
7. Research Hypothesis

Descriptive Hypothesis Descriptive hypothesis contains only one variable thereby it is also called as univariate hypothesis. Descriptive hypotheses typically state the existence, size, form, or distribution of some variable.

Relational Hypothesis These are the propositions that describe a relationship between two variables. The relationship could be non-directional or directional, positive or negative, causal or simply correlational. While stating the relationship between the two variables, if the terms of positive, negative, more than, or less than are used then such hypotheses are directional because the direction of the relationship between the variables (positive/negative) has been indicated. These hypotheses are relational as well as directional. The directional hypothesis is the one in which the direction of the relationship has been specified.

Non-directional hypothesis is the one in which the direction of the association has not been specified. The relationship may be very strong but whether it is positive or negative has not been postulated.

Correlational hypotheses It state merely that the variables occur together in some specified manner without implying that one causes the other. Such weak claims are often made when we believe that there are more basic causal forces that affect both variables. For example: Level of job commitment of the officers is positively associated with their level of efficiency.

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Explanatory (causal) hypotheses It imply the existence of, or a change in, one variable causes or leads to a change in the other variable. This brings in the notions of independent and the dependent variables. Cause means to "help make happen." So the independent variable may not be the sole reason for the existence of, or change in the dependent variable.

Null Hypothesis It is used for testing the hypothesis formulated by the researcher. Researchers treat evidence that supports a hypothesis differently from the evidence that opposes it. They give negative evidence more importance than to the positive one. It is because the negative evidence tarnishes the hypothesis. It shows that the predictions made by the hypothesis are wrong. The null hypothesis simply states that there is no relationship between the variables or the relationship between the variables is "zero." . That is how symbolically null hypothesis is denoted as H_0. For example:

H_0 = There is no relationship between the level of job commitment and the level of efficiency. Or
H_0 = The relationship between level of job commitment and the level of efficiency is zero

Or the two variables are independent of each other. It does not take into consideration the direction of association (i.e. H_0 is non directional), which may be a second step in testing the hypothesis.

Alternative Hypothesis The alternative (to the null) hypothesis simply states that there is a relationship between the variables under study. In our example it could be: there is a relationship between the level of job commitment and the level of efficiency. Not only there is an association between the two variables under study but also the relationship is perfect which is indicated by the number 1. Thereby the alternative hypothesis is symbolically denoted as H_1. It can be written like this:

H_1 : There is a relationship between the level of job commitment of the officers and their level of efficiency

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Research Hypothesis Research hypothesis is the actual hypothesis formulated by the researcher which may also suggest the nature of relationship i.e. the direction of relationship.

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2.14 Solved excercises

The following questions have been designed to test the objectives identified for this chapter.

Solved excercises

1. When large groups of interconnected facts are considered together in a consistent manner, we get a

   (A) Scientific Theory

   (B) Critical Problem

   (C) Combined Result

   (D) Confirmed Fact

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2. If in a research independent variables cannot be manipulated then it is known as

   (A) Experimental Research

   (B) Non-experimental Research

   (C) Fundamental Research

   (D) Exploratory Research

3. Which of the following is/are true about Expost Facto Study?

   (A) The investigators attempt to trace an effect which has already occurred to its probable causes

   (B) The effect becomes dependent variable

   (C) The investigators have no direct control over such variables

   (D) All of these

4. The per capita income of India from 1950 to 1990 is four times. This study is

   (A) Social

   (B) Horizontal

   (C) Longitudinal

   (D) Factorial

5. Which of the following is the most essential characteristic of a research worker?

   (A) Sympathy

   (B) Open mindedness

   (C) Patience

   (D) Emotional control

6. The decline of the British Empire should have spelt the decline of English. This statement is a/an

   (A) fact

   (B) advice

   (C) opinion

   (D) prejudice

7. To study the relationship of family size with income a researcher classifies his population into different income slabs and then takes a random sample from each slab. Which technique of sampling does he adopt?

   (A) Random Sampling

   (B) Stratified Random Sampling

   (C) Cluster Sampling

   (D) Systematic Sampling

8. Which of the following is the most read page of a thesis?

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(A) Title page

(B) Table of contents

(C) Abstract

(D) Research Design

9. The historical research is different from experimental research in the process of

(A) Replication

(B) Formulation of hypothesis

(C) Hypothesis testing

(D) All of the above

10. A statistical measure based upon the entire population is called parameter while a measure based upon a sample is known as

(A) Sample parameter

(B) Inference

(C) Statistic

(D) None of these

11. Ordinarily a good piece of research follows four phases. They are given below

I Setting of objectives
II Analyzing data
III Collecting data
IV Interpreting the findings

Which of the following orders for these phases is correct?

(A) III,I,IV,II

(B) I,III,II,IV

(C) I,II,III,IV

(D) II,IV,III,I

12. Suppose you have a glass of milk and with a measuring glass you continue to add half a c.c. of plain tea at every step, till your friend reports a change in judgment in the color of the milk. The quantity of tea added, has just crossed what is just termed as

(A) Illusion

(B) Absolute Threshold

(C) Color Blindness

(D) Just Noticeable Difference

13. Suppose one Experimenter (E) in psychology firmly believes that Brahmin children are inherently superior to the Harijan children. Naturally he would never think of home environment as an explanation. This is a very obvious example of

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(A) Experimenter's Bias

(B) Subjects Bias

(C) Stimulus Error

(D) Response Error

14. Which one of the following approaches tries to analyze human behavior in terms of stimulus-response units acquired through the process of learning, mainly through instrumental conditioning?

(A) Cognitive Approach

(B) Dynamic and Psychoanalytic Approach

(C) Stimulus-Response-Behaviouristic Approach

(D) Existential Approach

15. The approach which has its roots in Gestalt Psychology is popularly known as

(A) Holistic Approach

(B) Stimulus-Response-Behaviouristic Approach

(C) Dynamic and Psychoanalytic Approach

(D) Cognitive Approach

16. Which approach emphasizes the role of instinctual processes and their modification in the course of interaction with the society?

(A) Dynamic and Psychoanalytic Approach

(B) Cognitive Approach

(C) Holistic Approach

(D) Stimulus-Response-Behaviouristic Approach

17. Which approach placed emphasis on human existence–the need to establish a sense of personal identity and to build meaningful links with the world?

(A) Cognitive Approach

(B) Dynamic and Psychoanalytic Approach

(C) Holistic Approach

(D) Existential Approach

18. Existentialism tries to reach modern man, offer him help in terms of clarifying his values, work out a meaningful and purposive existence. Psychologists who shaped this approach were

(A) Rollo May, R. D. Laing and Erick Fromm

(B) G. W. Allport, R. B. Catell and H. J. Eysenk

(C) Erickson and Sullivan

(D) Piaget, Bruner and Witkin

19. The system which still survives very nearly in its rigid forms is

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(A) Cognitive Approach

(B) Dynamic and Psychoanalytic Approach

(C) Wholistic Approach

(D) Existential Approach

20. Which approach tells us that under normal conditions the Organism is not a passive recipient of stimuli but an active, seeking and striving entity trying to master the environment and also master itself?

(A) Organism, Wholistic and Self Approaches

(B) Dynamic and Psychoanalytic Approach

(C) Cognitive Approach

(D) Existential Approach

21. Psychologists are sometimes interested to study consciousness even though they have no method of observing it directly except by using

(A) "Inference" as the only tool

(B) "Experimentation" as the only tool

(C) "Observation" technique

(D) "Introspection" technique

22. The term "unconscious motivation" describes the key idea of

(A) Structuralism

(B) Functionalism

(C) Psychoanalysis

(D) Behaviorism

23. The psychologists who are especially concerned with increasing the efficiency of learning in school by applying their psychological knowledge about learning and motivation to the curriculum are popularly known as

(A) Experimental Psychologists

(B) Clinical Psychologists

(C) Physiological Psychologists

(D) Educational Psychologists

24. ASccording to Lindquist, how many types of experimental designs possible

(A) five

(B) six

(C) seven

(D) eight

25. Who of the following has edited a survey of educational research ?

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(A) Kothari
(B) Buch
(C) Yashpal
(D) Aryabhatta

26. The polluted facts can lead to the birth of
(A) Error free research
(B) human sorrows
(C) good research
(D) polluted research

27. Photocopy of books is not considered appropriate, as it is
(A) violation of intellectual property
(B) difficulty for reading
(C) and act of plagiarism
(D) both B and C

28. The research papers are written to
(A) communicate the research
(B) become popular in the society
(C) gain a lot of money
(D) none of the above

29. Which one of the following generally does not participate in concurrence?
(A) intelligent and curious person
(B) ignorant and dull persons
(C) highly expert person in that field
(D) low quality research scholars

30. In the assessment of personality, the normative and objective method refers to
(A) The use of sophisticated techniques for measuring the accuracy of a person's perception of reality.
(B) Prediction of behavior on the basis of intensive interviewing.
(C) Prediction of behavior on the basis of data from personality tests.
(D) The use of projective techniques.

31. Which is the best format to use if content and material gathered for certain number of students by different interviews have to be compared in a piece of research ?
(A) Projective
(B) Structured
(C) Unstructured

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(D) Analytical.

32. What best describes the Likert technique of attitude measurement?

(A) Subjects indicate whether they agree with each of a series of attitude statements which are equally spaced along an attitude continuum

(B) Subjects indicate on five point scales the extent of their agreement with a set of attitude statements

(C) Subjects judge a particular concept on a series of bipolar semantic scale

(D) Subjects response to an open-ended interview are coded by content analyst.

33. What can increase the power of a statistical test?

(A) Decreasing the size of the sample

(B) Avoiding the use if the null hypothesis

(C) Designing for small error effects

(D) Avoiding random sampling.

34. Which is not the effective way of controlling a nuisance variable in an experimental design?

(A) Excluding the variable as one of the factors in the experiment

(B) Exercising statistical control

(C) Random assignment of subjects

(D) Holding the nuisance variable constant for all subjects.

35. What are the types of Descriptive Research?

(A) Survey Test

(B) Questionnaire Survey

(C) Interview Survey

(D) All of the above .

36. Who has defined Ex-Post Facto Research by saying that it is a systematic scientific exploration in which the scientist (researcher) does not have direct control on the independent variable?

(A) Fred Karlinger

(B) George J. Mouly

(C) John W. Best

(D) W.S. Monroe.

37. What are the types of variables?

(A) Independent variables

(B) Controlled variables

(C) Both of them

(D) None of these.

38. What is the difference between Laboratory Experiment and Field Experiment?

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(A) Difference of place

(B) Difference of samples

(C) Difference of variables

(D) All of the above .

39. Which experiments are more popular in Educational Psychology?

(A) Laboratory Experiments

(B) Field Experiments

(C) Field Studies

(D) Historical Researches.

40. In some developed countries like U.S A. and U.K. many psychologists are engaged for diagnosing learning difficulties and trying to remedy them. These psychologists are popularly called

(A) School Psychologists

(B) Social Psychologists

(C) Experimental Psychologists

(D) Industrial Psychologists

41. Today, private and public organizations also apply psychology to problems of management and employee training, to supervision of personnel, to improving communication within the organization, to counseling employees and to alleviating industrial strife. The applied psychologists who do this work are sometimes called

(A) Personnel Psychologists

(B) Organizational Psychologists

(C) Experimental Psychologists

(D) Social Psychologists

42. A person who uses the particular psychotherapeutic techniques which originated with Sigmund Freud and his followers is called

(A) A psychoanalyst

(B) A psychiatrist

(C) A child psychologist

(D) A clinical psychologist

43. Finding the causes of behavior from a number of observations is called

(A) Inductive reasoning

(B) Observational technique

(C) Deductive reasoning

(D) Introspection

44. The clinical method is ordinarily used only when people come to psychologists with

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(A) Social problems

(B) Personal Problems

(C) Organizational problems

(D) Internal problems

45. The technique of regulating various variables in an experiment is called

(A) Independent Variable

(B) Dependent variable

(C) Experimental control

(D) Controlled variable

46. Psychologists with the Biological perspective try to relate behavior to functions of

(A) Body

(B) Mind

(C) Soul

(D) Unconscious

47. A little girl Leny pushed Bapula, her brother, off his tricycle. She learned to behave this way because the behavior paid off in the past, in other words, she learned to act aggressively in certain situations because she was rewarded for such behavior in the past. With which perspective, a psychologist can study this type of problem?

(A) Biological Perspective

(B) Behavioral Perspective

(C) Cognitive Perspective

(D) Social Perspective

48. The perspective which is concerned with characteristic changes that occur in people as they mature is known as

(A) Developmental Perspective

(B) Biological Perspective

(C) Humanistic Perspective

(D) Psychoanalytic Perspective

49. A person's sense of self is emphasized by

(A) Psychoanalytic Perspective

(B) Biological Perspective

(C) Developmental Perspective

50. A key psychodynamic idea is that when unconscious impulses are unacceptable or when they make us anxious; to reduce anxiety, we use

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(A) Defense Mechanisms

(B) Super ego

(C) Instincts

(D) Dreams

51. The distinction between a clinical psychologist and a psychiatrist is that

(A) A clinical psychologist normally holds a Ph.D. or M.A. degree or Psy. D. (Doctor in Psychology) and a psychiatrist holds an MD degree

(B) A clinical psychologist holds a Ph.D. degree in Psychology and a psychiatrist holds both Psy. D. degree and Ph.D. degree

(C) A clinical psychologist holds a special degree in Psychology and a psychiatrist holds a Ph.D. degree in Psychology

(D) A clinical psychologist has a special training in psychotherapy and a psychiatrist holds M.A. degree in Psychology

52. The Subject "Psychology" was formally recognized in Germany in the year

(A) 1789

(B) 1668

(C) 1879

(D) 1897

53. To study Abnormal Psychology means, to study mainly the nature of

(A) Conscious Mind

(B) Unconscious Mind

(C) Subconscious Mind

(D) Normal Mind

54. Sigmund Freud is regarded as the father of

(A) Psychoanalysis

(B) Behaviorism

(C) Functionalism

(D) Gestalt Psychology

55. The unit of Sociology is the 'Group', whereas the unit of Psychology is the

(A) Stimulus

(B) Individual

(C) Animal

(D) Institution

56. The branch of psychology which (teals with the study of animal behavior is known as

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(A) Social Psychology
(B) Abnormal Psychology
(C) Differential Psychology
(D) Comparative Psychology

57. The father of 'Experimental Psychology' is
(A) Wilhelm Wundt
(B) Sigmund Freud
(C) C.G. Jung
(D) E. B. Titchener

58. Hypothesis refers to
(A) The outcome of an experiment
(B) A conclusion drawn from an experiment
(C) A form of bias in which the subject tries to outguess the experimenter
(D) A tentative statement about the relationship

59. Statistics is used by researchers to
(A) Analyze the empirical data collected in a study
(B) Make their findings sound better
(C) Operationally define their variables
(D) Ensure the study comes out the way it was intended

60. An observation of a dependent variable response prior to any attempt to change this response is known as the .....
(A) Flat line
(B) Baseline
(C) Variance
(D) Reverse

61. The most frequently used quasi-experimental design is the ..... design.
(A) Nonequivalent comparison-group
(B) Interrupted time-series
(C) Changing-criterion
(D) Regression discontinuity

62. A baseline .....
(A) Is used as the standard against which change induced by the treatment is assessed
(B) Is the occurrence of a response in its freely occurring or natural state
(C) Is first obtained prior to the administration of a treatment
(D) All of the above are true

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63. A single-case experimental design in which the response to a treatment is compared to baseline occurring before and after the treatment is called what?

(A) Single-case design

(B) Multiple-baseline

(C) Changing-criterion

(D) None of the above

64. A literature review requires

(A) Planning

(B) Good & clear writing

(C) Lot of rewriting

(D) All of the above

65. Which of the following is true about good hypotheses?

(A) It is formulated in a way such that it can be tested by the data

(B) There is a limited scope and it should not have global significance

(C) It is precise, specific and consistent with most known facts

(D) none of the above

66. Which of the following is true about footnote?

(A) it is essential in report writing

(B) it is not much essential in the report writing

(C) it is not at all essential in report writing

(D) it is never used in report writing

67. While editing primary data, we have just to notice the information contained in the questionnaire is

(A) Homogeneous

(B) consistent

(C) complete

(D) All of the above

68. Which of the following statements is correct about validity and reliability?

(A) When internal validity is high, external validity is low

(B) When internal validity is high, there is no change in external validity

(C) When internal validity is high, external validity is also high

(D) All of the given options

69. In a single-case design, you hope that the behavior of the participants prior to the administration of a treatment condition is .....

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(A) Not highly variable
(B) Highly variable
(C) Moving at a steep rate of change
(D) None of the above

70. Which design would use analysis of covariance during data analysis?
(A) Nonequivalent comparison-group design
(B) Interrupted time-series design
(C) Changing criterion design
(D) All of the above

71. For the first time, the word 'Psychology' was used by
(A) Rudolf Goeckle
(B) Sigmund Freud
(C) William James
(D) E. B. Titchener

72. The literal meaning of 'Psychology' is
(A) Science of Behavior
(B) Science of Soul
(C) Science of Consciousness
(D) Science of Mind

73. Rudolf Goekle used the word 'Psychology' for the first time in
(A) 1590 AD
(B) 1950 AD
(C) 1095 AD
(D) 1509 AD

74. Psychology as the 'Science of Mind was defined by
(A) Psychoanalysis
(B) Behaviorists
(C) Functionalists
(D) Ancient Greek Philosophers

75. Scientific Psychology came into existence during
(A) 19th Century
(B) 20th Century
(C) 18th Century
(D) 17th Century

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76. E. B. Titchener (1867-1927) defined 'Psychology' as the science of
    (A) Soul
    (B) Mind
    (C) Experience
    (D) Conscious Experience

77. J. B. Watson defined 'Psychology' as the science
    (A) Soul
    (B) Behavior
    (C) Mind
    (D) Consciousness

78. Psychology was defined as the "Science of Behavior" by
    (A) Functionalists
    (B) Structuralisms
    (C) Gestalt Psychologists
    (D) Behaviorists

79. Who defined 'Psychology' as the scientific study of activities of the organism in relation to its environment?
    (A) J. B. Watson
    (B) Sigmund Freud
    (C) C. G. Jung

80. Any systematically organised body of verified knowledge about a certain class of facts and events is known as
    (A) Science
    (B) Experiment
    (C) Hypothesis
    (D) Fact

81. Psychology is
    (A) A social Science
    (B) A Natural Science
    (C) A Biological Science
    (D) Both Natural and Social Science

82. Why is it important to change one variable at a time in single case designs?
    (A) Changing one variable allows isolation of the cause of the change
    (B) Changing more than one variable at a time confounds those independent variables
    (C) Both A and B are true
    (D) None of the above

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83. Researchers can attempt to eliminate the threat of bias from the selection-maturation effect in the nonequivalent comparison-group design by matching experimental and control participants on important variables.

(A) True

(B) False

84. Group comparison designs are always superior to single-case designs.

(A) True

(B) False

85. When you are confident that the experimental manipulation produced the changes you measured in the dependent variable, your study probably has good ..... validity.

(A) Internal

(B) External

(C) Causal

(D) Construct

86. Identifying a factor to be measured by placing units or categories on a scale to differentiate varying degrees of that factor and describing these units in some manner is known as

(A) A checklist.

(B) A schedule,

(C) A test.

(D) A rating scale.

87. If a researcher conducts a research on finding out which administrative style contributes more to institutional effectiveness, it is an example of

(A) Basic research.

(B) Action research.

(C) Applied research.

(D) Fundamental research.

88. In case of ANOVA if there are no treatment effects at all, then F-ratio will be

(A) Zero.

(B) +1.0.

(C) -1.0.

(D) Any value between 1.0-1%.

89. What is the nature of F-test?

(A) Essentially a two-tailed test

(B) Essentially a one-tailed test

(C) Can be one-tailed as well as two-tailed depending on the hypothesis to be tested

(D) Can never be a one-tailed test.

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90. Who developed Method of equal appearing intervals forming the basis of constructing attitude scales?

(A) Likert

(B) Thurstone and Chave

(C) Bogardus

(D) Guttman.

91. What is an attitude scale with five points on it varying from strongly approved to strongly disapproved?

(A) Likert type

(B) Thurstone type

(C) Bogardus type

(D) Guttman type.

92. What is an attitude scale in which each item's value is calculated by finding out the mean or median of the ratings of a large number of judges on an eleven-point rating scale?

(A) Thurstone type

(B) Guttman type

(C) Bogardus type

(D) Likert type.

93. Which of the following situations calls for the use of a ratio-scale?

(A) A researcher waits to assert that the two persons X and V differ in their attitudes towards nationalization of education

(B) He wishes to state that the attitude of one person 'X' is more favorable than that of 'Y'

(C) He wishes to make a statement that as compared to Y, 'X' is much more in favor of nationalization than he is, as compared to 'Z'

(D) He wants to show that 'X' is twice as much in favor of Nationalization as 'Y'.

94. Which one of the following is regarded as the very breath of an experiment?

(A) Independent Variable

(B) Dependent Variable

(C) Controlled Variable

(D) Experimental Control

95. Mr. Ali has conducted an extensive review of the literature and has deductively reasoned a hypothesis about his problem on the basis of this review. Which type of a research plan is Mr. Ali likely proposing?

(A) Qualitative

(B) Ethical

(C) Both quantitative and qualitative

(D) Quantitative

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96. The directors of a graduate program in educational research wish to see what types of jobs their graduates take after they finish their program. They randomly sample students from the program and have them fill out questionnaires with items asking about the types of jobs they have had. They also are asked to describe the roles they play in their current positions. This project is best described as having what kind of objective

(A) Descriptive

(B) Predictive

(C) Explanatory

(D) None of the above

97. When research is done to test hypotheses and theories about how and why phenomena operate as they do, then the primary purpose of such research is

(A) Descriptive

(B) Predictive

(C) Explanatory

(D) None of the above

98. The variable the researcher matches to eliminate it as an alternative explanation is called a(n) ..... variable

(A) Matching

(B) Independent

(C) Dependent

(D) Partial

99. Which of the following is not a longitudinal design?

(A) Panel

(B) Cross-sectional

(C) Trend

(D) Both A and C are longitudinal designs

100. Researcher selects only 25 members as a sample from the total population of 20,000, and considers

(A) He was guided by his supervisor

(B) He was a good researcher

(C) The population was Homogeneous

(D) None of the above

101. The title page of a research synopsis must be

(A) attractive

(B) organised

(C) aesthetic

(D) logical

102. The positive correlation between teachers' salaries and the price of liquor is.....

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(A) Spurious

(B) Due to a third-variable

(C) Nonspurious

(D) Both A and B

103. Which of the following is considered a special case of the general linear model?

(A) A variable

(B) Partial correlation

(C) Analysis of covariance

(D) Both B and C

104. When a researcher starts with the dependent variable and moves backwards, it is called .....

(A) Predictive research

(B) Retrospective research

(C) Exploratory research

(D) Descriptive research

105. The method of working multiple hypotheses refers to a technique for identifying rival explanations.

(A) True

(B) False

106. GLM refers to which of the following?

(A) General Logic Model

(B) General Limited Model

(C) General Lab Model

(D) General Linear Model

107. In which of the following year Council of scientific and industrial research Society was constituted as an autonomous society

(A) 1940

(B) 1942

(C) 1962

(D) 1950

108. The objectivity of the research is enhanced

(A) through its impartiality

(B) through its reliability

(C) through its validity

(D) All of the above

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109. Which of the following is the basic purpose of pretest interview in this case study?

(A) To identified the potential problem

(B) To know the sample size

(C) To develop the questionnaire

(D) To use agency representative

110. Which one of the following sampling type is used in operations test to select the units?

(A) Simple random sampling

(B) Cluster sampling

(C) Quota sampling

(D) Judgment sampling

111. Which one of the following sets is the measure of central tendency?

(A) Mean, standard deviation, mode

(B) Mean, median, standard deviation

(C) Arithmetic mean, median, mode

(D) Standard deviation, internal validity, mode

112. In lab experiment the effect of Variables is controlled to evaluate the causal relationship.

(A) Extraneous

(B) Moderate

(C) Intervening

(D) All of the above

113. Internal validity refers to .

(A) Researcher's degree of confidence.

(B) Generalizability

(C) Operationalization

(D) All of the above

114. Which one of the following is not a step in nonexperimental research?

(A) Determine research problem and hypotheses

(B) Analyze data

(C) Interpret results

(D) All are steps

115. If a research finding is statistically significant, then .....

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(A) The observed result is probably not due to chance

(B) The observed result cannot possibly be due to chance

(C) The observed result is probably a chance result

(D) The null hypothesis of no relationship is probably true

116. A researcher is doing a study of peer groups in middle school. She interviews 5 girls and 5 boys. She is doing a grounded theory study; hence, she decides to generate her codes as she scans through her transcriptions of her data. These codes are labeled

(A) A priori codes

(B) Post hoc codes

(C) Inductive codes

(D) Master list codes

117. Sarah is a qualitative researcher studying how children and parents interact in Head Start Centers. As she examines her data (videotapes and transcripts), she jots down notes concerning the interactions, generating hypotheses, suggesting relationships among categories of information she is examining and so on. This process of jotting notes as she examines the data is called

(A) Memoing

(B) Transcription

(C) Facesheet coding

(D) Drawing diagrams

118. Qualitative data analysis is still a relatively new and rapidly developing branch of research methodology.

(A) True

(B) False

119. The process of marking segments of data with symbols, descriptive words, or category names is known as .....

(A) Concurring

(B) Coding

(C) Coloring

(D) Segmenting

120. What is the cyclical process of collecting and analyzing data during a single research study called?

(A) Interim analysis

(B) Inter analysis

(C) Inter-item analysis

(D) Constant analysis

121. Which of the following is/are necessary condition(s) for causation?

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(A) The relationship condition

(B) The temporal antecedence condition

(C) The lack of alternative explanation condition

(D) All of the above

122. Which of the following is the weakest experimental design?

(A) One group pretest-posttest design

(B) Quasi- experimental design

(C) Two group posttest only design

(D) Ex post facto design

123. The development of a solid foundation of reliable knowledge typically is built from which type of research?

(A) basic research

(B) action research

(C) evaluation research

(D) orientational research

124. Which form of reasoning is the process of drawing a specific conclusion from a set of premises?

(A) rationalism

(B) deductive reasoning

(C) inductive reasoning

(D) probabilistic

125. Research concerned with the derivation of generalizations of broad applicability and only secondarily with any practical value is called

(A) Applied research.

(B) Fundamental research.

(C) Action research.

(D) Practical research.

126. Which of the following is not relevant to analysis of the research problem?

(A) Isolating the variables that are involved in the problem and clarifying their relationships

(B) Accumulating the facts that might be related to the problem

(C) Attending seminars on research methodology

(D) Proposing various relevant explanations (hypothesis) for the cause of the difficulty.

127. Opinionnaire is defined as a special form of inquiry to collect

(A) The opinion of a sample of population on certain facts.

(B) To quantify, analyze and interpret the collected data.

(C) Both A and B

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(D) Neither A nor B

128. Sociometry is a technique for describing

(A) Social relationships that exists between members of a group.

(B) Attractions or repulsions between individuals.

(C) Both A and B

(D) Neither A nor B

129. Importance of Sociometry lies in

(A) To have an idea of the group at a glance, to form appropriate groups of students for various projects and activities.

(B) To find out the changes taking place in the group structure and qualities of leadership appreciated by the group.

(C) To compare one group with the other to help the guidance worker by acquainting him with the pupil relationships.

(D) All of the above .

130. In case of true experimental research the investigator is always required to make a compromise between which of the following four is not correct?

(A) Internal validity and external validity

(B) Contrived setting and natural setting

(C) Randomization and manipulation

(D) Control of extraneous variables and building the correlated variable into design.

131. While writing a research report investigators mostly arrange items in Bibliography in

(A) Heading like – books, perdiocals, newspaper reports, public documents and miscellaneous.

(B) In a single alphabetized list.

(C) Both A and B

(D) Neither A nor B

132. When researchers refer to a significant difference, they mean that the

(A) Scores of two groups shows great variability.

(B) Experimental results have social importance.

(C) Results of a study occurred by chance.

(D) Results of a study can be replicated by another similar study.

133. Free Association in Psychoanalysis means

(A) Allowing a subject to talk freely.

(B) Focused interview.

(C) A structured interview.

(D) None of the above.

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134. There is only person who has defined Educational Research. He is

(A) John W. Best.

(B) W.M. Travers.

(C) George Mouly.

(D) None of these.

135. Who said "Educational Research is that activity which is directed toward development of science of behavior in educational situation?"

(A) F.L. Whites

(B) W.S. Monroe

(C) W.M. Travers

(D) J.W. Best.

136. Which is not a characteristic of Science?

(A) Science employs hypothesis

(B) Science is based on facts

(C) Science is not free from emotional bias

(D) Science uses quantitative methods.

137. What is not the reason underlying the importance of research in education?

(A) It is a tool for verifying, testing and validating knowledge

(B) It is a potent means of creating new knowledge

(C) It has moved to the centre of the behavioral sciences

(D) It provides answers to many problems faced by educators.

138. What is not essential about a research problem?

(A) It should be amenable to research

(B) It should be significant

(C) It should lead to new knowledge

(D) It should lead to theory building.

139. In a normal distribution, 100 per cent of observations are covered by the following

(A) 3.09 s.

(B) 3 s.

(C) 2 s.

(D) s.

140. What can Statistics do?

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(A) Prove anything

(B) Disprove anything

(C) Neither prove nor disprove anything-is just a tool

(D) None of these.

141. Who said, Statistics has been defined as "The Science of Counting"?

(A) Bowley

(B) Galton

(C) Stephen King

(D) R.A.Fisher.

142. On what is placed reliance in most investigations?

(A) Secondary data

(B) Primary data

(C) Both primary and secondary data

(D) None of these.

143. What is true about Secondary data?

(A) Should never be used

(B) Should be used after careful scrutiny

(C) No scrutiny is required while using it

(D) While scrutinizing, only thing to see is who collected it.

144. To which aspect are related questioning assumptions under-lying the problem?

(A) Identifying the problem

(B) Defining the problem

(C) Analyzing the problem

(D) Stating the problem.

145. What does description of the research problem NOT include?

(A) Background of the study

(B) Theories on which it is based

(C) Assumptions underlying it

(D) Review of research done.

146. Which of the following is the least helpful to locating and analyzing problems?

(A) Exploring the literature in an area of interest

(B) Discussing with the research guide

(C) Examining every day experiences

(D) Critical analysis of the existing theories and practices.

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147. The correlation between two variables in which the effect of some other variable or variables on their relationship is controlled is called

(A) Contingency coefficient of correlation.

(B) Multiple correlations.

(C) Partial correlation.

(D) Product-moment correlation.

148. What is the nature of the statement that experimental generalizations are statistical inferences; they can only attain a degree of probability somewhere along a continuum between truth and falsity?

(A) Not wholly true

(B) Wholly true

(C) Incorrect entirely

(D) None of the above .

149. Which of the following is NOT an advantage of non-parametric statistical tests?

(A) They can be used when data are in the forms of ranks or categories

(B) They yield statements of exact probabilities irrespective of the shape of the population distribution

(C) They are less powerful than the parametric tests.

(D) They can be used in situations where parametric tests are applicable

150. ANOVA does NOT assume that

(A) The treatment groups are selected at random from the same population.

(B) The adjusted scores within groups have normal distribution.

(C) The treatment groups are homogeneous.

(D) The treatment groups are drawn from a larger population.

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Probable answer key.

If you get any wrong answer please mail me at narayan.changder@gmail.com. I am still working on answer key. Dont only criticise, rather report right answer at above email or you can message me in facebook

Answers

1. A 2. B 3. D 4. C 5. B 6. D 7. B 8. C 9. D 10. C 11. B 12. B 13. A 14. C 15. C 16. A
17. D 18. A 19. B 20. A 21. A 22. C 23. D 24. B 25. B 26. D 27. A 28. A 29. B 30. C
31. B 32. B 33. C 34. C 35. D 36. A 37. C 38. D 39. A 40. A 41. A 42. A 43. A 44. B
45. C 46. A 47. B 48. A 50. A 51. A 52. C 53. B 54. A 55. B 56. D 57. A 58. D 59. A
60. B 61. A 62. D 63. D 64. D 65. A 66. A 67. D 68. D 69. A 70. A 71. A 72. B 73. A
74. D 75. A 76. D 77. B 78. D 80. A 81. A 82. C 83. A 84. B 85. C 86. D 87. C 88. B
89. C 90. B 91. A 92. A 93. D 94. D 95. A 96. A 97. C 98. A 99. D 100. C 101. C 102. D
103. D 104. B 105. A 106. D 107. B 108. D 109. A 110. A 111. C 112. D 113. A 114. D
115. A 116. C 117. A 118. A 119. B 120. A 121. D 122. B 123. A 124. B 125. B 126. C
127. C 128. C 129. D 130. A 131. B 132. D 133. A 134. B 135. C 136. C 137. C 138. D
139. A 140. C 141. A 142. A 143. B 144. C 145. D 146. C 147. B 148. B 149. B 150. D

Chapter 3

Comunication



The English word communication has come from a Latin noun communis and the Latin verb communicare, which means to make common, sharing and not just sending messages. The term communication has been rigorously defined by different communication expert as follows

- **Oxford dictionary:** The transfer or convening of meaning
- **Claude Shannon:** One mind effecting another
- **L.A.Richards:** It is the exchange of meaning between individuals through a common system of symbols
- **Wilbur Schramm:** The mechanism through which you mend relations exist and develop

In other words, we can simply describe, communication is the interchange of information between two or more persons. One might think that communication is only limited to the art of speaking or writing, but it is not true. Communication also covers someone's body language, personal manners and the way of their style and effect, any gesture visible to someone's eyes , or audible in someone's ear.

3.1 Definition and meaning of computation

Communication is crucial for existence of human behaviour. Some sociologist define communication as "the mechanism through which human relations exist and develop". According to the American Society of Training Directors, a good communication is "*the interchange of thought or information to bring about mutual understanding and confidence or good human relations*". Mary Ellen Guffey defines communication as "*the transmission of information and meaning from one individual or group to another*". It should be noted that communication is anything which make a message meaningful to the one being communicated with, Communication is a two-way process and is not complete without feedback. Feedback helps a communication to be an effective communication because feedback confirms receipt an adequate understanding of the intended message. Communication can be describe as a process of information transmission by three rules

- **Syntactic:** It means formal properties of sign and symbols
- **Pragmatic:** It concerned with the relations between signs/expressions and their users
- **Semantic:** It is the study of relationships between signs and symbols and what they represent.

In a simple communication model ,information or message is sent from an emisor/Sender/encoder to a destination/receiver/Decoder.

3.2 Different viewpoints of communication

Communication is important in our daily life, business and other activities. It has taken much more attention nowadays both in academic and professional field. The most important factor, however, is how communication could be used to solve organizational communication difficulties. There are various viewpoints of communication available including the 'modern', 'interpretive', 'critical', and 'post-modern'.

3.2.1 Modern viewpoint

Modern framework of communication relies on objective measurement and decision-making based on traditional calculations and progress towards an improved and more general understanding of real world phenomena. In this framework, it requires the person to follow a clear appreciation of perspective implication for the communication process to be effective.

3.2.2 Interpretive viewpoint

The interpretive perspective of communication tends to be less concerned with generalized theory, but aims at revealing the complexity and richness of communication. It has been established that interpretive perspective of communication has some linkage to the ethnographic tradition in anthropology. An application of ethnographic studies to communication, therefore, will imply that researchers must spend lengthy periods in the field of communication using qualitative research methods like observation to record conversations, stories, rituals and other activities bothering on communication especially in offices, assembly plants, and in informal relationships. In such circumstances, such information may be interpreted in the form of detailed narratives. What must be noted however is that researchers in the field of interpretive communication are barred from imposing their own interpretation since this is likely to distort the whole process of communication.

3.2.3 Critical viewpoint

The idea behind the critical perspective is linked with the ways that communication channels are used to exercise power over employees in an organization for example. Research information on methods found in the modern and interpretive perspectives are also relevant to the critical perspective of communication. The critical perspective, however, uses a more sceptical approach, and this means a certain degree of critique of the manner in which communication evolves, especially in relation to manner of use of power relating to communication in organizations.

3.2.4 Post modern viewpoint

The post modern perspective normally challenges the assumptions of the modern perspective, for example, the way and manner in which research is used in the evolution of theory of communication science. The main focus of the post modern view is that there is no neutral access to the world, as portrayed by the modernists. Communication, it is believed, may be influenced by variables such as language, globalization and contemporary trends such as the internet. The implication of this is that it is possible to make an objective, generalized or unified statement about communication.

3.3 Goals of communication

Communication is a very important tool in our daily lives. Communication happens daily at workplace or at home and so many places. There are basically four major goals achievable by communication

a) Improve recipient's level of understanding;

b) Elicit receiver's response;

c) Create good relations; and

d) Create organisational goodwill.

3.3.1 Improve recipient's level of understanding

Suppose a sender send a message, it is obvious that sender of this message knows what is the meaning of the message. But, on the other hand if receiver is unable to understand the intended meaning of the message then it is ambiguous. The expected receiver's understanding of a message is the most critical goal or objective of the communication process.

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3.3.2 Elicit receiver's response

Once a message is received, the receiver will respond by one of several actions, depending on his (that is, receiver's) understanding of the message. In direct conversation, the receiver has the benefit of seeking clarification on the import of the message and the sender could also take advantage of the face-to-face interaction to explain any ambiguities in his message. In written communication, however, this is not possible and the message may thus elicit varying interpretations, based on receiver's understanding.

3.3.3 To create good relations

Another goal of communication is the creation of good relations between the parties. The sender of a message must ensure that the content of the message does not cause strains in relations. Primary responsibility for creating and maintaining good relations would be assumed by the sender and this can be done by ensuring that the wording of the message looks good, positive and encouraging. Composing messages whose contents stress the interests of the receiver is critical.

3.3.4 To create organisational goodwill

Goodwill is a critical success factor in business and communication that must be used to enhance the creation of organisational goodwill. The goodwill of all stakeholders that the organisation deals with such as clients, suppliers, customers, government, the community, etc., is necessary for the continued successful operation of business. Similarly, when individuals communicate, the receiver of the message must enjoy his or her (sender's) confidence and trust as this is likely to facilitate receiver's appreciation and response.

3.4 Process of communication

The process of communication can be viewed as six point process.

1. Conception
2. Encoding
3. Channel selection
4. Decoding
5. Interpreta
6. Feedback

The process of communication start with the idea of the message. This process may be instantaneous, that is, invention of message does not need serious reasoning.

Encoding the message

In the communication process, sender sends the message. To encode the message, sender nets to port the message into suitability form such that no one except the intended receiver understands the meaning of the message. The sender has the duty to ensure that language, vocabulary, symbols, pictures and signs used will convey the intended meaning to the receiver.

Selection of suitable channel

To send the message ,sender needs to choose the media channel. The actual transformation of the message from sender to receiver takes place inside the channel. Factors to be considered in deciding on a suitable channel include speed, cost, convenience, confidentiality, distance considerations as well as the nature and type of message.

Decoding the message

Whenever receiver receives the message from sender, the message is actually encoded message. In order to give the response to the sender, receiver needs to decode the message for effective understanding. It is totally the responsibility of the receiver to decode the message correctly.

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Interpretation of the message

Decoding the message and interpretation of the message looks similar. But, decoding the message means get the original message from the encoded message. After receiver gets the original message it is the receiver responsibility to interpret the meaning of the message properly. The interpretation made by receiver may be hampered if sender the message in complex way which may be unknown by the receiver.

Feedback

After receiver gets the message and interpreted correctly, it needs to tell the sender that the message is received correctly. The way by which Sender confirms the receiver about the message delivery is called feedback. Without feedback, whole communication process is unsuccessful. Depending on the type of communication, feedback could be oral , written or involve the use of body language.

3.5 Principles of effective communication

Each and every model of any process requires some standard. Similarly the model of copy effective communication follows below principles

Choice of words

choice of words is crucial is the intention of sender is to ensure effective decoding of the message by the receiver. The sender must choose the words carefully such that receiver will understand those words. The sender needs to know the interest of recipients, attitudes and emotion level to choose the word.

Clarity of purpose

The sender should be clear, concise, and to the point and thus avoid any irrelevant matter. Once this is done, no room is left for ambiguities, which could possibly lead to the message failing to convey the intended meaning.

Listen intelligently

communication is a two way process. Listening and speaking of the two opposite process but they are like husband-and-wife. When sender speak, she must speak in way such that receiver can understand. Suppose receiver listening the message intelligently but sender speak the message ambiguously. In this case, the communication is totally an unsuccessful communication.

Selection of proper media

The method for delivery of the message could have an impact on the expected results. This impact could be favourable or unfavourable depending on the suitability of the medium in a particular circumstance. For optimum results, therefore, it is imperative that the encoded message is delivered through the most suitable medium in order that the message would elicit the right response. Choice of media should be considered in relation to distance, time, sense of urgency, and cost.

Appropriate timing of the communication

It is important to decide when to send a particular message. Depending on the nature of the message a particular time may not be suitable. In our traditional African setting, transmission of news of death of a dear one, for instance, is carefully managed and this includes finding the most suitable time to break such news. This is for the obvious reason of managing the shock or impact of such bad piece of message on the recipient.

Obtaining feedback

Obtaining feedback will ensure that the communication has been effective. As stated earlier, a message may not be understood as a result of the inadequacies of the receiver but also because the sender may not have made the right decisions in relation to what likely impression could have been created by language and expressions used, suitability of the timing of delivery, nature of tone and appropriateness of the manner of delivery.

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Standards

The quality of response obtained from the communication process is as good as the standard set for all aspects of the process. High standards in choice of media, methods used both in relation to language and presentation are likely to deliver results, in so far as they are suitable for the purpose and objective of the message being communicated.

3.6 Importance of communication

Communication happens in daily life and it has lots of significance in our daily workplace or social life. Following are the points given describing importance of communication.

1. Communication happens with the individuals and in the society. Communication is the main tool for the achievement of organizational goals and objectives.
2. Communication happens between two parties where sender sends a message to the receiver and receiver interprets the message and sends the response to the receiver.
3. A good communicator has more grabbing power. Good communication always keep up the interest of the audience in the subject matter being discussed.
4. Good communication helps a person to be a good and efficient leader. Good communication skills always lead to unambiguous, clear instruction and always motivates others in the workplace.
5. Good communication always promote good relationship with others.

why communication skills are important

the main purpose of communication is to communicate with others unambiguously. To do this, both the sender and receiver are equally responsible. Message sent by sender can be misinterpreted by the receiver and in this case there is confusion. In fact, communication is successful when both the sender and receiver understand the same information as a result of communication.

3.7 Models of communication

In our dynamic life whenever we are communicating with other people we have to to test it. Model is used to test the communication. Models have been used in our daily life from engineering to the normal communication. A model is a theoretical representation of a real world situation. In the below model, Sx is the transmitter of the message and Rx is the receiver of the same message. When Rx gets the message from Sx, and respond to the message then there must be a feedback.

3.8 Barriers to effective communication

Barriers in the communication may affect the understanding of the message by receiver or even distort the messages. Barriers may arise at any stage of communication process.

1. At sender's level
2. At the encoding level
3. At the transmission level
4. At the receiver's level
5. At the feedback level

The main communication barriers are as follows

Unclear objective

If the sender of the message is not clear about the objective of the message then this situation occurs. And dignity and the lack of clarity in the message creates communication breakdown because the receiver have two unlikely to respond as expected by the sender.

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Choice of wrong medium

Communication breakdown may happen in the complication process if the choice of medium is not suitable. For example, if you want to post some important letter you must go for speed post. Once an appropriate medium is chosen, the effectiveness of the commutation process and the chances of eliciting the desired response are enhanced.

Wrong timing

Timing of the communication is also crucial for the success of communication process. For example, it is better to discuss the research process whenever your mind is stable. Communication process must be chosen at a time when there is a full concentration and thereby enhancing the effectiveness of the process.

Using bad words

The choice of words has great impact in the communication process. Suppose, the sender of the message choose the words which are too technical or too difficult for the receiver to understand. In this situation, the receiver cannot decode the message easily. Words that appear too easy or too simple may also constitute a problem. It is necessary, therefore, for the sender to be able to assess the receiver in order to be able to choose the most suitable words for the message. This way, the sender ensures that the message would achieve its goals.

Meaning of words

Whereas the sender may choose words with a certain and clear meaning in mind, the words in actual fact may connote some other meaning as far as the receiver is concerned. When this happens, the sender and the receiver are at cross purpose as they both have different meanings of the message. Connotative meaning can also arise as a result of one's experiences, opinions, emotional status and interests. In order to obtain shared meaning required for words used, the sender should analyse the message being sent to be able to determine what likely connotations could arise as a result of use of certain words.

Environmental factor

The environment within which, negation takes place also have great impact on the effectiveness of communication. For example, a telephone call from a crowded place or work from busy roadways is not clearly audible.

Capability of the receiver

Physical disabilities of recipient will have an obvious effect on the extent to which the recipient appreciates the intended meaning of a message. Hearing difficulties, for instance, are obvious situations that will constitute a barrier. It is important that the sender is able to take the receiver's capability into consideration in order to ensure effective communication.

Relationships

Relationships will, no doubt, affect the effectiveness of communication.

3.9 Media of communication

In this section, we will consider the media or methods for communicating a message. There are three main methods for communication: verbal method, non-verbal method and written communication

3.9.1 Verbal communication

Verbal communication always involves use of words. It is also known as oral communication. In this type of complication the information or message is transmitted by word from mouth. Verbal, negation is always two-way process involving two or more persons. Effective verbal communication needs would good pronunciation skills, good articulation of words etc

3.9.1.1 Different forms of verbal/oral communication

We have already seen that verbal communication is also known as oral communication. We can categories verbal or oral communication into the following forms:

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Interviews Interviews are always two party conversations for some specific objective. This type of communication is specially used for recruitment and selection process.

Meetings In a meeting people are gathered together for the purpose of discussion. Meeting may be arranged within the organization at any level.

Telephone communication One of the most prominent uses of verbal communication is happen in telephone conversation. In this type of communication, conversation may take place between two or more persons from different location. When appropriately used, this method of communication could be very effective as it provides immediate feedback and may be relatively less expensive.

3.10 non-verbal communication

In non-verbal communication message or information transmitted to the receiver by using body language, facial expressions, symbols and pictures. This type of communication is a perfect example of routine and non-routine communication. The various forms of diagrams, pictures, graphs and slides facilitate the effective transmission of non-verbal communication

3.10.1 different areas of non-verbal communication

There are different categories of non-verbal communication which is described below

Kinetics or body language: this involves the movement of the body and it can further be divided into the following categories

- facial expression: facial expression always comes with some meaning. A smiley face always different than an awkward face.
- Gestures: this involves pointing fingers, movement of head to show the agreement or disagreement.
- Movements: moving the finger, head or other body parts conveys non-verbal communication which may be used to send the messages to the receiver.

Proxemics: this involves physical contact like handshake. It can be further classified into the following categories Positioning: Keeping a respectful distance, looking over one's shoulder, sitting close to someone are all forms of using non-verbal cues to communicate. They transmit awareness of differing status, a close working relationship or relaxed mutual trust respectively.

- Posture: Standing straight and erect, lounging, sitting hunched up, leaning forward, spreading oneself in a chair are all means of communicating non-verbally. These convey alertness and care, self confidence (or even over confidence), nervousness or ease respectively
- Paralinguistic: Feedback sounds of surprise or agreement or annoyance or impatience, for example, uh-uh ooops!'. A heightened awareness of what people are saying non-verbally would greatly assist the manager to read a situation and to act perhaps to ward-off a personality clash or to calm an irate customer.

3.10.2 Characteristics of non-verbal communication

Following are the important characteristics of non-verbal communication

1. Non-verbal communication provides additional visual stimulus. The presence of diagrams enhances the quality of what is being communicated
2. Sometimes non-verbal communication can be unintentional. Whenever sender sends the message to the receiver, sender may be unaware that the message is non-verbal.
3. Non-verbal communication reinforces oral communication by providing non-verbal cues to emphasize what is being said orally
4. Non-verbal communication may be more honest than the verbal communication
5. Non-verbal communication is always present. Neither oral nor written communication exists without non-verbal communication

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3.10.3 Advantages of Non-Verbal Communication

a) Non-verbal communication can help the communicator to overcome language barriers.

b) Non-verbal communication makes it possible for information to be conveyed to many audiences.

c) Non-verbal communication may be more reliable, at times, than verbal or oral communication because it is mostly transmitted unconsciously.

d) Non-verbal communication is always present because this form of communication is always associated with oral or written communication.

3.10.4 Disadvantages of Non-Verbal Communication

a) Non-verbal communication can, at times, be difficult to interpret without reinforcing it with written or spoken word

b) Non-verbal communication may require additional skills of comprehension and interpretation

c) Non-verbal communication does not allow time for evaluation

3.10.5 Written communication

Written communication is a form of communication in which the information to be transmitted is documented. It includes letters, memorandum, fax transmission, electronic mail, and organisational periodicals.

The following are the advantages of written communication.

a) It provides written record and evidence of receipt.

b) It is capable of transmitting complex ideas.

c) It provides analysis, evaluation and summary.

d) It disseminates information to dispersed receivers.

e) It can confirm, interpret and clarify oral communication.

f) It serves as the basis of contract or agreement.

The disadvantages of written communication include

a) It can be expensive and take time to produce.

b) Communication tends to be formal and distant.

c) There is the tendency for misinterpretation to take place.

d) There is no instant feedback.

e) It does not allow for exchange of opinions, viewer's attitudes except over a period of time.

Visual communication

visual communication refers to the transfer of information through diagrams, display boards, flip charts and other forms of visual aids. The different types of Visual Aids/Communication are as

1. The White Board
2. Objects and Models
3. Posters, Diagrams and Charts
4. Tables and Graphs
5. Strips and Slide Projectors
6. Overhead Projectors (OHP)
7. Video Tapes/Video Cassette Recorders

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3.11 Patterns of communication

Communication in our society may take different patterns and various forms. The various types/ patterns of communication are Formal, Vertical, Horizontal and also Informal System.

3.11.1 Formal system of communication

The formal system of communication always communicates which passes through the official channels. In this type of communication flow of communication is always backed by some degree of authority.

3.11.2 Vertical system of communication

In any organisation vertical system of communication means principal channel for routing the policies and directives from top decision-makers down to the all levels who implement them. All the ideas, suggestions, criticism antiquaries that originates from the superior level in any organisation is called as vertical communication. Vertical communication is discriminated either downward or upward direction.

3.11.2.1 Downward communication

In downward communication, communication is always flows from superiors to the subordinates. Downward flows of communication are the most common flow of communication in any organization. Following are the forms of downward communication.

a) **Job instructions:** it is basically a direction about what to do and how to do it?

b) **Procedures and practices:** it is the information about the rules and regulations, policies and benefits in any organization.

c) **Feedback:** The manager can also provide information about how effective a subordinate is performing

3.11.2.2 Upward communication

In any organisation if the information goes from subordinates to superiors then it is known as upward communication. Upward communication is as important as the downward communication. Upward communication may take place in the following forms.

a) Information of the subordinate about himself, his performance, his problems and grievances.

b) Suggestion about what needs to be done and how it could be done.

c) Report on what has been done.

d) Information about other subordinates and their problems.

e) Feedback about the subordinate and may include some of the issues listed above. What should be noted is that managers rely on upward communication for ideas and how things can be improved

3.11.3 Horizontal system of communication

Horizontal communication is also known as lateral communication. This type of communication happens between peoples works at the same or similar level in the organisation. Horizontal communication serves five purposes

1. **Task coordination**
2. **Problem-solving**
3. **Sharing information that will enhance employee's performance**
4. **Conflict resolution**
5. **Building a rapport among the employees**

3.11.4 Informal communication system

Inside any organisation some or some of the communication is done informally even it is official. Some aspects of informal communication are discussed below.

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3.11.4.1 Grapevine

One of the major form of informal communication is Grapevine communication. Grapevine communication is totally unofficial communication system which is constantly changing.

Characteristics of Grapevine communication The major characteristics of the grapevine are as follows

1. Management has absolutely no control over this form of communication.
2. It is perceived by most employees as being more believable and reliable than formal communication issued by top management.
3. It is largely used to serve the self interest of the people within it.

It has been observed that the basis for grapevine is rumours and gossips.

3.12 Barriers to organisational communication

Barriers to effective organisational communication refer to all forms of impediments that may hinder the successful flow of communication in the organisation. A number of barriers can retard or distort effective communication. Some of these barriers are discussed below.

- Language
- Selective perception
- Information overload
- Emotion
- Noise
- Filtering
- Cultural differences
- Lack of feedback

One may take following steps to reduce the barriers to effective communication.

1. Expanding the basis of communication to include feedback
2. Use proper language
3. Improving the listening skills
4. Practising empathy
5. Follow basic communication guidelines like ambiguities, proper follow-ups, timing of messages
6. Filtering
7. Cultural differences
8. Lack of feedback

3.13 Interpersonal communication

Interpersonal communication is applied to both verbal and non-verbal interaction in one-to-one or in small group. The primary elements of the persons interpersonal communications are as follows

Listening: listening is the mental activity that a person goes through whilst he awaits his/her turn to speak. The listening process consists of four elements

- Hearing
- Filtering
- Interpreting
- Recalling

Listening, as a process, can be improved if the receiver takes an active role. The following guidelines can help to improve listening skills.

- Concentrating on the message
- Keeping an open mind
- Asking question if there is doubt

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- Provided regular feedback
- Monitoring and controlling personal non-verbal communication signals
- Ensuring that written or tape-recorded notes are made clearly and in sufficient details for future reference and follow-up work

Speaking/oral communication : One of the main part of oral communication is speaking, by this we can convey messages. In order to create a well-structured oral message, the speaker should do following

1. First decide on the context of the oral communication and what outcomes are desired.
2. Establish the key points to get across and what running order would best link them together in a beginning, middle and an end.
3. Advance the salient facts and figures which will support the argument.
4. Decide on what the delivery style of the message should be before embarking it.
5. The speaker should constantly monitor the feedback he receives from his audience
6. The speaker should know when he has said enough () and (then) stop on a positive note.

3.14 The 7 C's of communication

There are 7 C's of effective communication which are applicable to both written as well as oral communication. These are as follows:

Completeness : The communication must be complete. It should convey all facts required by the audience. The sender of the message must take into consideration the receiver's mind set and convey the message accordingly. A complete communication has following features:

a) Complete communication develops and enhances reputation of an organization.

b) Moreover, they are cost saving as no crucial information is missing and no additional cost is incurred in conveying extra message if the communication is complete.

c) A complete communication always gives additional information wherever required. It leaves no questions in the mind of receiver.

d) Complete communication helps in better decision-making by the audience/readers/receivers of message as they get all desired and crucial information.

e) It persuades the audience.

Conciseness: Conciseness means wordiness, i.e, communicating what you want to convey in least possible words without forgoing the other C's of communication. Conciseness is a necessity for effective communication. Concise communication has following features:

a) It is both time-saving as well as cost-saving.

b) It underlines and highlights the main message as it avoids using excessive and needless words.

c) Concise communication provides short and essential message in limited words to the audience.

d) Concise message is more appealing and comprehensible to the audience.

e) Concise message is non-repetitive in nature.

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Consideration : Consideration implies "stepping into the shoes of others". Effective communication must take the audience into consideration, i.e, the audience's view points, background, mind-set, education level, etc. Make an attempt to envisage your audience, their requirements, emotions as well as problems. Ensure that the self-respect of the audience is maintained and their emotions are not at harm. Modify your words in message to suit the audience's needs while making your message complete. Features of considerate communication are as follows:

a) Emphasize on "you" approach.

b) Empathize with the audience and exhibit interest in the audience. This will stimulate a positive reaction from the audience.

c) Show optimism towards your audience. Emphasize on "what is possible" rather than "what is impossible". Lay stress on positive words such as jovial, committed, thanks, warm, healthy, help, etc.

Clarity : Clarity implies emphasizing on a specific message or goal at a time, rather than trying to achieve too much at once. Clarity in communication has following features:

a) It makes understanding easier.

b) Complete clarity of thoughts and ideas enhances the meaning of message.

c) Clear message makes use of exact, appropriate and concrete words.

Concreteness : Concrete communication implies being particular and clear rather than fuzzy and general. Concreteness strengthens the confidence. Concrete message has following features:

a) It is supported with specific facts and figures.

b) It makes use of words that are clear and that build the reputation.

c) Concrete messages are not misinterpreted.

Courtesy: Courtesy in message implies the message should show the sender's expression as well as should respect the receiver. The sender of the message should be sincerely polite, judicious, reflective and enthusiastic. Courteous message has following features:

a) Courtesy implies taking into consideration both viewpoints as well as feelings of the receiver of the message.

b) Courteous message is positive and focused at the audience.

c) It makes use of terms showing respect for the receiver of message.

d) It is not at all biased.

Correctness : Correctness in communication implies that there are no grammatical errors in communication. Correct communication has following features:

a) The message is exact, correct and well-timed.

b) If the communication is correct, it boosts up the confidence level.

c) Correct message has greater impact on the audience/readers.

d) It checks for the precision and accurateness of facts and figures used in the message.

e) It makes use of appropriate and correct language in the message.

Awareness of these 7 C's of communication makes you an effective communicator.

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3.15 Barriers to communication

3.16 Features of communication

1. If a person replied like “I see” or “mm-hmm” then it is known as
   - (A) Positive feed back
   - (B) Negative feed back
   - (C) Ambiguous feed back
   - (D) Nonverbal feedback

2. Which of the following methods of communication is the most effective?
   - (A) Presenting written material
   - (B) Nonverbal Communication
   - (C) Multi-media method
   - (D) Oral Communication

3. Teaching on TV is superior to class room instruction because
   - (A) Very large classes are made possible and thus it is economically advantageous
   - (B) Experts for teaching difficult topics can be arranged
   - (C) Teaching can be filmed for reuse
   - (D) All of these

4. The most basic function of communication is to
   - (A) Inform people
   - (B) Instruct people
   - (C) Influence people
   - (D) All of these

5. Encoding is
   - (A) The formulation of messages in the communicator’s mind
   - (B) The formulation messages in the receiver’s mind
   - (C) Coding of whole communication process
   - (D) None of these

6. The two major types of essay are
   - (A) Simple and long
   - (B) Simple and complex
   - (C) Simple and direct
   - (D) Direct and long

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7. In writing an essay, ideas may NOT be generated in the mind through

   (A) Decomposition

   (B) Compounding

   (C) Association

   (D) Cooperation

8. ONE of the following is NOT a characteristic of oral presentations.

   (A) Appropriateness

   (B) Clarity

   (C) Clumsiness

   (D) Adequacy

9. Which of the following newspaper oldest and still existing?

   (A) Times of India

   (B) The Hindu

   (C) Mumbai Samachar

   (D) None of them existing now

10. Mumbai Samachar is a magazine in language

    (A) Hindi

    (B) Urdu

    (C) Gujarati

    (D) Marathi

11. Which of the following is oldest magazine published from Kolkata since 1944?

    (A) The Calcutta review

    (B) Bartaman patrika

    (C) Dainik jagran

    (D) The Calcutta news

12. Which of the following is the largest single edition regional newspaper?

    (A) Anandabazar patrika

    (B) janasatta

    (C) Nai Dunia

    (D) None of the above

13. The oldest existing English daily of India is

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(A) The Times of India

(B) The Hindustan Times

(C) The Hindu

(D) The Telegraph

14. Channels used for downward communication are

(A) Types of print

(B) Oral media

(C) Handbook manuals

(D) All of the above

15. What is the other name of Hicky's Bengal Gazette?

(A) The Bengal News

(B) Calcutta General advertiser

(C) Bengal Journal

(D) None of them

16. Which communication has an emotional appeal?

(A) Intrapersonal communication

(B) Interpersonal communication

(C) Mass communication

(D) Group communication

17. A fatwa was issued in Salman Rushdie's name following the publication of

(A) Midnight's children

(B) Shame

(C) Satanic Verses

(D) none of the above

18. The teacher has arranged a meeting with Sakshi's mother to discuss these concerns. Which of the following statements is best for the teacher to say to Sakshi's mother?

(A) Sakshi needs extra practice reading and writing problematic letters and words at home at least 30 minutes per day.

(B) Please discuss the importance of schoolwork to Sakshi so that she will increase her efforts in classwork.

(C) These are possible symptoms of dyslexia so I would like to refer her to a specialist for diagnosis.

(D) Please adjust Sakshi's diet because she is most likely showing symptoms of ADHD due to food allergies.

19. In which language the highest newspapers are published in India

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(A) English
(B) Hindi
(C) Bengali
(D) Gujarati

20. Which of the following is best suited with the Reader's Digest?
(A) It is monthly periodical
(B) It is a newspaper
(C) It is quarterly periodical
(D) None of the above

21. The first objective of teaching English is to develop
(A) Listening skill
(B) speaking skill
(C) Reading skill
(D) writing skill

22. The numbers of kings of sounds are
(A) 2
(B) 3
(C) 4
(D) 5

23. Which of the following is used to facilitate oral presentation?
(A) Aid
(B) Aids
(C) Visual Aids
(D) Manual Aids

24. Which ONE of the following is a basic type of speech?
(A) Poetry
(B) Written
(C) Public
(D) Precise

25. A speech-writer earns a good living by writing speeches is
(A) Professional
(B) Personal

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(C) Elementary

(D) Semi-literate

26. When using remote communication it is best to

(A) Use concise, accurate and clear statements.

(B) Use unexplained jargon.

(C) Use spoken expression and construction.

(D) Avoid checking spelling and grammar.

27. The kinds of sounds are

(A) Consonant sounds, oral sounds

(B) Oral sounds, vowel sound

(C) Verbal sounds, consonant sounds

(D) Consonant sounds, Vowel sounds

28. Phonemins the unit of sound

(A) Maximum

(B) Minimum

(C) Medium

(D) Large

29. The number of branches of phonetics are

(A) 2

(B) 3

(C) 4

(D) 5

30. Which of the following is matched with press trust of India

(A) It is an News agency

(B) It is an newspaper

(C) It is a trust for poor

(D) None of the above

31. In which year modern postal service started in India?

(A) 1837

(B) 1839

(C) 1848

(D) 1948

32. Who said that communication is the interchange of thoughts and ideas

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(A) McLuhan
(B) Dennis McQuail
(C) Charles E. Osgood
(D) Lord Mountbatten

33. ONE of the following groups is the components of The Rhetorical Triangle.
(A) Appeal and logic
(B) Appeal, emotion and logic
(C) Appeal, resolution and logic
(D) Resolution, logic and emotion

34. In an organization, the two basic types of correspondence are
(A) External and international
(B) International and regional
(C) Internal and external
(D) Internal and regional

35. ONE of the following is NOT a characteristic of internal correspondence.
(A) May not be disclosed to outsiders
(B) Sometimes restrictive
(C) Sometimes secretive
(D) May be disclosed to outsiders

36. Internal correspondence may be either secret or
(A) Closed
(B) Open
(C) National
(D) Departmental

37. At the end of 19th century who introduced motion pictures?
(A) Lumiere Brothers
(B) Guttenberg
(C) Thomas Kuhn
(D) Donald Knuth

38. Non-verbal communication is
(A) Kinesics
(B) Proxemics
(C) Para language
(D) All of the above

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39. Interpersonal communication is

(A) Person to person contact

(B) When an individual sends and receives messages

(C) The thought process

(D) Communication with mass audience

40. When using remote communication it is advisable to avoid

(A) Formal language.

(B) Abrupt and impolite messages.

(C) Correcting spelling and grammar.

(D) Using one idea to a sentence.

41. Phonology is the study of how sounds are

(A) Produced

(B) Transmitted

(C) Organized

(D) Distinguished

42. Which of the following incidents happened in year 1854?

(A) IU postal system was introduced

(B) Post office savings bank started

(C) The first postage stamp introduced

(D) All of them happened in the same year

43. Which of the following is the full form of UNI

(A) United Nations information

(B) United Nations India

(C) United News Indian

(D) None of the above

44. The highest level in linguistics is

(A) Phonology

(B) phonetics

(C) Morphology

(D) Pragmatics

45. DNA is a joint venture of

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(A) Zee TV and Star TV

(B) Zee TV and Dainik Jagran

(C) Zee TV and Dainik Bhaskar

(D) Zee TV and Doordarshan

46. Who among the following is a celebrated cartoonist

(A) Abu Abraham

(B) Ajay Jadeja

(C) Morris Odumbe

(D) Sanath Jayasurya

47. The official secrets act came into effect in

(A) 1910

(B) 1923

(C) 1945

(D) 1947

48. The Right to information act came into effect in

(A) 2006

(B) 2004

(C) 2005

(D) 1999

49. The numbers of vowels in English are

(A) 21

(B) 3

(C) 4

(D) 5

50. The number of consonants in English are

(A) 15

(B) 21

(C) 26

(D) 31

51. What is an external correspondence issued to the mass media on a specific issue, which is meant for public consumption called?

(A) House Release

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(B) Press Release

(C) Press Note

(D) House Report

52. Which of the following is NOT a feature of an official letter?

(A) Written on the letter head

(B) Contains personal feelings

(C) Carries a reference number

(D) contains address and telephone number(s)

53. ONE of the following is NOT a feature of a special meeting.

(A) Handling of routine matters

(B) No consideration of minutes of any previous meeting

(C) Notice of meeting

(D) Called to consider a specific issue or issues

54. The convession of spoken words into written language is

(A) Transplantation

(B) Transmission

(C) Transcription

(D) Translation

55. Remote communication takes many forms and has various characteristics. It includes

(A) Telephones and the internet.

(B) Written reports and databases.

(C) Video/teleconferences.

(D) All of the above.

56. Which of the following is the full form of PIN (related to PIN code)

(A) Postal index number

(B) Postal identity number

(C) Both A and B

(D) None of the above

57. In which year air mail system started

(A) 1854

(B) 1853

(C) 1829

(D) 1975

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58. In 1881-82, the first telephone service was started in

(A) Kolkata

(B) Mumbai

(C) Delhi

(D) Howrah

59. Effective communication requires

(A) Connection, an uncommon purpose and mutual understanding

(B) Receiving and understanding

(C) Understanding of different environmental factors

(D) None of the above

60. The Indian equivalent of communication is

(A) Antology bhab

(B) Sadaharanikaran

(C) Anubhav

(D) All of the above

61. Intrapersonal communication is best described as

(A) Complication between person to person

(B) Talking to oneself

(C) More than two persons are talking

(D) All of the above

62. Which is the father of Indian language journalism in India

(A) Raja Rammohan Roy

(B) Swami Vivekananda

(C) Sister Nivedita

(D) Netaji Subhash Chandra Bose

63. Who among the following wrote the book television in India

(A) Vinod Mehta

(B) Nalin Mehta

(C) Milkha singh

(D) Amitava Bachhan

64. Which of the following newspaper is published in a tabloid form

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(A) Mail today
(B) The statement
(C) The Telegraph
(D) The Tribune

65. Grapevine is related to
(A) Horizontal communication
(B) Vertical communication
(C) Oral communication
(D) Informal communication

66. Misunderstandings
(A) Can be easily avoided if you supply written information.
(B) Only occur when you have not clearly explained something.
(C) Can be avoided if you adjust your language appropriately and allow time for questioning and clarifying.
(D) Are breakdowns in communication

67. Which of the following is NOT a feature of a regular meeting?
(A) Notice of meeting
(B) Consideration of minutes of a previous meeting
(C) Motion for adjournment
(D) Call to the bar

68. Which of the following is the purpose for convening an emergency meeting?
(A) There is a ceremony to be performed
(B) There is a member of staff to be sent off
(C) There is an urgent matter at hand
(D) There is money to be shared

69. Channel for upward communication is
(A) Newspapers
(B) Letters sent to home
(C) Posters
(D) Offer options that allow anonymous input, such as suggestion boxes etc

70. When was censorship introduced on Indian press
(A) 1970
(B) 1790
(C) 1792
(D) 1795

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71. When was commercial broadcasting started in Akashvani?

(A) November 1, 1967

(B) November 1, 1957

(C) November 1, 1935

(D) November 1, 1945

72. In India, the first automatic telephone exchange was commissioned at

(A) Calcutta

(B) Delhi

(C) Shimla

(D) None of the above

73. Which of the following is full form of NSD with respect to communication technology

(A) National subscriber dialling

(B) National School of defence technology

(C) National system of dialling technology

(D) none of the above

74. In which year VSNL was formed

(A) 1986

(B) 1983

(C) 1922

(D) 1935

75. When was the national channel started up broadcast quality music.

(A) 18 May, 1988

(B) 18 May, 1936

(C) 18 May, 1947

(D) 18 May, 1992

76. Which of the following happened in 1976

(A) Doordarshan was separated from AIR

(B) Doordarshan was separated from FM

(C) Colour television was introduced in India

(D) None of the above

77. Which of the following is true about Prasar Bharti?

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(A) It is a television channel

(B) It is newspaper

(C) It is magazine

(D) It is autonomous broadcasting Corporation

78. The first newspaper in India started in

(A) Kolkata

(B) Assam

(C) Bangladesh

(D) Chattagram

79. ONE of the following is NOT a purpose for which a notice of meeting is sent to members of a meeting.

(A) Invite participants to an event

(B) Inform participants prior to the take-off of an event

(C) Inform participants after the take-off of an event

(D) Give ample time for participants to plan to attend an event

80. Which of the following states the three fundamental tools of a meeting?

(A) Notice of Meeting, Chairman's Opening Remarks and Agenda

(B) Notice of Meeting, Agenda and Minutes of Meeting

(C) Agenda, Chairma's Opening Remarks and Chairman's Closing Remarks

(D) Notice of Meeting, Chairman'S Closing Remarks and Agenda

81. Match the following

A	Sounds	1	Facial expressions
B	Writing of a letter	2	Formal communication
C	Mannerism	3	Speech rate
D	Office meeting	4	Written communication

(A) $A-2, B-3, C-1, D-4$

(B) $A-3, B-2, C-1, D-4$

(C) $A-4, B-3, C-1, D-2$

(D) $A-3, B-2, C-4, D-1$

82. In Internet technology ISP means

(A) Internet service provider

(B) Internet subscriber Porter

(C) Internet subscriber provider

(D) Internet system provider

83. Which of the following is the largest Internet service provider in India

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(A) VSNL

(B) BSNL

(C) NTML

(D) Airtel

84. Where from the term cummunis came from

(A) Latin

(B) Greek

(C) Roman

(D) Persia

85. Which of the following is nature of communication

(A) Process of exchange of ideas

(B) A purposive process

(C) A psychosocial process

(D) All of the above

86. Match the following

A	Ratan tata	1	We the people
B	Arun Shorie	2	Editor of Indian Express
C	Barkha Dutt	3	grapevine
D	Keith davis	4	Industrialist

(A) $A-2, B-3, C-1, D-4$

(B) $A-4, B-2, C-1, D-3$

(C) $A-4, B-3, C-1, D-2$

(D) $A-3, B-2, C-4, D-1$

87. Cultural safety

(A) Protects the culture of the health professional, keeping it safe.

(B) Requires special places of safety that accommodate the relevant culture.

(C) Requires understanding of your own culture, the culture of the health service and the culture of the person seeking assistance.

(D) All of the above.

88. Match the following

A	Pictures	1	High order skills
B	High skills	2	Visual communication
C	Hums	3	Speech art
D	Long distances	4	Public telephone network

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(A) $A-2, B-3, C-1, D-4$

(B) $A-2, B-1, C-3, D-4$

(C) $A-4, B-3, C-1, D-2$

(D) $A-3, B-2, C-4, D-1$

89. Match the following

A	Teleconferencing	1	First para of news
B	Angle	2	A website where you can add, remove or edit the content
C	Lead	3	group of persons
D	Wikipedia	4	Focus of the story

(A) $A-2, B-3, C-1, D-4$

(B) $A-3, B-4, C-1, D-2$

(C) $A-4, B-3, C-1, D-2$

(D) $A-3, B-2, C-4, D-1$

90. Generally in a communication the position of perception, retention and recall will be

(A) Like Channel variables

(B) Like dependent variable

(C) Like destination variable

(D) None of the above

91. Which of the following is the responsibility of a messenger?

(A) To encode the message

(B) To decline the message

(C) To develop the message

(D) All of the above

92. In the question below the two statements labelled as assertion (A) and reason (R) . Which one of the following is correct

Assertion (A) : downward communication flows from superior to downward

Reason(R) : downward communication helps in resolving conflicts

(A) Both A and R are true and R is the correct explanation of A

(B) Both A and R are true, R is not the correct explanation of A

(C) A is true, R is false

(D) A is false, R is false

93. Which of the following is responsible for decoding the message?

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(A) Sender
(B) Receiver
(C) Channel
(D) Adapter

94. Which of the following is known as the biggest barrier of communication?
(A) Noise
(B) Bad words
(C) Channel distortion
(D) None of the above

95. At present network, Akashvani comprises of how many broadcasting centres
(A) 197
(B) 132
(C) 120
(D) 95

96. Communication with indigenous peoples
(A) Is no diff erent to communication with non-indigenous peoples.
(B) Is inevitable when practising as a health professional.
(C) Requires the health professional to stereotype each indigenous person they see.
(D) Requires understanding of the complexity and diversity of cultural identity to create cultural safety

97. Which of the following is NOT a type of technical report?
(A) Research Report
(B) Committee Report
(C) Spectator's Report of a football match
(D) Investigative Report of Communal riot

98. ONE of the following is NOT a part of a technical report.
(A) Title Page
(B) Table of Contents
(C) Acknowledgement
(D) Invitation

99. The reference section of a report does NOT have ONE of the following features.
(A) Author's names are arranged alphabetically
(B) Titles of cited works are indicated in full
(C) Year of publication for each entry is indicated
(D) Acknowledgement

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100. Which of the following is NOT included in the appendix section of a report?

(A) Conclusion

(B) Maps

(C) Questionnaire

(D) Graphs

101. How many relay centres does Akashvani have

(A) 10

(B) 12

(C) 14

(D) 15

102. Communication by using the Eyes is an example of

(A) Non-verbal communication

(B) Written communication

(C) Verbal communication

(D) None of the above

103. Which of the following is responsible to change the messages into symbols?

(A) Decoding

(B) Encoding

(C) Symbolic expression

(D) All of the above

104. When did the radio broadcasting started in India

(A) 1927

(B) 1925

(C) 1936

(D) 1920

105. Which of the following places two privately owned transmitters placed when AIR started in India?

(A) Mumbai and Kolkata

(B) Mumbai and pune

(C) Kolkata and Pune

(D) Kolkata and Assam

106. When did Vividh Bharati started?

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(A) 1957

(B) 1955

(C) 1947

(D) 1920

107. In which year FM became private organization?

(A) July 6, 1999

(B) July 6, 1997

(C) July 6, 1995

(D) July 6, 1993

108. In the question below the two statements labelled as assertion (A) and reason (R) . Which one of the following is correct.

Assertion (A):two way communication is not possible in the mass media
Reason (R):the message is conveyed, but the feedback is not immediate

(A) Both A and R are true, R is the correct explanation of A

(B) Both A and R are true, R is not the correct explanation of A

(C) A is true, R is false

(D) A is false, R is false

109. Which of the following is known as important element of communication?

(A) The sender and the receiver

(B) The sender and the chairman

(C) The receiver and the channel

(D) The sender, Channel and receiver

110. For a teacher to be an effective communicator it is essential that

(A) Teacher must start from the point from where the children are ready to learn

(B) Teacher must use good teaching aid

(C) The teacher must be a master in that subject

(D) All of the above

111. A teacher should behave with the children

(A) Intellectually

(B) Democratically

(C) Autocratically

(D) Morally

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112. In the question below the two statements labelled as assertion (A) and reason (R) . Which one of the following is correct.

Assertion (A):a newspaper is a mass media tool
Reason (R):newspaper connects masses with pieces of information

(A) Both A and R are true, R is the correct explanation of A
(B) Both A and R are true, R is not the correct explanation of A
(C) A is true, R is false
(D) A is false, R is false

113. Interpretation is beneficial when communicating across cultures. There are different kinds of interpretation, which include

(A) Simultaneous.
(B) Transliteration.
(C) Sequential.
(D) All of the listed items.

114. In the question below the two statements labelled as assertion (A) and reason (R) . Which one of the following is correct.

Assertion (A):non-verbal communication is related to expression of feelings, emotions in a wordless manner
Reason (R):body language is helpful in creating an understanding of any matter of feelings

(A) Both A and R are true, R is the correct explanation of A
(B) Both A and R are true, R is not the correct explanation of A
(C) A is true, R is false
(D) A is false, R is false

115. Suppose you are unable to follow a foreigners language. In this case, communication of messages will be carried out through

(A) Symbolic language
(B) Body language
(C) Screaming
(D) None of the above

116. Message is passing through the

(A) Transmission wire
(B) Channel
(C) Transmission medium
(D) None of the above

117. Which of the following is the meaning of communication according to Hegons

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(A) Dialogue between two-persons

(B) Interaction among two groups

(C) Both A and B

(D) None of the above

118. The general appeal of a report is NOT dependent on ONE of the following.

(A) Language choice

(B) Language use

(C) Format

(D) Launching ceremony

119. Marketing communication in an organization is NOT directed at ONE of the following.

(A) Middlemen

(B) Consumers

(C) Salesmen

(D) Management

120. Which of the following is NOT a method of establishing and sustaining marketing relations?

(A) Press Release

(B) Advertorial

(C) Feature article

(D) Force

121. Identify the correct sequence of newspaper format

(A) Mast-head, headline, conclusion, body

(B) Body, conclusion, headline, mast-head

(C) Conclusion, headline, body, mast-head

(D) Mast-head, headline, body, conclusion

122. Identify the correct sequence of news channels

(A) Zee news, colors, Star plus, Al Jazeera

(B) Zee news, ABP news, Al Jazeera, Times

(C) CNBC,BBC,Star world, Sony

(D) All of the above

123. Which of the following is not true about the types of oral communication?

A) Auditory communication is dependent on hearing

B) Idiolect is a language of an individual at a particular period in life

C) monologue is a long utterance by many people simultaneously

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(A) Only A

(B) Only B

(C) Only C

(D) all of the above

124. Which of the following is not a true statement about an oral communication?

I) Oral communication provides an immediate feedback

II) Oral communication is more authentic than written communication

III) Oral communication is not frequently used in legal records

(A) Both I and II

(B) Both I and III

(C) Both II and III

(D) None of the above

125. Which of the following is the barrier of communication?

(A) Language barrier

(B) Physical barrier

(C) Psychological barrier

(D) All of the above

126. In effective communication a long statement is considered as

(A) Barrier

(B) Not a barrier to

(C) Effective message

(D) Wrong message

127. Which of the following train disseminates scientific awareness in the country?

(A) Technological rail

(B) Scientific rail

(C) Science and technology rail

(D) All of the above

128. Culturally appropriate communication is essential for eff ective communication.

(A) It requires the health professional to live in the country and speak the language.

(B) It is impossible for a health professional to be culturally competent so being friendly and helpful will compensate.

(C) If the health professional uses an interpreter they will achieve culturally appropriate communication.

(D) It requires awareness of cultural diff erences, sensitivity and openness to these differences, and acknowledgement of the validity of the other culture.

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129. To communicate easily and effectively with your readers, how many number of principles communication are applied

(A) Nine

(B) Seven

(C) Eleven

(D) Six

130. A letter that completes a valid contract between a buyer and a seller is called.

(A) An order letter

(B) An acknowledgment letter

(C) An inquiry

(D) A sales letter

131. Who enforced the vernacular press act?

(A) Raymond Williams

(B) Marshall Lyton

(C) Queen Victoria

(D) Lord Clive

132. Who among the following differentiated between Hot and Cold messages?

(A) Raymond Williams

(B) Marshall Mcluhan

(C) James Augustus

(D) None of the above

133. Which of the following is NOT an effective advertising media?

(A) Bill boards

(B) Television

(C) Whisper

(D) Internet

134. ONE of the following is NOT an example of an electronic media.

(A) The internet

(B) Newspapers

(C) Television

(D) Cable network

135. Which of the following is NOT an example of the print media?

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(A) Television
(B) National Dailies
(C) Metropolitan Dailies
(D) Magazines

136. Which of the following is an important property for an effective communicator?
(A) The objective of communication
(B) Thinking about the evaluation procedure
(C) Both A and B
(D) None of the above

137. The ultimate objective of feedback in the process of communication is a
(A) To bring some desirable changes in the process of communication
(B) To understand about the messages
(C) To understand the disadvantage of communication
(D) All of the above

138. In discussion with small group, the students can interact with each other in
(A) Restricted environment
(B) A more liberal environment
(C) A fully restricted environment
(D) None of the above

139. Which committee was set up to re-examine the Prasar Bharti Act?
(A) Sengupta committee
(B) Changder committee
(C) Ghosh committee
(D) Pradhan committee

140. A combination of document analysis, observations and interviews are applied usefully in
(A) Content analysis
(B) Case study
(C) Survey research
(D) Field experiment

141. Which was the first Indian advertising agency?
(A) Indian advertising agency
(B) Indian national advertising agency
(C) national advertising agency
(D) international advertising agency

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142. Which of the following is the popular editing software for film/video?

(A) Photoshop

(B) Indesign

(C) Final cut pro

(D) VCD cutter

143. Which of the following is the most important step for an effective communicator?

(A) Determining objectives of communication

(B) Identifying mediums of communication

(C) Selecting the most suitable channel

(D) All of the above

144. Culture includes

(A) Values and beliefs.

(B) Customs, traditions, values and desires.

(C) Ways of living and behavioural habits.

(D) Beliefs, values, spirituality, language, familial and social roles, artistic expression, food, non-verbal behaviour and remedies.

145. Family/person-centred practice is

(A) Supported by all health professions.

(B) A new concept that developed at the beginning of this century.

(C) Only useful when working with children.

(D) The use of a collaborative relationship to fulfil the needs and achieve the goals of the person seeking assistance.

(E) The practice of mainstream medical health professions only.

146. Respect is essential when practising as a health professional.

(A) However, you only need to respect yourself and your colleagues.

(B) It is the foundational factor that builds mutual understanding and a therapeutic relationship.

(C) It is especially important when relating to people older than you.

(D) However, you only need to respect those people who respect you.

147. The interpretation of physical message into a form that has eventual meaning for a receiver is called

(A) Coding

(B) Recording

(C) Decoding

(D) Encoding

148. Which of the following is the first newspaper to have a reader's editor?

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(A) The Times of India

(B) The Hindu

(C) Hindustan Times

(D) the pioneer

149. In communication, ... confirms receipt of the message.

(A) Receiver

(B) Communication

(C) Channel

(D) Sender

150. Communication is a ..... way process.

(A) Two

(B) Three

(C) One

(D) None of above

151. Which is India's first channel on children on TV?

(A) Cartoon network

(B) Walt Disney

(C) United home entertainments Hungama TV

(D) Nick Junior

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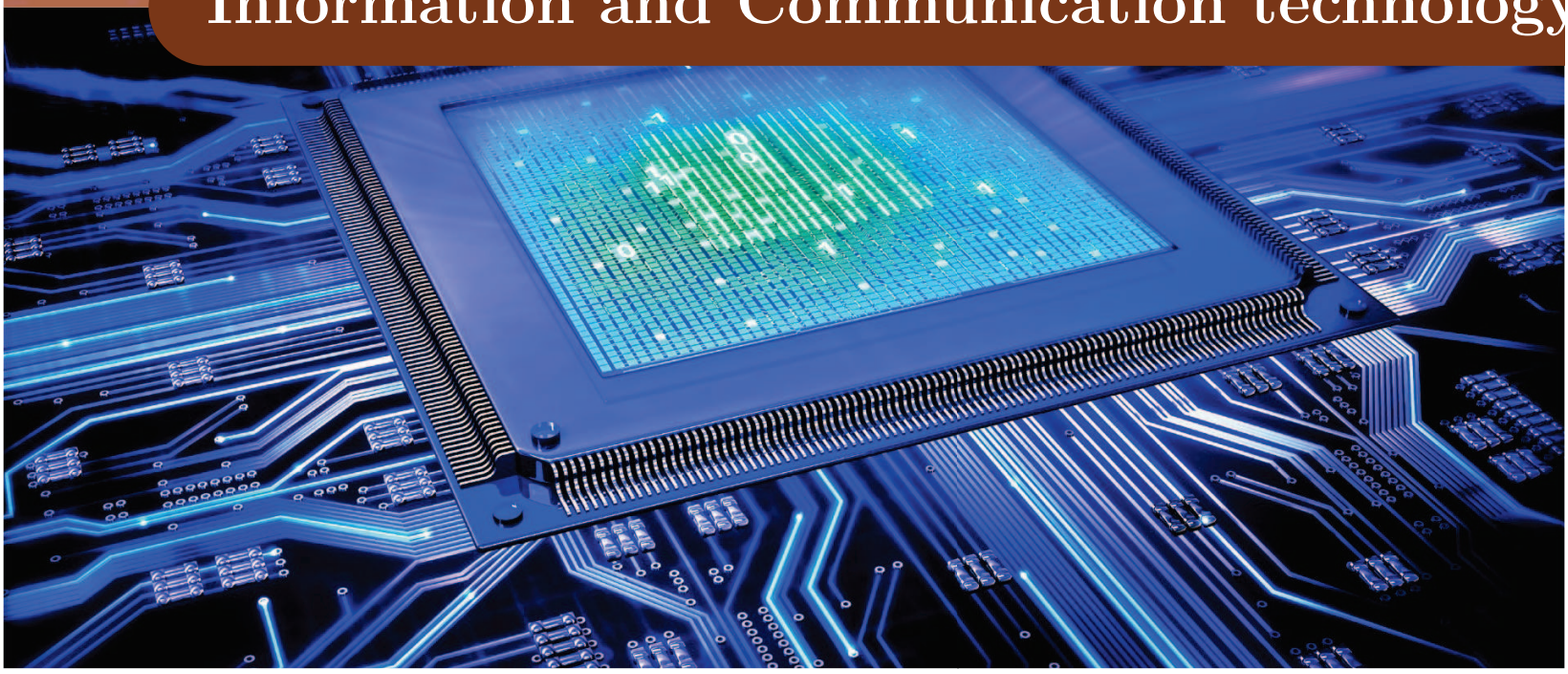
Probable answer key.

If you get any wrong answer please mail me at narayan.changder@gmail.com. I am still working on answer key. Dont only criticise, rather report right answer at above email or you can message me in facebook

Answers

1. C 2. C 3. D 4. D 5. A 6. A 7. D 8. C 9. C 10. C 11. A 12. A 13. A 14. D 15. B 16. B
17. C 18. C 19. B 20. A 21. A 22. A 23. C 24. C 25. A 26. A 27. D 28. B 29. B 30. A
31. A 32. B 33. B 34. C 35. D 36. B 37. A 38. D 39. A 40. B 41. C 42. C 43. A 44. B
45. C 46. A 47. B 48. C 49. D 50. B 51. B 52. B 53. A 54. C 55. D 56. A 57. A 58. A
59. B 60. B 61. B 62. A 63. B 64. A 65. D 66. C 67. D 68. C 69. D 70. D 71. A 72. C
73. A 74. A 75. A 76. A 77. D 78. A 79. C 80. B 81. B 82. A 83. A 84. A 85. D 86. B
87. C 88. B 89. B 90. A 91. D 92. B 93. B 94. A 95. A 96. D 97. C 98. D 99. D 100. A
101. A 102. A 103. B 104. A 105. A 106. A 107. B 108. A 109. D 110. A 111. B 112. A
113. D 114. C 115. A 116. B 117. C 118. D 119. D 120. D 121. D 122. B 123. C 124. B
125. D 126. A 127. C 128. D 129. B 130. B 131. B 132. B 133. C 134. B 135. A 136. C
137. A 138. B 139. A 140. D 141. A 142. C 143. A 144. D 145. D 146. B 147. C 148. B
149. A 150. A 151. C

Information and Communication technology



In this chapter we will learn about the computer and its different viewpoint. So what is a computer system?. In principle, any system is contained within a boundary, either logical or physical. The system interacts with the environment where the environment lies outside the boundary. A computer system interacts with its environment via inputs and outputs. Mind it, the computer system has no direct control over the environment it can only control what is happening inside the boundary. The system receives inputs, but it has no control over what these inputs are. At the end it gives output.

Systems can be defined in many ways. They could have the same boundary, but a different way of looking at it. It could also have a different boundary.

Computer Systems

You could look at a computer system in the following ways:

1. A tool that takes commands and returns data.
2. A collection of components that take in electrical signals and returns electrical signals.
3. A device for converting characters to binary code.
4. A component in an office workflow diagram.

4.1 Computer systems

Computer Systems

Computer is an advanced electronic device that takes raw data as input from the user and processes these data under the control of set of instructions (called program) and gives the result (output) and saves output for the future use. It can process both numerical and non-numerical (arithmetic and logical) calculations.

A computer has four functions:

1. **Input(Data)** Computer input is whatever is entered or fed into a computer system. Input can be supplied by a person (such as by using a keyboard) or by another computer or device (such as a diskette or CD-ROM). Some examples of input include the words and symbols in a document, numbers for a calculation, instructions for completing a process, pictures, and so on.

2. **Processing** Process is the manipulating the data in many ways.This manipulation is called processing. Examples of processing include performing calculations, sorting lists of words or numbers, modifying documents and pictures according to user instructions, and drawing graphs. A computer processes data in the CPU.

What is a process

Process is A systematic series of actions a computer uses to manipulate data.

3. **Output:** Output is the processed data given by computer after data processing. Output is also called as Result. We can save these results in the storage devices for the future use.

4. **Store result:** A computer must store data so that it is available for processing. Most computers have more than one location for storing data (the hard drive or C:\and the floppy drive or A:\). The place where the computer stores the data depends on how the data is being used. The computer puts the data in one place while it is waiting to be processed and another place when it is not needed for immediate processing. The storage of data in the computer is called online storage while the storage of data on computer tapes, diskettes or CD-ROMs is called offline storage.

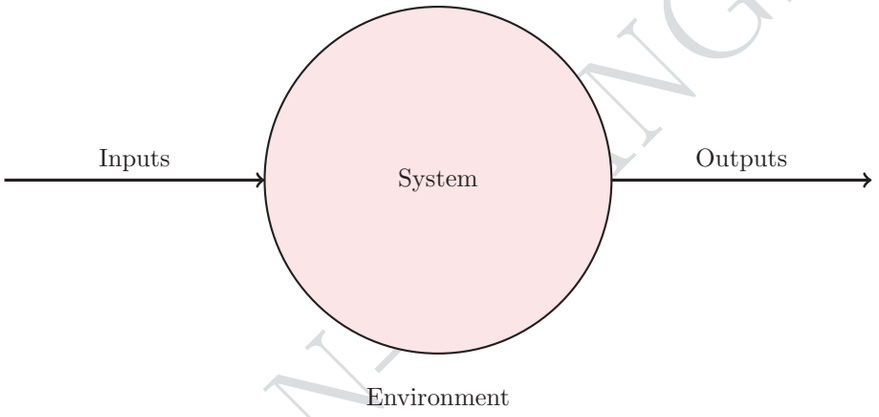


Figure 4.1: figure
View of a system

All of the components of a computer system can be summarized with the simple equation.

COMPUTER SYSTEM = HARDWARE + SOFTWARE+ USER.

- **Hardware = Internal Devices + Peripheral Devices**
  All physical parts of the computer (or everything that we can touch) are known as Hardware.
- **Software = Programs**
  Software gives *"intelligence"* to the computer.
- **USER = Person**, who operates computer.

4.1.1 Types of Computer

A computer is a programmable machine. It allows the user to store all sorts of information and then process that information,or data, or carry out actions with the information, such as calculating numbers or organising words. Computers can be generally classified by size and working principle, although there can be considerable overlap. Following are descriptions of several different types of computers.

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Computer as data procesing Systems

1. **Data (pural):** The representation of information in a formalised manner suitable for communication, interpretation and processing, generally by a computer system.
2. **Information:** Knowledge that is communicated.
3. **Computer:** A machine that can receive and store information and change or process it

4.1.1.1 Types of Computer On the basis of working principle

a) **Analog Computer:**An analog computer (spelt analogue in British English) is a form of computer that uses *continuous* physical phenomena such as electrical, mechanical, or hydraulic quantities to model the problem being solved.

b) **Digital Computer:**A computer that performs calculations and logical operations with quantities represented as digits, usually in the binary number system.

c) **Hybrid Computer (Analog + Digital):**A combination of computers those are capable of inputting and outputting in both digital and analog signals. A hybrid computer system setup offers a cost effective method of performing complex simulations.

4.1.1.2 Types of Computer on the basis of Size:

a) **Super Computer:** The fastest type of computer. Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations. For example, weather forecasting requires a supercomputer. Other uses of supercomputers include animated graphics, fluid dynamic calculations, nuclear energy research, and petroleum exploration.
The chief difference between a supercomputer and a mainframe is that a supercomputer channels all its power into executing a few programs as fast as possible, whereas a mainframe uses its power to execute many programs concurrently.



Figure 4.2: Indian-American uses supercomputer to make HIV evolutionary

b) **Mainframe computer:** It is large-sized, powerful multi-user computers that can support concurrent programs. That means, they can perform different actions or processes at the same time. Mainframe computers can be used by as many as hundreds or thousands of users at the same time. Large organisations may use a mainframe

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computer to execute large-scale processes such as processing the organisations payroll.
In the hierarchy that starts with a simple microprocessor (in watches, for example) at the bottom and moves to supercomputers at the top, mainframes are just below supercomputers. In some ways, mainframes are more powerful than supercomputers because they support more simultaneous programs. But supercomputers can execute a single program faster than a mainframe.



Figure 4.3: Mainframe computer

c) **Mini Computer:** A midsized computer. In size and power, minicomputers lie between *workstations* and *mainframes*. In the past decade, the distinction between large minicomputers and small mainframes has blurred, however, as has the distinction between small minicomputers and workstations. But in general, a minicomputer is a multiprocessing system capable of supporting from 4 to about 200 users simultaneously.



Figure 4.4: Mini computer

d) **Workstations:** It is powerful, single-user computers. They have the capacity to store and process large quantities of data, but they are only used by one person at a time.However, workstations are typically linked together to form a computer network called a local area network, which means that several people, such as staff in an office,can communicate with each other and share electronic files and data.

Computer network

A grouping of computers and peripherals connected together by telecommunications links to enable a group of users to share and exchange information

A workstation is similar to a personal computer but is more powerful and often comes with a higher-quality monitor. In terms of computing power, workstations lie in between personal computers and mini-computers. Workstations commonly support applications that require relatively high-quality graphics capabilities and a lot of memory, such as desktop publishing, software development and engineering applications.

e) **Micro Computer:** A microcomputer is a computer with a microprocessor as its central processing unit. They are physically small compared to mainframe and minicomputers. Many microcomputers (when equipped with a keyboard and screen for input and output) are also personal computers (in the generic sense).

i) **Desktop Computer:** A personal or micro-mini computer sufficient to fit on a desk.

ii) **Laptop Computer:** A portable computer complete with an integrated screen and keyboard. It is generally smaller in size than a desktop computer and larger than a notebook computer.

iii) **Palmtop Computer/Digital Diary /Notebook /PDAs:** A hand-sized computer. Palmtops have no keyboard but the screen serves both as an input and output device.

4.2 The Generations of Computers

The development of computers started with mechanical and electromechanical devices (17^{th} through 19^{th} century) and has progressed through four generations of computers.

4.2.1 Mechanical Devices:



Blaise Pascal(1623-1662)

One of the earliest mechanical calculating devices was the Pascaline, invented in 1642 by the French philosopher and mathematician Blaise Pascal. The Pascaline was a complicated set of gears that operated similarly to a clock. It was designed to only perform addition.Unfortunately, due to manufacturing problems, Pascal never got the device to work properly. Later in the 17th century Gottfried Wilhelm von Leibniz, a famous mathematician, invented a device that was supposed to be able to add and subtract, as well as multiply, divide, and calculate square roots.His device, the Stepped Reckoner, included a cylindrical wheel called the Leibniz wheel and a moveable carriage that was used to enter the number of digits in the multiplicand. However, because of mechanically unreliable parts, the device tended to jam and malfunction.In 1822 Charles Babbage began work on the Difference Engine, which was intended to calculate numbers to the 20th place and then print them at 44 digits per minute. The original purpose of this machine was to produce tables of numbers that would be used by ships navigators. At the time, navigation tables were often highly inaccurate due to calculation errors and a number of ships were known to have been lost at sea because of these errors. Although never built, the ideas for the Difference Engine led to the design of Babbages Analytical Engine. The Analytical Engine, designed around 1833, was supposed to perform a variety of calculations by following a set of instructions, or program, stored on punched cards. During processing, the Analytical Engine was planned to store information in a memory unit that would allow it to make decisions and then carry out instructions based on those decisions. For example, when comparing two numbers, it could be programmed to determine which was larger and then follow an appropriate set of instructions. The Analytical Engine was also never built, but its design served as a model for the modern computer.

Babbages chief collaborator on the Analytical Engine was Ada Byron, Countess of Lovelace, the daughter of Lord Byron. Interested in mathematics, Lady Byron was a sponsor of the Analytical Engine and one of the first people to realize its power and significance. She also wrote of its achievements in order to gain support for it. Ada Byron is often called the first programmer because she wrote a program based on the design of the Analytical Engine.

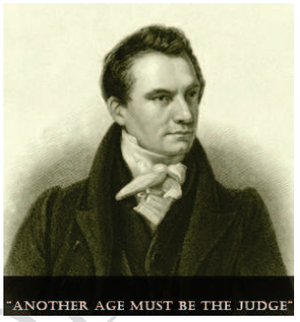
Babbage had hoped that the Analytical Engine would be able to think. Ada Byron, however, said that the Engine could never originate anything, meaning that she did not believe that a machine, no matter how powerful, could think. To this day her statement about computing machines remains true.

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4.2.2 Electro-Mechanical Devices:

By the end of the 19th century, U.S. Census officials were concerned about the time it took to tabulate the continuously increasing number of Americans. This counting was done every 10 years, as required by the Constitution. However, the Census of 1880 took nine years to compile which made the figures out of date by the time they were published.

In response to a contest sponsored by the U.S. Census Bureau, Herman Hollerith invented a tabulating machine that used electricity rather than mechanical gears. Holes representing information to be tabulated were punched in cards, with the location of each hole representing a specific piece of information (male, female, age, etc.). The cards were then inserted into the machine and metal pins used to open and close electrical circuits. If a circuit was closed, a counter was increased by one.



Charles Babbage(1792-1871)

Holleriths machine was immensely successful. The general count of the population, then 63 million, took only six weeks to compile. Although the full statistical analysis took seven years, it was still an improvement over the nine years it took to compile the previous census.Based on the success of his tabulating machine, Herman Hollerith started the Tabulating Machine Company in 1896. In 1924, the company was taken over by International Business Machines (IBM)

The first electronic computer was built based on vacuum tube technology between 1939 and 1942 at Iowa State University by John Atanasoff, a math and physics professor, and Clifford Berry, a graduate student. Vacuum tubes were used to perform logic operations and to store data. Generations of computers has been divided into five according to the development of technologies used to fabricate the processors, memories and I/O units.. The Atanasoff-Berry Computer (ABC) used the binary number system of 1s and 0s that is still used in computers today. It contained hundreds of vacuum tubes and stored numbers for calculations by electronically burning holes in sheets of paper. The output of calculations was displayed on an odometer type of device.



Herman Hollerith(1860-1929)

The patent application for the ABC was not handled properly, and it was not until almost 50 years later that Atanasoff received full credit for his invention. In 1990, he was awarded the Presidential Medal of Technology for his pioneering work. A working replica of the ABC was unveiled at the Smithsonian in Washington, D.C. on October 9, 1997.

In June 1943, John Mauchly and J. Presper Eckert began work on the ENIAC (Electronic Numerical Integration and Calculator). It was originally a secret military project which began during World War II to calculate the trajectory of artillery shells. Built at the University of Pennsylvania, it was not finished until 1946, after the war had ended. But the great effort put into the ENIAC was not wasted. In one of its first demonstrations, ENIAC was given a problem that would have taken a team of mathematicians three days to solve. It solved the problem in twenty seconds.

The ENIAC weighed 30 tons and occupied 1500 square feet, the same area taken up by the average three bedroom house. It contained over 17,000 vacuum tubes, which consumed huge amounts of electricity and produced a tremendous amount of heat requiring special fans to cool the room.

The ABC and the ENIAC are first generation computers because they mark the beginning of the computer era.

4.2.3 The Stored Program Computer:

The ABC and ENIAC required wire pulling, replugging, and switch flipping to change their instructions. A breakthrough in the architectural design of first generation computers came as a result of separate publications by Alan Turing and John von Neumann, both mathematicians with the idea of the stored program.

In the late 30s and 40s, Alan Turing developed the idea of a universal machine. He envisioned a computer that could perform many different tasks by simply changing a program rather than by changing electronic components. A program is a sequence of instructions written in a code that the computer understands.

In 1945, John von Neumann presented his idea of the stored program concept. The stored program computer would store computer instructions in a CPU (Central Processing Unit). The CPU consisted of different elements used to control all the functions of the computer electronically so that it would not be necessary to flip switches or pull wires to change instructions.

Together with Mauchly and Eckert, von Neumann designed and built the EDVAC (Electronic Discrete Variable Automatic Computer) and the EDSAC (Electronic Delay Storage Automatic Computer). These computers were

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designed to solve many different problems by simply entering new instructions that were stored on paper tape. The instructions were in machine language, which consists of 0s and 1s to represent the status of a switch (0 for off and 1 for on).

The third computer to employ the stored program concept was the UNIVAC (UNIVersal Automatic Computer) built by Mauchly and Eckert. With the UNIVAC came the first computer language called C- 10, which was developed by Betty Holberton. Holberton also designed the first computer keyboard and numeric keypad in an effort to make the computer more user-friendly. The first UNIVAC was sold to the U.S. Census Bureau in 1951.

These first generation computers continued to use many vacuum tubes which made them large and expensive. They were so expensive to purchase and run that only the largest corporations and the U.S. government could afford them. Their ability to perform up to 1,000 calculations per second, however, made them popular.

Summary of First Generation computer

1. Vacuum tubes were used basic arithmetic operations took few milliseconds.
2. Consume more power with limited performance
3. High cost and bulky.
4. Uses assembly languag- to prepare programs. These were translated into machine level language for execution.
5. Mercury delay line memories and Electrostatic memories were used.
6. Fixed point arithmetic was used.
7. Punched cards and paper tape were invented to feed programs and data and to get results..
8. Magnetic tape/magnetic drum were used as secondary memory.
9. Mainly used for scientific computations.

Generation	Period
I Generation	1945 55
II Generation	1955 65
III Generation	1965 75
IV Generation	1975 89
V Generation	1989 to present

Table 4.1: Generation of computer

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4.2.4 Second Generation Computers:

In 1947, William Shockley, John Bardeen, and Walter Brittain of Bell Laboratories invented the transistor. A transistor is a semiconductor device that could replace a vacuum tube. Transistors were much smaller than vacuum tubes, less expensive, and allowed computer to process up to 10,000 calculations per second:

Summary of second Generation computer

1. Transistors were used in place of vacuum tubes. (invented at AT&T Bell lab in 1947)
2. Small in size& Lower cost
3. Lesser power consumption and better performance.
4. Magnetic ferrite core memories were used as main memory which is a random-access nonvolatile memory.
5. Magnetic tapes and magnetic disks were used as secondary memory.
6. Hardware for floating point arithmetic operations was developed.
7. Index registers were introduced which increased flexibility of programming.
8. High level languages such as FORTRAN, COBOL etc were used - Compilers were developed to translate the high-level program into corresponding assembly language program which was then translated into machine language.
9. Separate input-output processors were developed that could operate in parallel with CPU.
10. Punched cards continued during this period also.
11. Increasingly used in business, industry and commercial organizations for preparation of payroll, inventory control, marketing, production planning, research, scientific & engineering analysis and design etc.

In the early 1960s, IBM introduced the first medium-sized computer named the Model 650. It was expensive, but much smaller than first generation computers and still capable of handling the flood of paperwork produced by many government agencies and businesses. Such organizations provided a ready market for the 650, making it popular in spite of its cost.

Second generation computers also saw a change in the way data was stored. Punched cards were replaced by magnetic tape and high speed reel-to-reel tape machines. Using magnetic tape gave computers the ability to read (access) and write (store) data quickly and reliably.Transistors made computers smaller, less expensive, and more reliable than those with vacuum tubes.



John Bardeen, William Shockley and Walter Brattain at Bell Labs, 1948.

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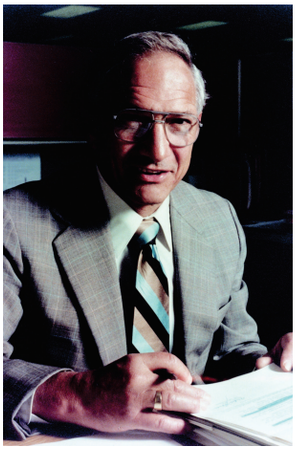
4.2.5 Third Generation Computers:

The use of integrated circuits (ICs) began the third generation of computers. In 1961, Jack Kilby and Robert Noyce, working independently, developed the IC, also called a chip.Noyce developed the integrated circuit while working at Fairchild Semiconductor. In 1968, he formed the company that is now Intel Corporation. Hundreds of transistors, as well as other electronic components and wiring could be housed within a single IC, which allowed computers to process information at a rate of millions of calculations per second.

Summary of third Generation computer

1. ICs were used.
2. Small Scale Integration and Medium Scale Integration technology were implemented in CPU, I/O processors etc.
3. Smaller& better performance
4. Comparatively lesser cost.
5. Faster processors.
6. In the beginning magnetic core memories were used. Later they were replaced by semiconductor memories (RAM & ROM)
7. Introduced microprogramming.
8. Microprogramming, parallel processing (pipelining, multiprocessor system etc), multiprogramming, multi-user system (time shared system) etc were introduced.
9. Operating system software were introduced (efficient sharing of a computer system by several user programs)
10. Cache and virtual memories were introduced (Cache memory makes the main memory appear faster than it really is. Virtual memory makes it appear larger).
11. High level languages were standardized by ANSI eg. ANSI FORTRAN, ANSI COBOL etc.
12. Database management, multi-user application, online systems like closed loop process control, airline reservation, interactive query systems, automatic industrial control etc emerged during this period.

ICs are created from silicon wafers which are then etched with intricate circuits and then coated with a metallic oxide to allow the circuits to conduct electricity. The silicon wafers are housed in special plastic cases that have metal pins. The pins allow the ICs to be plugged into circuit boards that have wiring printed on them.
In 1964, the IBM System 360 was one of the first computers to use integrated circuits and was so popular with businesses that IBM had difficulty keeping up with the demand. Computers had come down in size and price to such a point that smaller organizations such as universities and hospitals could now afford them.



Robert Noyce
1927 1990

4.2.6 Fourth Generation of Computers:

In 1970, Marcian Hoff, an engineer at Intel Corporation, invented the microprocessor, an entire CPU on a single chip. The replacement of several larger components by one microprocessor made possible the fourth generation of computers.

The small microprocessor made it possible to build a computer called a microcomputer, which was small enough to fit on a desktop.The first of these was the Altair built in 1975. In 1976, Stephen Wozniak and Steven Jobs designed and built the first Apple computer. The Apple Macintosh set new standards for ease of computer use with its graphical user interface. In 1981, IBM introduced the IBM-PC. The computer was an instant success because of the availability of spreadsheet, accounting, and word processor software. Desktop computers are referred to as either PCs or Macs.

Advances in technology made personal computers inexpensive and therefore available to many people. Because of these advances almost anyone could own a machine that had more computing power and was faster and more

reliable than either the ENIAC or UNIVAC. As a comparison, if the cost of a sports car had dropped as quickly as that of a computer, a new Porsche would now cost about one dollar.

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Summary of fourth Generation computer

1. Microprocessors were introduced as CPU-Complete processors and large section of main memory could be implemented in a single chip.
2. Tens of thousands of transistors can be placed in a single chip (VLSI design implemented)
3. CRT screen, laser& ink jet printers, scanners etc were developed.
4. Semiconductor memory chips were used as the main memory.
5. Secondary memory was composed of hard disks Floppy disks & magnetic tapes were used for backup memory.
6. Parallelism, pipelining cache memory and virtual memory were applied in a better way.
7. LAN and WANS were developed (where desktop work stations interconnected).
8. Introduced Graphical User Interface.
9. Less power consumption.
10. High performance, lower cost and very compact.
11. Much increase in the speed of operation.

4.3 Brief overview of a Computer

Your PC (Personal Computer) is a system, consisting of many components. Some of those components, like Windows XP, and all your other programs, are software. The stuff you can actually see and touch, and would likely break if you threw it out a fifth-story window, is hardware.

Not everybody has exactly the same hardware. But those of you who have a desktop system, like the example shown in Figure 4.5, probably have most of the components shown in that same figure. Those of you with notebook computers probably have most of the same components. Only in your case the components are all integrated into a single book-sized portable unit. The system unit is the actual computer; everything else is called a peripheral



Figure 4.5: View of a Personal computer

device. Your computer's system unit probably has at least one floppy disk drive, and one CD or DVD drive, into

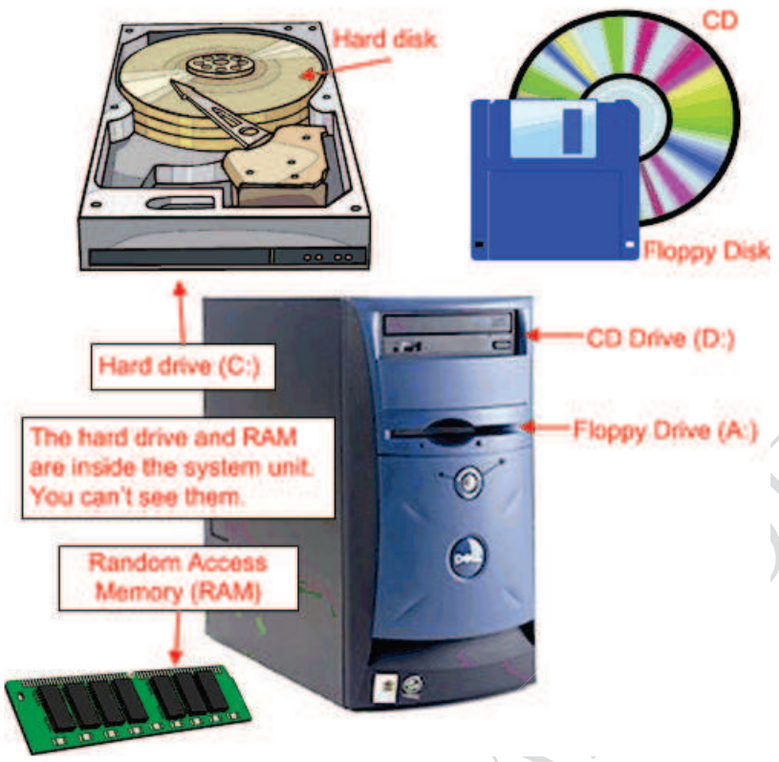


Figure 4.6: View of RAM,Hard drive,Floppy disk

which you can insert floppy disks and CDs. There's another disk drive, called the hard disk inside the system unit, as shown in Figure 4.6. You can't remove that disk, or even see it. But it's there. And everything that's currently "in your computer" is actually stored on that hard disk. (We know this because there is no place else inside the computer where you can store information!).

The floppy drive and CD drive are often referred to as drives with removable media or removable drives for short, because you can remove whatever disk is currently in the drive, and replace it with another. Your computer's hard disk can store as much information as tens of thousands of floppy disks, so don't worry about running out of space on your hard disk any time soon. As a rule, you want to store everything you create or download on your hard disk. Use the floppy disks and CDs to send copies of files through the mail, or to make backup copies of important items.

4.3.1 Different component of a computer

Computers are made up of two parts, the hardware and the software.Hardware is The physical equipment required to run the software. Software is The computerised instructions that operate a computer, manipulate the data and execute particular functions or tasks.

Definition 4.3.1: Computer hardware & software

Computer hardware is any physical device, something that you are able to touch and software is a collection of instructions and code installed into the computer and cannot be touched. For example, the computer monitor you are using to read this text on and the mouse you are using to navigate the web page is computer hardware. The Internet browser that allowed you to visit the web-page and the operating system that the browser is running on is software.

All computers require the following hardware components:

1) **CPU (Central Processor Unit):** The chip or chips at the heart of a computer that enable it to process data.Also known as a processor. It does the 'work', fetches, stores and manipulates values that are stored in the computers memory. Processors come in all different 'shapes and sizes' – there are many different types of architectures which are suited to a variety of different tasks.

2) **Main memory (RAM-Random Access Memory):** An area within a computer system that holds *data*

waiting to be processed. It is used to store values during execution of a program. It can be written to and read from at any time.

3) **Disc drive (hard or floppy):** 'Permanently' stores files (programs and data). Hard discs are generally located inside the machine and come in a variety of different sizes and speeds. They do not, in fact, store files permanently – they often go wrong and so must undergo a back-up at regular intervals. The floppy disc drive allows a user to make his or her own back up of important files and data. It is very important to keep back-ups. Do not be caught out – you may well lose all your work!

4) **VDU (Visual Display Unit):** Visually outputs data. There are numerous types of VDU differing in the resolution (dots per inch) and the number of colours that can be represented.

5) **Printer:** Allows a hard copy to be made. Again, there are many different types of printers available, for example, line printers, dot-matrix printers, bubble jet printers and laser printers. These also differ in their resolution and colour palette.

The central processing unit (CPU) is the heart of the computer. It carries out all of the instructions given in a program, such as a word processing or spreadsheet program. The CPU consists of one or more chips (another name for integrated circuits).

Definition 4.3.2: what is chip

A small piece of semi-conducting material (such as silicon) about 1 centimetre (inch) square on which an integrated circuit is embedded. An integrated circuit is a number of electronic components joined together to form a path for electricity. Central processing unit chips contain the circuits representing the CPU.

CPUs are not all equal. Some process data faster than others. A computer contains a system clock that emits pulses to establish the timing of all systems operations. The system clock operates at a speed quite different from a clock that keeps track of the time of the day. The system clock determines the speed at which the computer can execute an instruction, and therefore limits the number of instructions the computer can complete within a specific amount of time. The time to complete an instruction execution cycle is measured in megahertz (MHz) or millions of cycles per second. Although some instructions require multiple cycles to complete, the processor speed should be thought of in terms of the number of instructions the processor can execute in one second.

4.4 Block diagram of a digital computer

In the diagram, the arrows indicate the direction of data flow.Some data flows in one direction only.In some cases it flows in both directions.At the heart of the computer is the microprocessor.This contains several REGISTERS to store data and an ARITHMETIC LOGIC UNIT (ALU) which manipulates data.It acts as the central processing unit (CPU) of the computer, carrying out a sequence of instructions, called a program.The program may be stored in memory, as software, or written into the memory from tape or disk.

4.4.1 Different types of storage Unit:

The storage unit of the computer holds data and instructions that are entered through the input unit, before they are processed. It preserves the intermediate and final results before these are sent to the output devices. It also saves the data for the later use.

Types of Storage Devices:

1. **Primary Storage:**
   (a) Stores and provides very fast.
   (b) This memory is generally used to hold the program being currently executed in the computer, the data being received from the input unit, the intermediate and final results of the program.
   (c) The primary memory is temporary in nature. The data is lost, when the computer is switched off.
   (d) In order to store the data permanently, the data has to be transferred to the secondary memory. The cost of the primary storage is more compared to the secondary storage.

Definition 4.4.1: Primary storage

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1. **Secondary Storage:**
   (a) It stores several programs, documents, data bases etc.
   (b) The programs that run on the computer are first transferred to the primary memory before it is actually run.
   (c) Whenever the results are saved, again they get stored in the secondary memory.
   (d) The secondary memory is slower and cheaper than the primary memory. Some of the commonly used secondary memory devices are Hard disk, CD, etc.

Definition 4.4.2: Secondary storage

4.4.1.1 Memory Size:

All digital computers use the binary system, i.e. 0s and 1s. Each character or a number is represented by an 8 bit code. The set of 8 bits is called a byte. A Character occupies 1 byte space. A numeric occupies 2 byte space. Byte is the space occupied in the memory. The size of the primary storage is specified in KB (Kilobytes) or MB (Megabyte). One KB is equal to 1024 bytes and one MB is equal to 1000KB. The size of the primary storage in a typical PC usually starts at 16MB. PCs having 32 MB, 48MB, 128 MB, 256MB memory are quite common.

4.4.2 Interface:

Memory (ROM) .The computer needs to communicate with the outside world.It does this via interfaces which are usually a plug or socket of some type.The computer is a digital device.It may need to communicate with an analogue device such as a loudspeaker or variable speed control.To do this it uses digital to analogue and analogue to digital converters.

Block diagram of a digital computer

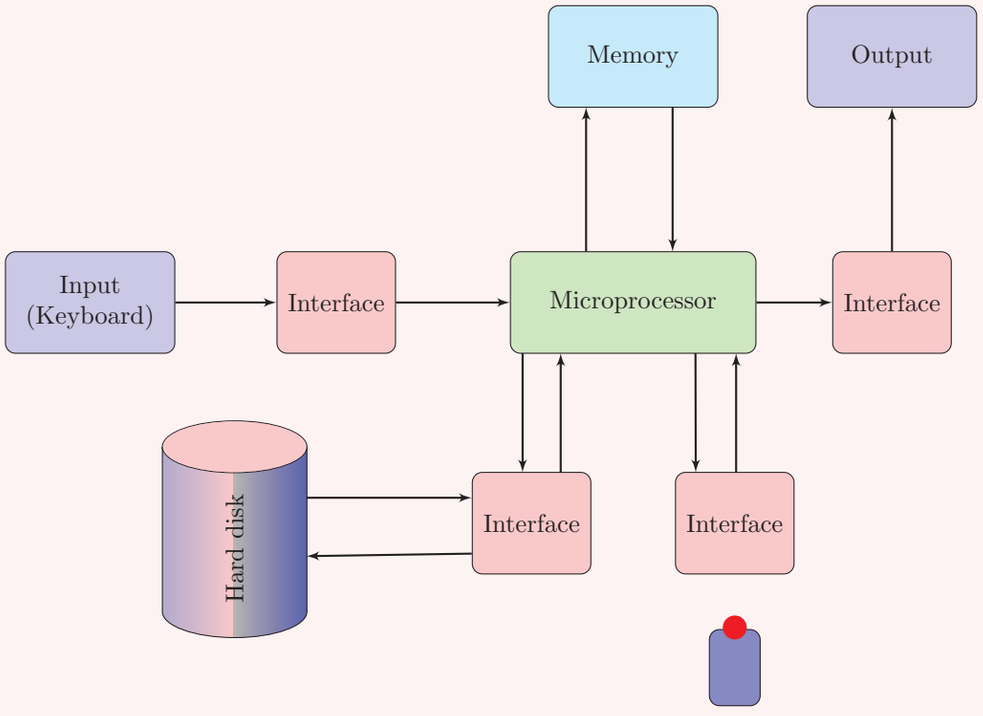


Figure 4.7: Block diagram of a digital computer

4.4.3 Central Processing Unit:

The control unit and ALU of the computer are together known as the Central Processing Unit (CPU). The CPU is like brain performs the following functions:

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1. It performs all calculations.
2. It takes all decisions.
3. It controls all units of the computer.

A PC may have CPU-IC such as Intel 8088, 80286, 80386, 80486, Celeron, Pentium, Pentium Pro, Pentium II, Pentium III, Pentium IV, Dual Core, and AMD etc.

4.4.3.1 Control Unit:

It controls all other units in the computer. The control unit instructs the input unit, where to store the data after receiving it from the user. It controls the flow of data and instructions from the storage unit to ALU. It also controls the flow of results from the ALU to the storage unit. The control unit is generally referred as the central nervous system of the computer that control and synchronizes its working.

4.4.3.2 Arithmetic Logical Unit:

All calculations are performed in the Arithmetic Logic Unit (ALU) of the computer. It also does comparison and takes decision. The ALU can perform basic operations such as addition, subtraction, multiplication, division, etc and does logic operations viz $>$, $<$, $=$ etc.

Whenever calculations are required, the control unit transfers the data from storage unit to ALU once the computations are done, the results are transferred to the storage unit by the control unit and then it is send to the output unit for displaying results.

4.4.4 Input & Output Devices

Before a computer can process your data, you need some method to input the data into the machine. The device you use will depend on what form this data takes (be it text, sound, artwork, etc.).

Similarly, after the computer has processed your data, you often need to produce output of the results. This output could be a display on the computer screen, hardcopy on printed pages, or even the audio playback of music you composed on the computer.

The terms input and output are used both as verbs to describe the process of entering or displaying the data, and as nouns referring to the data itself entered into or displayed by the computer.

Below we discuss the variety of peripheral devices used for computer input and output.

4.4.4.1 Input Devices

the devices that allow data and instructions to enter a computer (such as a keyboard, mouse, scanner).*Input* is the Any resource required for the functioning of a process, in the course of which it will be transformed into one or more outputs.

Definition 4.4.3: Input device

Computers need to receive data and instruction in order to solve any problem. Therefore, we need to input the data and instructions into the computers. The input unit consists of one or more input devices. Keyboard is the one of the most commonly used input device. Other commonly used input devices are the mouse, floppy disk drive, magnetic tape, etc. All the input devices perform the following functions.

1. *Accept the data and instructions from the outside world.*
2. *Convert it to a form that the computer can understand.*
3. *Supply the converted data to the computer system for further processing.*

i) **Keyboard:** The keyboard is a means of interacting with your computer. You really only need to use the keyboard when you're typing text. Most of the keys on the keyboard are laid out like the keys on a typewriter. But there are some special keys like Esc (Escape), Ctrl (Control), and Alt (Alternate). There are also some keys across the top of the keyboard labeled F1, F2, F3, and so forth. Those are called the function keys, and the exact role they play depends on which program you happen to be using at the moment.

Most keyboards also have a numeric keypad with the keys laid out like the keys on a typical adding machine. If you're accustomed to using an adding machine, you might want to use the numeric keypad, rather than the numbers across the top of the keyboard, to type numbers. It doesn't really matter which keys you use. The numeric keypad is just there as a convenience to people who are accustomed to adding machines.

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Most keyboards also contain a set of navigation keys. You can use the navigation keys to move around around through text on the screen. The navigation keys won't move the mouse pointer. Only the mouse moves the mouse pointer.

On smaller keyboards where space is limited, such as on a notebook computer, the navigation keys and numeric keypad might be one in the same. There will be a Num Lock key on the keypad. When the Num Lock key is "on", the numeric keypad keys type numbers. When the Num Lock key is "off", the navigation keys come into play. The Num Lock key acts as a toggle. Which is to say, when you tap it, it switches to the opposite state. For example, if Num Lock is on, tapping that key turns it off. If Num Lock is off, tapping that key turns Num Lock on.

ii) **The Mouse:** Obviously you know how to use your mouse, since you must have used it to get here. But let's take a look at the facts and buzzwords anyway. Your mouse probably has at least two buttons on it. The button on the left is called the *primary mouse button*, the button on the right is called the *secondary mouse button* or just the *right mouse button*. I'll just refer to them as the left and right mouse buttons. Many mouse have a small wheel between the two mouse buttons, as illustrated in Figure **??**.

The mouse pointing device sits on your work surface and is moved with your hand. In older mice, a ball in the bottom of the mouse rolls on the surface as you move the mouse, and internal rollers sense the ball movement and transmit the information to the computer via the cord of the mouse.

The newer optical mouse does not use a rolling ball, but instead uses a light and a small optical sensor to detect the motion of the mouse by tracking a tiny image of the desk surface. Optical mice avoid the problem of a dirty mouse ball, which causes regular mice to roll unsmoothly if the mouse ball and internal rollers are not cleaned frequently.

A cordless or wireless mouse communicates with the computer via radio waves (often using BlueTooth hardware and protocol) so that a cord is not needed (but such mice need internal batteries).

A mouse also includes one or more buttons (and possibly a scroll wheel) to allow users to interact with the GUI. The traditional PC mouse has two buttons, while the traditional Macintosh mouse has one button. On either type of computer you can also use mice with three or more buttons and a small scroll wheel (which can also usually be clicked like a button). The buzzwords that describe how you use the mouse are as follows:

Point: To point to an item means to move the mouse pointer so that it's touching the item.

Click: Point to the item, then tap (press and release) the left mouse button.

Double-click: Point to the item, and tap the left mouse button twice in rapid succession - click-click as fast as you can.

Right-click: Point to the item, then tap the mouse button on the right.

Drag: Point to an item, then hold down the left mouse button as you move the mouse. To drop the item, release the left mouse button.

Right-drag: Point to an item, then hold down the right mouse button as you move the mouse. To drop the item, release the right mouse button.

iii) **Touch pad:** Most laptop computers today have a touch pad pointing device. You move the on-screen cursor by sliding your finger along the surface of the touch pad. The buttons are located below the pad, but most touch pads allow you to perform mouse clicks by tapping on the pad itself.

Touch pads have the advantage over mice that they take up much less room to use. They have the advantage over trackballs (which were used on early laptops) that there are no moving parts to get dirty and result in jumpy cursor control.

iv) **Trackpoint:** The trackball is sort of like an upside-down mouse, with the ball located on top. You use your fingers to roll the trackball, and internal rollers (similar to whats inside a mouse) sense the motion which is transmitted to the computer. Trackballs have the advantage over mice in that the body of the trackball remains stationary on your desk, so you dont need as much room to use the trackball. Early laptop computers often used trackballs (before superior touch pads came along).

Trackballs have traditionally had the same problem as mice: dirty rollers can make their cursor control jumpy and unsmooth. But there are modern optical trackballs that dont have this problem because their designs eliminate the rollers.

v) **Joysticks:** Joysticks and other game controllers can also be connected to a computer as pointing devices. They are generally used for playing games, and not for controlling the on-screen cursor in productivity software.

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vi) **Light pen:** A light pen is a light-sensitive pointing device commonly used to select or otherwise modify text or data on a screen.

The term light pen may also refer to a pointing device utilizing a light that is commonly used during a presentation

vii) **Trackball:** A trackball is a pointing device consisting of a ball held by a socket containing sensors to detect a rotation of the ball about two axeslike an upside-down mouse with an exposed protruding ball. The user rolls the ball with the thumb, fingers, or the palm of the hand to move a pointer. Compared with a mouse, a trackball has no limits on effective travel; at times, a mouse can reach an edge of its working area while the operator still wishes to move the screen pointer farther. With a trackball, the operator just continues rolling. Some trackballs, such as Logitech's optical-pickoff types, have notably low friction, as well as being dense (glass), so they can be spun to make them coast.

viii) **Touch screen:** Some computers, especially small hand-held PDAs, have touch sensitive display screens. The user can make choices and press button images on the screen. You often use a stylus, which you hold like a pen, to write on the surface of a small touch screen.

ix) **Graphics tablet:** A graphics tablet consists of an electronic writing area and a special pen that works with it. Graphics tablets allows artists to create graphical images with motions and actions similar to using more traditional drawing tools. The pen of the graphics tablet is pressure sensitive, so pressing harder or softer can result in brush strokes of different width (in an appropriate graphics program).

x) **Scanners:** A scanner is a device that images a printed page or graphic by digitizing it, producing an image made of tiny pixels of different brightness and color values which are represented numerically and sent to the computer. Scanners scan graphics, but they can also scan pages of text which are then run through OCR (Optical Character Recognition) software that identifies the individual letter shapes and creates a text file of the page's contents.

xi) **Microphone:** A microphone can be attached to a computer to record sound (usually through a sound card input or circuitry built into the motherboard). The sound is digitizedturned into numbers that represent the original analog sound wavesand stored in the computer to later processing and playback.

xii) **MIDI Devices:** MIDI (Musical Instrument Digital Interface) is a system designed to transmit information between electronic musical instruments. A MIDI musical keyboard can be attached to a computer and allow a performer to play music that is captured by the computer system as a sequence of notes with the associated timing (instead of recording digitized sound waves).

4.4.4.2 Output Devices:

An output device receives information from the computer and translates it from machine language to a form that humans can read or so that another machine can read the information. An output device is any piece of computer hardware equipment used to communicate the results of data processing carried out by an information processing system (such as a computer) to the outside world.

Electronic output devices can be mechanical, audio, or visual. Mechanical outputs include motors, solenoids, and other electromagnetic devices. Audio outputs include buzzers, loudspeakers, piezo transducers, and ultrasonic transmitters. Mechanical and audio outputs tend to have a higher power demand than other output devices. Visual outputs include lamps, LEDs (light-emitting diodes), and infrared transmitters.

Definition 4.4.4: Ouput device

The output unit of a computer provides the information and results of a computation to outside world. Printers, Visual Display Unit (VDU) are the commonly used output devices. Other commonly used output devices are floppy disk drive, hard disk drive, and magnetic tape drive.

1. **CRT Monitor:** The traditional output device of a personal computer has been the CRT (Cathode Ray Tube) monitor. Just like a television set (an older one, anyway) the CRT monitor contains a large cathode ray tube that uses an electron beam of varying strength to paint a picture onto the color phosphorescent dots on the inside of the screen. CRT monitors are heavy and use more electrical power than flat panel displays, but they are preferred by some graphic artists for their accurate color rendition, and preferred by some gamers for faster response to rapidly changing graphics.

   Monitor screen size is measured diagonally across the screen, in inches. Not all of the screen area may be usable for image display, so the viewable area is also specified. The resolution of the monitor is the maximum

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number of pixels it can display horizontally and vertically (such as 800×600, or 1024×768, or 1600×1200). Most monitors can display several resolutions below its maximum setting. Pixels (short for picture elements) are the small dots that make of the image displayed on the screen. The spacing of the screens tiny phosphor dots is called the dot pitch (dp), typically .28 or .26 (measured in millimeters). A screen with a smaller dot pitch produces sharper images.

Your computer must produce a video signal that a monitor can display. This may be handled by circuitry on the motherboard, but is usually handled by a video card in one of the computers expansion slots; often the slot is a special one dedicated to video use, such as an AGP slot (Accelerated Graphics Port). Video cards are also called video display adapters, and graphics cards. Many video cards contain separate processors and dedicated video memory for generating complex graphics quickly without burdening the CPU. These accelerated graphics cards are loved by gamers.

2. **Flat Panel Monitor:** A flat panel display usually uses an LCD (Liquid Crystal Display) screen to display output from the computer. The LCD consists of several thin layers that polarize the light passing through them. The polarization of one layer, containing long thin molecules called liquid crystals, can be controlled electronically at each pixel, blocking varying amounts of the light to make a pixel lighter or darker. Other types of flat panel technology exist (such as plasma displays) but LCDs are most commonly used in computers, especially laptops.

   Older LCDs had slow response times and low contrast, but active matrix LCD screens have a transparent thin film transistor (TFT) controlling each pixel, so response, contrast, and viewing angle are much improved.

   Flat panel displays are much lighter and less bulky than CRT monitors, and they consume much less power. They have been more expensive than CRTs in the past, but the price gap is narrowing. You will see many more flat panels in the future.

   As with CRTs, the display size of a flat panel is expressed in inches, and the resolution is the number of pixels horizontally and vertically on the display.

3. **Ink Jet Printer:** For hardcopy (printed) output, you need some kind of printer attached to your computer (or available over a network). The most common type of printer for home systems is the color ink jet printer. These printers form the image on the page by spraying tiny droplets of ink from the print head. The printer needs several colors of ink (cyan, yellow, magenta, and black) to make color images. Some photo-quality ink jet printers have more colors of ink.

   Ink jet printers are inexpensive, but the cost of consumables (ink cartridges and special paper) make them costly to operate in the long run for many purposes.

4. **Laser Printer:** A laser printer produces good quality images by the same technology that photocopiers use. A drum coated with photosensitive material is charged, then an image is written onto it by a laser (or LEDs) which makes those areas lose the charge. The drum then rolls through toner (tiny plastic particles of pigment) that are attracted to the charged areas of the drum. The toner is then deposited onto the paper, and then fused into the paper with heat.

   Most laser printers are monochrome (one color only, usually black), but more expensive laser printers with multiple color toner cartridges can produce color output.

   Laser printers are faster than ink jet printers. Their speed is rated in pages per minute (ppm). Laser printers are more expensive than ink jets, but they are cheaper to run in the long term if you just need good quality black & white pages.

5. **Other Printers:** Multi-function printers are available that not only operate as a computer printer, but also include the hardware needed to be a scanner, photocopier, and FAX machine as well.

6. **Dot matrix printer:** It use small electromagnetically activated pins in the print head, and an inked ribbon, to produce images by impact. These printers are slow and noisy, and are not commonly used for personal computers anymore (but they can print multi-layer forms, which neither ink jet or laser printers can).

7. **Sound Output:** Computers also produce sound output, ranging from simple beeps alerting the user, to impressive game sound effects, to concert quality music. The circuitry to produce sound may be included on the motherboard, but high quality audio output from a PC usually requires a sound card in one of the expansion slots, connected to a set of good quality external speakers or headphones.

   Multimedia is a term describing computer output that includes sound, text, graphics, movies, and animation. A sound card is an example of a multimedia output device (as is a monitor that can display graphics).

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4.5 How does the computer work?

Software is the computerised instructions that operate the computer, execute particular functions or tasks, and manipulate the data. For software (the instructions) to perform various functions, it must be programmed. That is, the instructions need to be written in a programming language that the computer can understand. Without a program, a computer is useless.

Definition 4.5.1: What is a programming language

Programming language: *An artificial set of rules, vocabulary and syntax used to instruct the computer to execute certain tasks.A programming language is a computer language,programmers use to develop applications, scripts, or other set of instructions for a computer to execute.*

The language the computer actually understands is called machine language, which comprises numbers only. This language is used by the computer to understand the programming language and translate the terms into executable instructions. Lying between programming languages and machine languages are assembly languages. Assembly languages have the same structure and set of commands as machine languages but they enable a program to use names instead of numbers.
There are two kinds of software, systems software and applications software.Systems software includes the operating system and all the utilities that enable the computer to function. The most important program that runs on a computer is the operating system. Every general-purpose computer must have an operating system in order to run other programs. This includes controlling functions such as the coordination of the hardware and applications software, allocating storage facilities, controlling the input and output devices and managing time sharing for linked or networked computers.

Definition 4.5.2: Program

Computer program: *A computer is nothing but a very dumb machine that has the ability to perform mathematical operations very rapidly and very accurately, but it can do nothing without the aid of a program written by a human being. Moreover, if the human being writes a program that turns good data into garbage, the computer will very obediently, and very rapidly turn good data into garbage. It is possible to write a large program with one small error that will do just that. In some cases the error will be obvious, but if the error is subtle, the answers may appear to be right, and the error will go unnoticed. It is up to you, the human programmer, to write a correct program to tell the computer what to do. You can think of the computer as your very obedient slave ready to do your every whim. It is up to you to tell your slave what you want it to do.*
A computer program is a "recipe" which the computer will use on the input data to derive the desired output data. It is similar to the recipe for baking a cake. The input data is comparable to the ingredients, including the heat supplied by the oven. The program is comparable to the recipe instructions to mix, stir, wait, heat, cool, and all other possible operations on the ingredients. The output of the computer program can be compared to the final cake sitting on the counter ready to be cut and served. A computer then is composed of two parts, the data upon which the program operates, and the data. The data and program are inseparable as implied by the last sentence.

4.5.1 Software

Computers seem to perform amazing feats as they process information and display output almost instantly; but behind the scenes, they are really very simpleminded devices. All they do is plod along executing long strings of instructions that were previously written by a clever human programmer. The thing that makes a computers performances seem so amazing is that it executes these instructions very, very, very quickly, accurately, and tirelessly. Computers arent smart; they are just FAST.

But computers cant do ANYTHING without step-by-step instructions written out for them. These lists of instructions are called programs. Programs (and the associated data) are known as software. Software needs to be installed onto a computer before it can be used. Software is often sold in sets of several programs and associated data called a software package, and typically comes on a CD-ROM or may be downloaded from the Internet. The Microsoft Office Suite is such a collection of programs and data that allows users to manipulate words, numbers, and data.

There are two major categories of software: System software and Application software.

4.5.1.1 System Software

System software controls a computers operations and manages a computers resources. System software includes the operating system, utilities, and computer programming tools.

The operating system (OS) controls the allocation of hardware resources such as memory space and CPU processing time, and handles the basic input and output (I/O) for data flowing from and to storage devices (such as hard disks) and peripherals (such as your keyboard). The operating system allows application software to access system resources without the applications having to know the details about the system hardware. The operating system often allocates resources and processing time between several programs which are running at once, which is called multitasking. Multitasking allows you to perform multiple tasks at the same time, such copying a chart from an open Excel document and pasting it into a report you have open in Word, all while your web browser is downloading a large file from the Internet in the background. It is the OS that plays traffic cop in this situation, deciding which program gets time on the CPU when, and handles the flow of data.

System software also includes the software needed to access a peripheral device connected to the computer. Such software is called a device driver, and it controls I/O to the peripheral. The device drivers may come already installed in the OS, or you may have to install or update a driver when you add a new peripheral device.

System software may also include security software, such as Virus checkers and firewalls. A virus checker searches files for potentially harmful programs such as viruses, worms, or trojan horses that are written by malicious programmers. Viruses and similar programs can perform disastrous activities on your computer system, such as erasing your hard disk. To be safe, you should scan all downloaded files and messages on your PC (anti-virus software can automatically do this) and never run any e-mail attachments if you dont know what they are. (Note: There are vastly fewer viruses that affect Macintosh computers than affect PCs.) A firewall, or similar program, protects your computer from unauthorized access over a network or telecom connection.

Utilities are programs that perform a very specific task, usually related to managing system resources such as disk drives, printers, etc. Unlike application software, utilities tend to be smaller in size and perform activities related to the computer system (scanning for viruses, manipulating file settings, scanning for disk errors, etc.). Some utilities are memory-resident programs that are loaded into RAM and operate in the background.

System software also includes the tools used to write other programs. These include compilers, assemblers, and debuggers for various computer programming languages. A programming language allows a person to write computer instructions in a language that is easier for a human to understand, but which is then converted into the low level numerical instruction codes that a computer processor unit can execute. Some programming languages include C, C++, Java, FORTRAN, COBOL, PASCAL, BASIC, Visual Basic (and such scripting languages as JavaScript and Perl)

4.5.1.2 Application Software

Application software runs on top of the operating system and allows the user to perform a specific task, such as word processing a letter, calculating a payroll in a spreadsheet, manage a database of information, reading e-mail messages, or manipulating digital photographs. Most applications allow the production and editing of documents (which are the data files created by the application programs). The document files (such as a report created in Word, or a PowerPoint presentation, or a budget spreadsheet) can then be printed, displayed on a screen, or transmitted to other locations.

Applications (and other programs) are stored on your PC as executable files (they contain program steps that the computer can execute); documents are stored as data files. **Applications software** includes programs that users access to carry out work. They include applications for the following functions.

1. Word processing is the most common applications software. The great advantage of word processing over using a typewriter is that you can make changes without retyping the entire document. Word processors make it easy to manipulate and format documents.

2. Spreadsheets are computer programs that let people electronically create and manipulate spreadsheets (tables of values arranged in rows and columns with predefined relationships to each other). Spreadsheets are used for mathematical calculations such as accounts, budgets, statistics and so on.

3. Database management applications are computer programs that let people create and manipulate data in a database. A database is a collection of related information that can be manipulated and used to sort information, conduct statistical analyses or generate reports.

4. Presentation packages and graphics are computer programs that enable users to create highly stylised images for slide presentations and reports. They can also be used to produce various types of charts and graphs. Many software applications include graphics components including: paint programs, desktop publishing applications and so on.

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5. Communications applications typically include software to enable people to send faxes and emails and dial into other computers.

4.6 Operating system

This section provides an overview of Operating System principles. We begin with Objectives, Functions and Services of Operating System, which serves to define the requirements that an operating system is intended to meet. We will also see how the resources are effectively managed by operating system. Then we will focus on how an operating system evolved from Simple batch system to Multiprogrammed, and Timesharing systems.

4.6.1 Introduction to Operating System

An operating system is a program that controls the execution of application programs and acts as an interface between the user of a computer and the computer hardware. In other words The software that controls the hardware. Some examples of operating systems are UNIX, Mach, MS-DOS, MS-Windows, Windows/NT, OS/2, MacOS, VMS, MVS, and VM.

Controlling the computer involves software at several levels. We will differentiate kernel services, library services, and application-level services, all of which are part of the operating system. Processes run Applications, which are linked together with libraries perform standard services. The kernel supports the processes by providing a path to the peripheral devices. The kernel responds to service calls from the processes and interrupts from the devices. The core of the operating system is the kernel, a control program that functions in privileged state (an execution context that allows all hardware instructions to be executed), reacting to interrupts from external devices and to service requests and traps from processes. Generally, the kernel is a permanent resident of the computer. It creates and terminates processes and responds to their request for service. Operating Systems are resource managers. The main resource is computer hardware in the form of processors, storage, input/output devices, communication devices, and data.

Definition 4.6.1: What is operating system

Operating system:

1. *A program that is executed by the processor that frequently relinquishes control and must depend on the processor to regain control.*
2. *A program that mediates between application programs and the hardware*
3. *A set of procedures that enable a group of people to use a computer system.*
4. *A program that controls the execution of application programs*
5. *An interface between applications and hardware*

4.6.1.1 Functions of an operating system

The basic functions of an operating system are:

1. Booting the computer.
2. Performs basic computer tasks eg managing the various peripheral devices eg mouse, keyboard.
3. Provides a user interface, e.g. command line, graphical user interface (GUI) Handles system resources such as computer's memory and sharing of the central processing unit (CPU) time by various applications or peripheral devices.
4. Provides file management which refers to the way that the operating system manipulates, stores, retrieves and saves data.

Booting the computer

The process of starting or restarting the computer is known as booting. A cold boot is when you turn on a computer that has been turned off completely. A warm boot is the process of using the operating system to restart the computer.

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Performs basic computer tasks

The operating system performs basic computer tasks, such as managing the various peripheral devices such as the mouse, keyboard and printers. For example, most operating systems now are plug and play which means a device such as a printer will automatically be detected and configured without any user intervention.

Provides a user interface

A user interacts with software through the user interface. The two main types of user interfaces are: command line and a graphical user interface (GUI). With a command line interface, the user interacts with the operating system by typing commands to perform specific tasks. An example of a command line interface is DOS (disk operating system). With a graphical user interface, the user interacts with the operating system by using a mouse to access windows, icons, and menus. An example of a graphical user interface is Windows Vista or Windows 7.

The operating system is responsible for providing a consistent application program interface (API) which is important as it allows a software developer to write an application on one computer and know that it will run on another computer of the same type even if the amount of memory or amount of storage is different on the two machines.

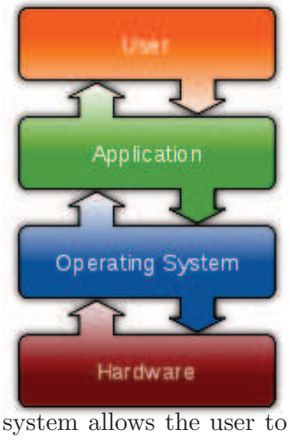


Figure 4.8: **Operating system**

Handles system resources

The operating system also handles system resources such as the computer's memory and sharing of the central processing unit (CPU) time by various applications or peripheral devices. Programs and input methods are constantly competing for the attention of the CPU and demand memory, storage and input/output bandwidth. The operating system ensures that each application gets the necessary resources it needs in order to maximise the functionality of the overall system.

Provides file management

The operating system also handles the organisation and tracking of files and directories (folders) saved or retrieved from a computer disk. The file management system allows the user to perform such tasks as creating files and directories, renaming files, coping and moving files, and deleting files. The operating system keeps track of where files are located on the hard drive through the type of file system. The type two main types of file system are File Allocation table (FAT) or New Technology File system (NTFS).

4.6.2 The History of Operating Systems

Operating systems have evolved through a number of distinct phases or generations, which corresponds roughly to the decades.

The 1940's - First Generations

The earliest electronic digital computers had no operating systems. Machines of the time were so primitive that programs were often entered one bit at time on rows of mechanical switches (plug boards). Programming languages were unknown (not even assembly languages).

The 1950's - Second Generation

By the early 1950's, the routine had improved somewhat with the introduction of punch cards. The General Motors Research Laboratories implemented the first operating systems in early 1950's for their IBM 701. The system of the 50's generally ran one job at a time. These were called single-stream batch processing systems because programs and data were submitted in groups or batches.

The 1960's - Third Generation

The systems of the 1960's were also batch processing systems, but they were able to take better advantage of the computer's resources by running several jobs at once. So operating systems designers developed the concept of multiprogramming in which several jobs are in main memory at once; a processor is switched from job to job as needed to keep several jobs advancing while keeping the peripheral devices in use.

For example, on the system with no multiprogramming, when the current job paused to wait for other I/O operation to complete, the CPU simply sat idle until the I/O finished. The solution for this problem that evolved

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was to partition memory into several pieces, with a different job in each partition. While one job was waiting for I/O to complete, another job could be using the CPU.

Another major feature in third-generation operating system was the technique called SPOOLing (simultaneous peripheral operations on line). In spooling, a high-speed device like a disk interposed between a running program and a low-speed device involved with the program in input/output. Instead of writing directly to a printer, for example, outputs are written to the disk. Programs can run to completion faster, and other programs can be initiated sooner when the printer becomes available, the outputs may be printed.

Another feature present in this generation was time-sharing technique, a variant of multiprogramming technique, in which each user has an on-line (i.e., directly connected) terminal. Because the user is present and interacting with the computer, the computer system must respond quickly to user requests, otherwise user productivity could suffer. Timesharing systems were developed to multiprogram large number of simultaneous interactive users.

Fourth Generation

With the development of LSI (Large Scale Integration) circuits, chips, operating system entered in the system entered in the personal computer and the workstation age. Microprocessor technology evolved to the point that it became possible to build desktop computers as powerful as the mainframes of the 1970s. Two operating systems have dominated the personal computer scene: MS-DOS, written by Microsoft, Inc. for the IBM PC and other machines using the Intel 8088 CPU and its successors, and UNIX, which is dominant on the large personal computers using the Motorola 6899 CPU family.

4.7 Some Basic Terminology

It is necessary to cover some terminology. Hopefully, much of it will be familiar – you will hear many of the terms used throughout the course

- **Bit**– is the smallest piece of information used by the computer. Derived from "binary digit". In computer language, is short for Binary Digit. Bits have value of 1 or 0, (or on or off, or, true or false).
- 8 Bits make up 1 **Byte**.

  1024 Bytes make up 1 KByte (1 KiloByte or 1K), (Because $2^{10} = 1024$).

  1024 KBytes make up 1 MByte (1 MagaByte or 1M).

  1024 MBytes make up 1 GByte (1 GigaByte or 1G).
- All machines have a wordsize – a fundamental unit of storage, for example, 8-bits, 16-bits, etc. The size of a word (in Bytes) differs between machines. A Pentium based machine is 32-bit.
- parallel processing occurs when two or more CPUs work on solution of the same problem at the same time
- **Access time**–The performance of a hard drive or other storage device– how long it takes to locate a file.
- **Active program or window**– The application or window at the front (foreground) on the monitor.
- **Alert box**– a message that appears on screen, usually to tell you something went wrong.
- **Application**– a program in which you do your work.
- **ASCII** (pronounced ask-key)– American Standard Code for Information Interchange. a commonly used data format for exchanging information between computers or programs.
- **Boot**– to start up a computer.
- **Bug** –A programming error that causes a program to behave in an unexpected way.
- **Bus** –An electronic pathway through which data is transmitted between components in a computer.
- **Card**– a printed circuit board that adds some feature to a computer.
- **CD-ROM**– An acronym for Compact Disc Read-Only Memory.
- **Clock Rate (MHz)**– The instruction processing speed of a computer measured in millions of cycles per second (i.e., 200 MHz).
- **Compiler**– a program the converts programming code into a form that can be used by a computer.

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- **Compression**– a technique that reduces the size of a saved file by elimination or encoding redundancies (i.e., JPEG, MPEG, LZW, etc.)
- **Control panel**– a program that allows you to change settings in a program or change the way a Mac looks and/or behaves.
- **CPU**– the Central Processing Unit. The processing chip that is the "brains" of a computer.
- **Crash**– a system malfunction in which the computer stops working and has to be restarted.
- **Cursor**– The pointer, usually arrow or cross shaped, which is controlled by the mouse.
- **Daisy chaining** – the act of stringing devices together in a series (such as SCSI).
- **Windows:**
  i. The most widely used operating system for personal computers from Microsoft. (Software only. Other companies manufacture the hardware that runs the Windows Operating System.) Compare Macintosh. (Windows with a large "W".)
  ii. The thing you see on screen that contains a directory listing or the contents of a document. (Window with a small "w".)
- **Trash:** Place where you put files and folders that you want to delete or get rid of.
- **System files:** Allows our computer to work.
- **Software:** Instructions that tell the computer what to do.
- **Shut down:** To quit all applications and turn off the computer
- **Scroll bar:** Allows you to move around through your document.
- **Save As :** Give the file a name and/or store the file in a certain place.
- **Save:** Tell the computer to create a file on disk that has the information you've put into the document (usually typing).
- **Right click:** To press the right button on the mouse. (This is Windows specific. On a Mac running System 8 or higher, you hold down the Control key and then click to get the same effect.)
- **Recycle Bin:** Place where you put files and folders that you may later want to delete or get rid of. Compare Trash.
- **Random Access Memory (RAM):** This stands for Random Access Memory. You can think of this as the "space" where you computer does its processing. The more space you have the more processes you can run at the same time. More RAM is always better than less. You can never have much RAM.
- **Pointer (Cursor):** The name of the arrow (or other shape) that tracks across the screen as you move the mouse (or other pointing device) around.
- **Operating System (OS):** System software that allows your computer to work.
- **Mouse:** Pointing device that allows you to tell the computer what to do.
- **MegaHertz (Mhz):** This stands for MegaHertz. A hertz is an electronics term. 1 hz = one cycle (or wavelength) per second. 1 megahertz = 1,000,000 cycles per second. In computer jargon, Mhz measures how *fast* your CPU chip runs. Although it's more important to know the chip than the speed, if you're comparing the same kind of CPU chip then a higher / faster CPU speed (measured in MHz) is better than a slower speed.
- **Macintosh:** The brand name of a family of personal computers (hardware) and an operating system (software) from Apple, introduced in 1984.
- **Keyboard:** This if the primary text input device. It also contains certain standard function keys, such as the Escape key, tab, and arrow keys, shift and control keys, and sometimes other manufacturer-customized keys.
- **Icons:** In a graphical user interface (GUI), a small, pictorial, on screen representation of an object, such as a document, program, folder or disk drive.

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- **Folder (Directory, Sub-Directory):** Allows you to organize files and other folders.
- **Folder Icons:** Collections of documents and other folders.
- **Edit:** To make a change to existing data
- **Drag:** To move an object on screen in which its complete movement is visible from starting location to destination.
- **Double Click:** To press the mouse button twice in rapid succession without moving the mouse between clicks.
- **Documents:** Files you create and edit.
- **Disk Space:** This is the place where your files live. The greater the disk space the more files you can keep.More disk space is always better than less. You can never have much disk space.
- **Desktop:** An on-screen representation of a desktop such as used in the Macintosh and Windows operating systems.
- **Delete:** To remove an item of data from a file or to remove a file from the disk.
- **Creating A File:** Storing data as a file with an assigned file name that is unique within the directory it resides in.
- **Crash:** Your computer or application no longer works correctly and so you "loose" all the work you've done since the last time you saved.
- **Central Processor Unit (CPU) :**This term has two meanings

  i. Central Processor Unit−the main chip on the computer that makes everything go.

  ii. The box that holds the guts of the computer.

  A faster CPU is always better than a slower one. You can never have too fast of a CPU.
- **Compute:** A general-purpose machine that processes data according to a set of instructions that are stored internally either temporarily or permanently.
- **WORM:** Acronym for Write Once-Read Many; an optical disk that can only be written to once (like a CD-ROM).
- **vaporware :** "software" advertised, and sometimes sold, that does not yet exist in a releasable for.
- **UPS:**acronym for *"Uninterruptible Power Source"*,a constantly charging battery pack which powers the computer. A UPS should have enough charge to power your computer for several minutes in the event of a total power failure, giving you time to save your work and safely shut down.
- **upload:** To send a file from one computer to another through a network.
- **title bar**the horizontal bar at the top of a window which has the name of the file or folder it represents.
- **System folder:** an all-important folder that contains at least the System file.
- **System file:**a file in the System folder that allows your Mac to start and run.
- **start up disk:** the disk containing system software and is designated to be used to start the computer.
- **spreadsheet:** a program designed to look like an electronic ledger as in Excel.
- **server:**a central computer dedicated to sending and receiving data from other computers (on a network).
- **serial port:** a port that allows data to be transmitted in a series (one after the other), such as the printer and modem ports on a Mac.
- **SCSI:** acronym for Small Computer System Interface.
- **SCSI address:** a number between zero and seven that must be unique to each device in a SCSI chain. Fast and Wide SCSI devices will allow up to 15 SCSI Ids (hexidecimal); however, the length restriction (3 meters) is such that it is virtually impossible to link 15 devices together.

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- **SCSI port:** a 25 pin connector on the back of a Mac (native SCSI port); used to connect SCSI devices to the CPU.
- **root directory:**the main hard drive window.
- **ROM:**acronym for Read Only Memory; memory that can only be read from and not written to.
- **RISC:** acronym for Reduced Instruction Set Computing; the smaller set of commands used by the PowerPC and Power Mac.
- **RAM:**Acronym for Random-Access Memory.
- **QuickTime:**the Apple system extension that gives one the ability to compress, edit and play animation, movies and sound on the Mac.
- **print spooler:** a program that stores documents to be printed on the hard drive, thereby freeing the memory up and allowing other functions to be performed while printing goes on in the background.
- **PCI:**acronym for Peripheral Component Interchange - the newer, faster bus achitecture.
- **paste:** to insert text, or other material, from the clipboard or copy buffer.
- **partition:** a subdivision of a hard drives surface that is defined and used as a separate drive.
- **optical disk:** a high-capacity storage medium that is read by a laser light.
- **nanosecond:**one billionth of a second.
- **multi tasking:** running more than one application in memory at the same time.
- **memory:** the temporary holding area where data is stored while it is being used or changed; the amount of RAM a computer has installed.
- **megabyte:**1024 kilobytes.
- **Measurements (summary)**
- **database:**an electronic list of information that can be sorted and/or searched.
- **defragment:** to concatenate fragments of data into contiguous blocks in memory or on a hard drive.
- **digitize:**to convert linear, or analog, data into digital data which can be used by the computer.
- **disk:**a spinning platter made of magnetic or optically etched material on which data can be stored.
- **disk drive:** the machinery that writes the data from a disk and/or writes data to a disk.
- **DOS:**acronym for Disk Operating System - used in IBM PCs.
- **DPI:** acronym for Dots Per Inch - a gauge of visual clarity on the printed page or on the computer screen.
- **download:** to transfer data from one computer to another. (If you are on the receiving end, you are downloading. If you are on the sending end, you are uploading).
- **driver:**a file on a computer which tells it how to communicate with an add-on piece of equipment (like a printer).
- **Ethernet:**a protocol for fast communication and file transfer across a network.
- **font :**a typeface that contains the characters of an alphabet or some other letterforms.
- **fragmentation:**The breaking up of a file into many separate locations in memory or on a disk.
- **freeze:** a system error which causes the cursor to lock in place.
- **hard drive:**a large capacity storage device made of multiple disks housed in a rigid case.
- **head crash:** a hard disk crash caused by the heads coming in contact with the spinning disk(s).
- **icon:** a graphic symbol for an application, file or folder.
- **Measurements:**

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* 1024 bytes =one kilobyte
* K= kilobyte
* Kb = kilobit
* MB= megabyte
* Mb= megabit
* MB/s = megabytes per second
* Mb/s= megabits per second
* bps= bits per second

155 Mb/s = 19.38 MB/s

4.8 Some shortcut command

Command name	Shortcut key
All Caps	CTRL+SHIFT+A
Annotation	ALT+CTRL+M
App Maximize	ALT+F10
App Restore	ALT+F5
Apply Heading1	ALT+CTRL+1
Apply Heading2	ALT+CTRL+2
Apply Heading3	ALT+CTRL+3
Apply List Bullet	CTRL+SHIFT+L
Auto Format	ALT+CTRL+K
Auto Text	F3 or ALT+CTRL+V
Bold	CTRL+B or CTRL+SHIFT+B
Bookmark	CTRL+SHIFT+F5
Browse Next	CTRL+PAGE DOWN
Browse Previous	CTRL+PAGE UP
Browse Sel	ALT+CTRL+HOME
Cancel	ESC
Center Para	CTRL+E
Change Case	SHIFT+F3
Char Left	LEFT
Char Left Extend	SHIFT+LEFT
Char Right	RIGHT
Char Right Extend	SHIFT+RIGHT
Clear	DELETE
Close or Exit	ALT+F4
Close Pane	ALT+SHIFT+C
Column Break	CTRL+SHIFT+ENTER
Column Select	CTRL+SHIFT+F8
Copy	CTRL+C or CTRL+INSERT
Copy Forma	t CTRL+SHIFT+C
Copy Text	SHIFT+F2
Create Auto Tex	t ALT+F3
Customize Add Menu	ALT+CTRL+=
Customize Keyboard	ALT+CTRL+NUM +
Customize Remove Menu	ALT+CTRL+-
Cut	CTRL+X or SHIFT+DELETE
Date Field	ALT+SHIFT+D
Delete Back Word	CTRL+BACKSPACE
Delete Word	CTRL+DELETE
Dictionary	ALT+SHIFT+F7
Do Field	Click ALT+SHIFT+F9
Doc Close	CTRL+W or CTRL+F4
Doc Maximize	CTRL+F10
Doc Move	CTRL+F7

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Doc Restore	CTRL+F5
Doc Size	CTRL+F8
Doc Split	ALT+CTRL+S
Double Underline	CTRL+SHIFT+D
End of Column	ALT+PAGE DOWN
End of Column	ALT+SHIFT+PAGE DOWN
End of Doc Extend	CTRL+SHIFT+END
End of Document	CTRL+END
End of Line	END
End of Line Extend	SHIFT+END
End of Row	ALT+END
End of Row	ALT+SHIFT+END
End of Window	ALT+CTRL+PAGE DOWN
End of Window Extend	ALT+CTRL+SHIFT+PAGE DOWN
Endnote Now	ALT+CTRL+D
Extend Selection	F8
Field Chars	CTRL+F9
Field Codes	ALT+F9
Find	CTRL+F
Font	CTRL+D or CTRL+SHIFT+F
Font Size Select	CTRL+SHIFT+P
Footnote Now	ALT+CTRL+F
Go Back	SHIFT+F5 or ALT+CTRL+Z
Go To	CTRL+G or F5
Grow Font	CTRL+SHIFT+.
Grow Font One Point	CTRL+]
Hanging Indent CTRL+T	
Header Footer Link	ALT+SHIFT+R
Help	F1
Hidden	CTRL+SHIFT+H
Hyperlink	CTRL+K
Indent	CTRL+M
Italic	CTRL+I or CTRL+SHIFT+I
Justify Para	CTRL+J
Left Para	CTRL+L
Line Down	DOWN
Line Down Extend	SHIFT+DOWN
Line Up	UP
Line Up Extend	SHIFT+UP
List Num Field	ALT+CTRL+L
Lock Fields	CTRL+3 or CTRL+F11
Macro	ALT+F8
Mail Merge Check	ALT+SHIFT+K
Mail Merge Edit Data Source	ALT+SHIFT+E
Mail Merge to Doc	ALT+SHIFT+N
Mail Merge to Printer	ALT+SHIFT+M
Mark Citation	ALT+SHIFT+I
Mark Index Entry	ALT+SHIFT+X
Mark Table of Contents Entry	ALT+SHIFT+O
Menu Mode	F10
Merge Field	ALT+SHIFT+F
Microsoft Script Editor	ALT+SHIFT+F11
Microsoft System Info	ALT+CTRL+F1
Move Text	F2
New	CTRL+N
Next Cell	TAB
Next Field	F11 or ALT+F1
Next Misspelling	ALT+F7
Next Object	ALT+DOWN
Next Window	CTRL+F6 or ALT+F6
Normal	ALT+CTRL+N

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Normal Style	CTRL+SHIFT+N or ALT+SHIFT+CLEAR (NUM 5) Open CTRL+O or CTRL+F12 or AL
Open or Close Up Para	CTRL+0
Other Pane	F6 or SHIFT+F6
Outline	ALT+CTRL+O
Outline Collapse	ALT+SHIFT+- or ALT+SHIFT+NUM
Outline Demote	ALT+SHIFT+RIGHT
Outline Expand	ALT+SHIFT+=
Outline Expand	ALT+SHIFT+NUM +
Outline Move Down	ALT+SHIFT+DOWN
Outline Move Up	ALT+SHIFT+UP
Outline Promote	ALT+SHIFT+LEFT
Outline Show First Line	ALT+SHIFT+L
Overtype	INSERT
Page	ALT+CTRL+P
Page Break	CTRL+ENTER
Page Down	PAGE DOWN
Page Down Extend	SHIFT+PAGE DOWN
Page Field	ALT+SHIFT+P
Page Up	PAGE UP
Page Up Extend	SHIFT+PAGE UP
Para Down	CTRL+DOWN
Para Down Extend	CTRL+SHIFT+DOWN
Para Up	CTRL+UP
Para Up Extend	CTRL+SHIFT+UP
Paste	CTRL+V or SHIFT+INSERT
Paste Format	CTRL+SHIFT+V
Prev Cell	SHIFT+TAB
Prev Field	SHIFT+F11 or ALT+SHIFT+F1
Prev Object	ALT+UP
Prev Window	CTRL+SHIFT+F6 or ALT+SHIFT+F6
Print	CTRL+P or CTRL+SHIFT+F12
Print Preview	CTRL+F2 or ALT+CTRL+I
Proofing	F7
Redo	ALT+SHIFT+BACKSPACE
Redo or Repeat	CTRL+Y or F4 or ALT+ENTER
Repeat Find	SHIFT+F4 or ALT+CTRL+Y
Replace	CTRL+H
Reset Char	CTRL+SPACE or CTRL+SHIFT+Z
Reset Para	CTRL+Q
Revision Marks Toggle	CTRL+SHIFT+E
Right Para	CTRL+R
Save	CTRL+S or SHIFT+F12 or ALT+SHIFT+F2
Save As	F12
Select All	CTRL+A or CTRL+CLEAR (NUM 5) or CTRL+NUM 5
Select Table	ALT+CLEAR (NUM 5)
Show All	CTRL+SHIFT+8
Show All Headings	ALT+SHIFT+A
Show Heading1	ALT+SHIFT+1
Show Heading2	ALT+SHIFT+2
Show Heading3	ALT+SHIFT+3
Show Heading4	ALT+SHIFT+4
Show Heading5	ALT+SHIFT+5
Show Heading6	ALT+SHIFT+6
Show Heading7	ALT+SHIFT+7
Show Heading8	ALT+SHIFT+8
Show Heading9	ALT+SHIFT+9
Shrink Font	CTRL+SHIFT+,
Shrink Font One Point	CTRL+[
Small Caps	CTRL+SHIFT+K
Space Para1	CTRL+1
Space Para15	CTRL+5

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Space Para2	CTRL+2
Spike	CTRL+SHIFT+F3 or CTRL+F3
Start of Column	ALT+PAGE UP
Start of Column	ALT+SHIFT+PAGE UP
Start of Doc Extend	CTRL+SHIFT+HOME
Start of Document	CTRL+HOME
Start of Line	HOME
Start of Line Extend	SHIFT+HOME
Start of Row	ALT+HOME
Start of Row	ALT+SHIFT+HOME
Start of Window	ALT+CTRL+PAGE UP
Start of Window Extend	ALT+CTRL+SHIFT+PAGE UP
Style	CTRL+SHIFT+S
Subscript	CTRL+=
Superscript	CTRL+SHIFT+=
Symbol Font	CTRL+SHIFT+Q
Thesaurus	SHIFT+F7
Time Field	ALT+SHIFT+T
Toggle Field Display	SHIFT+F9
Toggle Master Subdocs	CTRL+
Tool	SHIFT+F1
Un Hang	CTRL+SHIFT+T
Un Indent	CTRL+SHIFT+M
Underline	CTRL+U or CTRL+SHIFT+U
Undo	CTRL+Z or ALT+BACKSPACE
Unlink Fields	CTRL+6 or CTRL+SHIFT+F9
Unlock Fields	CTRL+4 or CTRL+SHIFT+F11
Update Auto Format	ALT+CTRL+U
Update Fields	F9 or ALT+SHIFT+U
Update Source	CTRL+SHIFT+F7
VBCode	ALT+F11
Web Go Back	ALT+LEFT
Web Go Forward	ALT+RIGHT
Word Left	CTRL+LEFT
Word Left Extend	CTRL+SHIFT+LEFT
Word Right	CTRL+RIGHT
Word Right Extend	CTRL+SHIFT+RIGHT
Word Underline	CTRL+SHIFT+W

4.9 General definition and terminology

- **Monitor:** A device used to display information visually
- **Mouse:** A peripheral device used to point to items on a monitor
- **NIC:** Network interface card; a board inserted in a computer that provides a physical connection to a network
- **Printer:** A peripheral device that converts output from a computer into a printed image
- **Applications:** Complete, self-contained programs that perform a specific function (ie. spreadsheets, databases)
- **Bit:** A computer's most basic unit of information
- **Boot:** The process of loading or initializing an operating system on a computer; usually occurs as soon as a computer is turned on
- **Browser:** A program used to view World Wide Web pages, such as Netscape Navigator or Internet Explorer
- **Bug:** A part of a program that usually causes the computer to malfunction; often remedied in patches or updates to the program
- **Byte:** Small unit of data storage; 8 bits; usually holds one character
- **Click:** Occurs when a user presses a button on a mouse which in turn, generates a command to the computer

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- **Database:** A large structured set of data; a file that contains numerous records that contain numerous fields
- **Diskette:** A small flexible disk used for storing computer data
- **Double Click:** Occurs when a user presses a button on the mouse twice in quick succession; this generates a command to the computer
- **Download:** Transferring data from another computer to your computer
- **Drag:** Occurs when a user points the mouse at an icon or folder, presses the button and without releasing the button, moves the icon or folder to another place on the computer where the button is released
- **Driver:** Software program that controls a piece of hardware or a peripheral
- **FAQ:** Frequently asked question; documents that answer questions common to a particular website or program
- **File:** Namable unit of data storage; an element of data storage; a single sequence of bytes
- **Folder:** A graphical representation used to organize a collection of computer files; as in the concept of a filing cabinet (computer's hard drive) with files (folders)
- **Freeware:** Software provided at no cost to the user
- **Gigabyte:** 1,073,741,824 bytes or 1,024 megabytes; generally abbreviated GB
- **GUI:** Graphical user interface; uses pictures and words to represent ideas, choices, functions, etc.
- **Icon:** A small picture used to represent a file or program in a GUI interface
- **Internet:** A network of computer networks encompassing the World Wide Web, FTP, telnet, and many other protocols
- **IP number:** Internet protocol; a computer's unique address or number on the Internet
- **Kilobyte:** 1,024 bytes; usually abbreviated KB
- **Megabyte:** 1,048,576 bytes or 1,024 kilobytes; enough storage to approximately equal a 600 page paperback book; generally abbreviated Mb
- **Memory:** Any device that holds computer data
- **Menu:** A list of operations available to the user of a program
- **Network:** A collection of computers that are connected
- **Peripheral:** Any of a number of hardware devices connected to a CPU
- **RAM:** Random access memory; the type of storage that changes; when the computer is turned off, the RAM memory is erased
- **ROM:** Read-only memory; the type of storage that is not changed even when the computer is turned off
- **Scroll Bar:** Allows the user to control which portion of the document is visible in the window; available either horizontally or vertically or both
- **Shareware:** Software provided at a minimal cost to users who are on their honor to send in payment to the programmer
- **Spreadsheet:** A program arranged in rows and columns that manipulates numbers
- **Tool Bar:** A graphical representation of program activities; a row of icons used to perform tasks in a program
- **URL:** Uniform resource locator; the address of a site on the World Wide Web; a standard way of locating objects on the Internet
- **Virus:** A deliberately harmful computer program designed to create annoying glitches or destroy data
- **Window:** A screen in a software program that permits the user to view several programs at one time
- **Word Processor:** A program that allows the user to create primarily text document.

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- **CPU:** Central processing unit; the brain of the computer; controls the other elements of the computer
- **Disk Drive:** A peripheral device that reads and/or writes information on a disk
- **Hard Drive:** A device (usually within the computer case) that reads and writes information, including the operating system, program files, and data files
- **Keyboard:** A peripheral used to input data by pressing keys
- **Modem:** A peripheral device used to connect one computer to another over a phone line
- **Application Files :**Program files environment where you can create and edit the kind of document that application makes.
- **Click :**To select an object by pressing the mouse button when the cursor is pointing to the required menu option, icon or hypertext link.
- **Close :**To close a window that has been opened for viewing and / or editing.
- **Computer :**A general-purpose machine that processes data according to a set of instructions that are stored internally either temporarily or permanently.
- **Central Processor Unit (CPU) :**Central Processor Unit–the main chip on the computer that makes everything go.
- **Crash :**Your computer or application no longer works correctly and so you "loose" all the work you've done since the last time you saved.
- **Creating A File :**Storing data as a file with an assigned file name that is unique within the directory it resides in.
- **Delete :**To remove an item of data from a file or to remove a file from the disk.
- **Desktop :**An on-screen representation of a desktop such as used in the Macintosh and Windows operating systems.
- **Dialog Boxes :**Takes over your screen and allows you to "dialog" with the computer.
- **Directory (AKA Folder, sub-directory) :**Allows you to organize files and other folders.
- **Disk Space :**This is the place where your files live. The greater the disk space the more files you can keep. (See also Megabytes) More disk space is always better than less. You can never have much disk space.
- **Documents :**Files you create and edit.
- **Document Files :**Files we care about (memos, letters, pictures, etc.)
- **Double Click :**To press the mouse button twice in rapid succession without moving the mouse between clicks.
- **Drag :**To move an object on screen in which its complete movement is visible from starting location to destination.
- **Edit :**To make a change to existing data.
- **File Cabinet :**Metaphorically, the hard drive (and other kinds of storage media like floppy disks) which store files and folders.
- **Folder (AKA Directory, Sub-Directory) :**Allows you to organize files and other folders.
- **Folder Icons :**Collections of documents and other folders.
- **Icons :**In a graphical user interface (GUI), a small, pictorial, on screen representation of an object, such as a document, program, folder or disk drive.
- **Icon View :**Allows you to see icons of folders and files primarily as icons with little information.
- **Keyboard :**This if the primary text input device. It also contains certain standard function keys, such as the Escape key, tab, and arrow keys, shift and control keys, and sometimes other manufacturer-customized keys.

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- **Kilo (K) :**This is a unit of measure = 1,000. So 1,000 bytes is a KiloByte.
- **List View :**Shows the icons but also orders the icons (often by name, but can sort the list in other ways) and shows more information about them.
- **Macintosh :**The brand name of a family of personal computers (hardware) and an operating system (software) from Apple, introduced in 1984.
- **Megabytes (Mb) :**Mega = million so Mb is 1,000,000 bytes. It's enough information for the computer to store one character (e.g. "h"), so 1mb text file = 1,000,000 keystrokes in that file. Just to confound the masses, although RAM and Disk Space do something completely different we measure both in megabytes. This leads to confusion.
- **Menu :**Displays a list of commands, some with images next to them.
- **Modifier Keys :**Keys that change the meaning of what you type.
- **Mouse :**Pointing device that allows you to tell the computer what to do.
- **Operating System (OS) :**System software that allows your computer to work.
- **Pointer (AKA Cursor) :**The name of the arrow (or other shape) that tracks across the screen as you move the mouse (or other pointing device) around.
- **Random Access Memory (RAM) :**This stands for Random Access Memory. You can think of this as the "space" where you computer does its processing. The more space you have the more processes you can run at the same time. More RAM is always better than less. You can never have much RAM.
- **Recycle Bin :**Place where you put files and folders that you may later want to delete or get rid of. Compare Trash.
- **Resize Box :**Allows you to change the size and shape of a window.
- **Right click :**To press the right button on the mouse. (This is Windows specific. On a Mac running System 8 or higher, you hold down the Control key and then click to get the same effect.)
- **Save :**Tell the computer to create a file on disk that has the information you've put into the document (usually typing).
- **Save As :**Give the file a name and/or store the file in a certain place.
- **Scroll bar :**Allows you to move around through your document.
- **Shut down :**To quit all applications and turn off the computer.
- **Software :**Instructions that tell the computer what to do.
- **System files :**Allows our computer to work.
- **Trash :**Place where you put files and folders that you want to delete or get rid of.
- **Volume Icons :**Devices that hold files and folders.
- **Windows :**1) The most widely used operating system for personal computers from Microsoft. (Software only. Other companies manufacture the hardware that runs the Windows Operating System.) Compare Macintosh. (Windows with a large "W".)
- **Hardware port:**any place on the computer where devices can be plugged in
- **USB:**type of computer port used for keyboards, drives, mouse, etc.
- **CD drive:**a piece of hardware that reads CDs
- **Hardware:**physical parts of the computer and devices used with a computer
- **Software:**computer programs
- **Operating system:**software that communicated with hardware enabling other software to run (examples: Windows, Mac OS, and Linux)
- **Icon:**a visual representation of files and programs on the computer

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- **Shortcut:**uses an icon like a button to go directly to a file or program
- **Folder:**store files just like real folders
- **File:**a collection of data stored in one unit, identified by a filename(examples: document, pictures, videos, etc.)
- **Window:**an area on the screen that displays information for a specific program
- **Dialog box:**a window that pops up with options for the user to select
- **Toolbar:**a set of icons or buttons that is part of the software being used

4.10 Input-Output Devices

4.11 Data communication ports

4.12 Short forms for computer and internet terminology

AAL	ATM Adaptation Layer
AARP	AppleTalk Address Resolution Protocol
ABM	Asynchronous Balance Mode (HDLC)
ABR	Available Bit Rate
AC	Access Control (IEEE)
ACF	Access Control Field (DQDB)
ACK	Acknowledgment
ADM	Add/Drop Multiplexer
ADSL	Asymmetric Digital Subscriber Links
AIS	Alarm Indication Signal (SONET)
PC	Personal computer
COMPUTER	Commonly operating machine particularly used for technology entertainment and research
HTML	Hyper text markup language
AJAX	Asynchronous javascript and xml
ORACLE	Oak ridge automatic computer and logical engine
RDBMS	Relational database management system
SQL	Structured query language
XML	Extensible markup language
PERL	Practical extraction and report language
PHP	Hypertext preprocessor
ASP	Active server pages
API	Application programming interfaces
XHTML	Extensible hypertext markup language
CSS	Cascading style sheets
ASCII	American standard code for information interchange
XSL	Extensible style sheet language
J2EE-	Java 2 platform enterprise edition
JSP-	Java server page
VBS	Visual basic scripting language
JS	Java script
3GP	3rd generation protocol
3GPP	3rd generation partnership project
AAC	Advanced audio codec
AC3	Dolby digital sound file
AIFF	Audio interchange file format
AMR	Adoptive multi rate
AWB	Adoptive multi rate wideband
AVI	Audio video interleaved
CDA	Compact disk audio
DLL	Dynamik link library
DVD	Digital video disk

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EXE	Executable format
FLAC	Free lossless audio codec
FLV	Flash live video
JPEG	Joint photographic expert group
BMP	Bitmap
GIF	Graphics interchange format
JAD	Java application development
JAR	Java archive
MIDI	Musical instrument digital interface
MMF	Music Mobile Format
MP2	Mpeg audio layer 2
MP3	Mpeg audio layer 3
MP4	Mpeg layer 4
MPEG	Motion picture experts group
PDF	Portable document format
PNG	Portable network/new graphics
RM	Real media
SIS	Symbian installation source
SWF-	Shock wave flash
ZIP	Zone improvement plan
VCD	Video compact disk
VOB	Video object
WAV	Waveform pcm audio
WMA	Windows media audio
PDF	Portable document format
M3G	Mobile 3d graphics
M4A	Mpeg-4 audio file
MMF	Synthetic music mobile application file
XMF	Extensible music file
WBMP	Wireless bitmap image
DVX	Divx video
WML	Wireless markup language
CD	Compact disk.
DVD	Digital versatile disk.
CRT	Cathode ray tube.
DAT	Digital audio tape.
DOS	Disk operating system.
GUI	Graphical user interface.
HTTP	Hyper text transfer protocol.
HTTPS	Hyper text transfer protocol secure
. IP	Internet protocol.
ISP	Internet service provider.
TCP	Transmission control protocol.
UPS	Uninterruptible power supply.
VHF	Very high frequency.
UHF	Ultra high frequency.
ALU	Arithmetic logic unit
URL	Uniform resource locator.
WINDOWS	Wide interactive network for development of office work solution
AMD	Advance micro device
ASPI	Advacne scsi programming interface
ASIC	Application specific integrated circuit
EPROM	Erasable programmable read only memory.
FPS	Frame per second
USB	Universal serial bus.
VIRUS	Vital information resource under seized.
RAM	Random access memory
ROM	Read only memory
MIME	Multipurpose internet mail extensions
SMTP	Simple mail transfer protocol
IMAP	Internet message access protocol

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HSDPA	High speed downlink packet access.
EDGE	Enhanced data rate for gsm evolution.
GPRS	General packet radio service.
3G	3rd generation.
GSM	Global system for mobile communication.
CDMA	Code division multiple access.
UMTS	Universal mobile telecommunication system.
ARPANET	Advanced research project agency network.
AM/FM	Amplitude/ frequency modulation.
WLAN	Wireless local area network
CPU	Central processing unit
RAM	random access memory
ROM	read only memory
PROM	Programmable Read Only Memory
HDD	Hard Disk Drive
FDD	Floppy Disk Drive
KBD	KeyBoard
I/O	Input & Output
CD	Compact Disk
DVD	Digital Video Disk
SMPS	Switch Mode Power Supply
POST	Power ON Self Test
BIOS	Basic Input Output System
VDU	Visible Display Unit
LED	Light Embedded Diode
LCD	Liquid Crystal Display
USB	Universal Serial Bus
VGA	Video/Visual Graphic Adapter
LAN	Local Area Network
WAN	Wide Area Network
MAN	Metropolitan Area Network
HLL	High Level Language
LLL	Low Level Language
MIPS	Million of Instruction Per Second
Mbps	Mega Bytes Per second
Kbps	Kilo Bytes per second
CMD	Command
KB	Kilobyte
MB	Mega byte
GB	Giga byte
GiB	Gibi byte
TB	Tera byte
TiB	Tebi byte
PB	Peta byte
PiB	Pebi byte
EB	Exa byte
ATA	Advanced Technology Attachment
ASCII	American Standard Code for Information Interchange
ARPANET	Advanced Research Projects Agency Network
Ajax	Asynchronous JavaScript and XML
ASP	Active Server Pages/Application Service Provider
API	Application Programming Interface
ATA	Advanced Technology Attachment
ATM	Asynchronous Transfer Mode
BiDi	Bi-Directional
bin	binary
BAL	Basic Assembly Language
BASIC	Beginner's All-Purpose Symbolic Instruction Code
BIOS	Basic Input Output System
bps	bits per second
BCD	Binary Coded Decimal

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Blog	Web Log
BMP	Basic Multilingual Plane
BT	BitTorrent / Bluetooth
BW	Bandwidth
CAD	Computer-Aided Design
CPU	Central Processing Unit
CIM	Common Information Model
CRS	Computer Reservations System
CRT	Cathode Ray Tube
CLI	Command Line Interface
CDMA	Code Division Multiple Access
CMOS	Complementary Metal-Oxide Semiconductor
CSI	Common System Interface
CD-R	CD-Recordable
CD-ROM	CD Read-Only Memory
CD-RW	CD-Rewritable
CMOS	Complementary Metal-Oxide Semiconductor
CSV	Comma-Separated Values
COBOL	Common Business-Oriented Language
CGI	Common Gateway Interface /Computer-Generated Imagery
DAO	Data Access Objects
DHTML	Dynamic Hypertext Markup Language
DAT	Digital Audio Tape
DB	Database
DIVX	Digital Video Express
DVD	Digital Video Disc
DVD-R	DVD-Recordable
DVD-ROM	DVD-Read Only Memory
DVD-RW	DVD-Rewritable
DOS	Disk Operating System
DDR	Double Data Rate
DNS	Domain Name System
EEPROM	Electronically Erasable Programmable Read-Only Memory
ENIAC	Electronic Numerical Integrator And Computer
EBCDIC	Extended Binary Coded Decimal Interchange Code
EPROM	Erasable Programmable Read-Only Memory
ESD	Electrostatic Discharge
FAT	File Allocation Table
FAQ	Frequently Asked Questions
FDD	Floppy Disk Drive
FDMA	Frequency-Division Multiple Access.
FS	File System
FSB	Front Side Bus
FTP	File Transfer Protocol
Gb	Gigabit / GB&Gigabyte
GIF	Graphics Interchange Format
GPL	General Public License
GPRS	General Packet Radio Service
HD	High Density
HDD	Hard Disk Drive
HD DVD	High Definition DVD
HP	Hewlett-Packard
HT	Hyper Threading
HTM	Hierarchical Temporal Memory
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
Hz	Hertz
IBM	International Business Machines.
IC	Integrated Circuit
ICMP	Internet Control Message Protocol
ICT	Information and Communication Technology

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IDE	Integrated Development Environment /Integrated Drive Electronics
IE	Internet Explorer
IIS	Internet Information Services
IM	Instant Messaging
IMAP	Internet Message Access Protocol
I/O	Input/Output
IP	Intellectual Property /Internet Protocol
IrDA	Infrared Data Association
ISA	Industry Standard Architecture /Instruction Set Architecture
iSCSI	Internet Small Computer System Interface
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
IT	Information Technology
J2EE	Java 2 Enterprise Edition
J2ME	Java 2 Micro Edition
J2SE	Java 2 Standard Edition
JDK	Java Development Kit
JPEG	Joint Photographic Experts Group
JRE	Java Runtime Environment
JS	JavaScript
KB	Keyboard /Kilobyte /Knowledge Base
Kb	Kilobit
kHz	Kilohertz
KVM	Keyboard, Video, Mouse
LED	Light-Emitting Diode
MAN	Metropolitan Area Network
Mb	Megabit
MB	Megabyte
MBR	Master Boot Record
MDI	Multiple Document Interface
MHz	Megahertz
MIDI	Musical Instrument Digital Interface
MMU	Memory Management Unit
MMX	Multi-Media Extensions
MNG	Multiple-image Network Graphics
MPEG	Motion Pictures Experts Group
MOSFET	Metal-Oxide Semiconductor Field Effect Transistor
MPEG	Motion Pictures Experts Group
MS	Microsoft
MS-DOS	Microsoft DOS
NIC	Network Interface Controller
NTFS	NT Filesystem
NVRAM	Non-Volatile Random Access Memory
OO	Object-Oriented
OS	Open Source /Operating System
P2P	Peer-To-Peer
PAN	Personal Area Network
PATA	Parallel ATA
PC	Personal Computer
PCB	Printed Circuit Board
PC DOS	Personal Computer Disk Operating System
PCI	Peripheral Component Interconnect
PCIe	PCI Express
PERL	Practical Extraction and Reporting Language
PGA	Pin Grid Array
PHP	PHP: Hypertext Preprocessor
PIC	Peripheral Interface Controller /Programmable Interrupt Controller
PLC	Power Line Communication /Programmable Logic Controller
POST	Power-On Self Test
PPI	Pixels Per Inch
PS/2	Personal System/2

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PSU	Power Supply Unit
RAD	Rapid Application Development
RAM	Random Access Memory
RAID	Redundant Array of Inexpensive Disks
RAIT	Redundant Array of Inexpensive Tapes
RF	Radio Frequency
RGB	Red, Green, Blue (RGBA&Red, Green, Blue, Alpha)
RIP	Raster Image Processor /Routing Information Protocol
ROM	Read Only Memory
ROM-DOS	Read Only Memory - Disk Operating System
SATA	Serial ATA
SCSI	Small Computer System Interface
SDRAM	Synchronous Dynamic Random Access Memory
SFTP	Secure FTP /Simple File Transfer Protocol
SHDSL	Single-pair High-speed Digital Subscriber Line
SIMD	Single Instruction, Multiple Data
SIMM	Single Inline Memory Module
SPI	Serial Peripheral Interface
SPI	Stateful Packet Inspection
SVG	Scalable Vector Graphics
SVGA	Super Video Graphics Array
TB	TeraByte
TCP/IP	Transmission Control Protocol/Internet Protocol
TDMA	Time Division Multiple Access
tmp	temporary
TTF	TrueType Font
TTL	Transistor-Transistor Logic
UPS	Uninterruptible Power Supply
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
USB	Universal Serial Bus
UTF	Unicode Transformation Format
UTP	Unshielded Twisted Pair
VB	Visual Basic
VBA	Visual Basic for Applications
VBS	Visual Basic Script
VPN	Virtual Private Network
VPU	Visual Processing Unit
WAN	Wide Area Network
WAP	Wireless Access Point /Wireless Application Protocol
Wi-Fi	Wireless Fidelity
WLAN	Wireless Local Area Network
WMA	Windows Media Audio
WMV	Windows Media Video
WPAN	Wireless Personal Area Network
XML	eXtensible Markup Language
Y2K	Year Two Thousand
EiB	Exbi byte
ZB	Zetta byte
ZiB	Zebi byte
YB	Yotta byte
YiB	Yobi byte
LCD	Liquid crystal display
LED	Light-emitting diode
NTFS	New technology file system
FAT	File allocation table
DOC	Document
TXT	Text
SD	Secure digital
USB	Universal serial bus
IT	Information technology

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NET	Internet
IP	Internet protocol
AP	Access point
DNS	Domain name system
HTTP	Hypertext transfer protocol
HTTPS	Hypertext transfer protocol secure
HTML	Hypertext markup language
PHP	Hypertext preprocessor
XML	Extensible markup language
CSS	Cascading style sheets
ASP	Active server pages
SQL	Structured query language
RSS	Really simple syndication
DMCA	Digital millennium copyright act
IPV4	Internet protocol version 4
IPV6	Internet protocol version 6
VOIP	Voice over internet protocol
FAQ	Frequently asked questions
SEO	Search engine optimization
1024 Bytes	1 Kilo Byte (KB)
1024 KB	1 Mega Byte (MB)
1024 MB	1 Gyga Byte (GB)
1024 GB	1 Tera Byte (TB)
1024 TB	1 Peta Byte (PB)
1024 PB	1 Exa Byte (EB)
1024 EB	1 Zetta Byte (ZB)
1024 ZB	1 Yotta Byte (YB)
ANI	Automatic Number Identification
ANS	American National Standards
ANSI	American National Standards Institute
API	Application Programming Interface
APS	Automatic Protection Switching
ARM	Asynchronous Response Mode (HDLC)
ARP	Address Resolution Protocol
Async	Asynchronous
ATM	Asynchronous Transfer Mode
AU	Access Unit (DQDB)
AUI	Attachment Unit Interface (Ethernet 802.3)
B8ZS	Bipolar with 8 Zero Substitution
BCC	Block Check Characters
BCD	Binary Coded Decimal
BECN	Backward Explicit Congestion Notification (FR)
Bellcore	Bell Communications Research
BER	Bit Error Ratio or Rate
BGP	Border Gateway Protocol
BIP	Bit Interleaved Parity (8)
B-ISDN	Broadband Integrated Services Digital Network
B-NT	Broadband Network Terminator
BO	Bit Oriented (SONET)
BOC	Bell Operating Company
BOM	Beginning of Message (DQDB)
BootP	Bootstrap Protocol
bps	Bits per second or bytes per second
BRI	Basic Rate Interface (ISDN)
BSC	IBMs Binary Synchronous Communications protocol
B-TA	Broadband Terminal Adapter (ATM)
B-TE	Broadband Terminal Equipment (ATM)
CAD/CAM	Computer Aided Design/Computer Aided Manufacturing
CAN	Customer Access Node (SMDS)
CBDS	Connectionless Broadband Data Service
CBEMA	Computer and Business Equipment Manufacturers Association

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CBR	Constant Bit Rate
CCI	Carrier-to-Carrier Interface
CCITT	Consultative Committee International Telegraph & Telephone
CD	CountDown counter (DQDB)
CE	Connection Endpoint
CEPT	Conference on European Post & Telegraph
CIR	Committed Information Rate (FR)
CL	Connectionless (SONET)
CLEC	Competitive Local Exchange Carrier
CLLM	Consolidated Link Layer Management (FR)
CLNP	Connectionless Layer Network Protocol
CLNS	ConnectionLess Network Service (OSI)
CLSF	ConnectionLess Server Function (ITU-T)
CMIP	Common Management Interface Protocol (ISO)
CMIS	Common Management Information Service (ISO)
CMISE	CMIS Element (ISO)
CMT	Connection Management (FDDI)
CNMS	Customer Network Management System
CO	Central Office
COAM	Customer Owned and Maintained
COCF	Connection-Oriented Convergence Function (DQDB)
COM	Continuation of Message (DQDB)
CONS	Connection-Oriented Network Service (ITU-T)
CPE	Customer Premises Equipment
C/R	Command/Response Indicator or bit
CRC	Cyclic Redundancy Check or Test
CS	Convergence Sublayer (DQDB)
CSMA/CD	Carrier-Sense Multiple Access with Collision Detection
CSU	Channel Service Unit
CTI	Computer-to-telephony interface
DA	Destination Address field
DAL	Dedicated Access Line
DARPA	Defense Advanced Research Program Agency
DARPAnet	Defense Advanced Research Program Agency network
DAS	Dual-Attach Station connection (FDDI)
DCE	Data Communications Equipment
DCS	Digital Cross-connect System
DDD	Direct Distance Dialing
DDS	Digital Data Service
DE	Discard Eligibility (FR)
DEC	Digital Equipment Corporation
DH	DMPDU Header (DQDB)
DHCP	Dynamic Host Configuration Protocol
DLCI	Data Link Connection Identifier (FR)
DMPDU	Derived MAC PDU (DQDB)
DNIS	Directory Number Information Service
DNS	Distributed Naming Service
DPG	Dedicated Packet Group (FDDI)
DoD	Department of Defense
DQDB	Distributed Queue Dual Bus (IEEE)
DS0	Digital Signal Level 0
DS1	Digital Signal Level 1
DS3	Digital Signal Level 3
DSAP	Destination Service Access Point (LLC)
DSG	Default Slot Generator (DQDB)
DSP	Digital Signal Processor
DSU	Data Service Unit
DT	DMPDU trailer (DQDB)
DTE	Data Terminal Equipment
DTMF	Dual Tone MultiFrequency
DVMRP	Distance Vector MulticaRouting Protocol

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DXC	Digital Cross-Connect
DXI	Data Exchange Interface (SMDS, ATM)
E1	European Transmission Level 1
E3	European Transmission Level 3
EA	Extended Address
ECN	Explicit Congestion Notification (FR)
ECSA	Exchange Carriers Standards Association
ED	End Delimiter (IEEE 802)
EDI	Electronic Data Interchange (or document interchange)
EGP	Exterior Gateway Protocol
EGRP	Exterior Gateway Routing Protocol
EIA	Electronics Industries Association
EIGRP	Enhanced Interior Gateway Routing Protocol
EIR	Excess Information Rate
EMA	Enterprise Management Architecture (DEC)
EOM	End Of Message
EOT	End Of Transmission
ES	End System (OSI)
ESF	Extended SuperFrame
ES-IS	End System-to-Intermediate System protocol (OSI)
ETB	End of Transmission Block
ETSI	European Telecommunications Standards Institute
ETX	End of Text
F	Flag
FC	Frame Control field (FDDI)
FCS	Frame Check Sequence (FR)
FDDI	Fiber Distributed Data Interface (ANSI)
FDDI-II	Fiber Distributed Data Interface Version II
FDM	Frequency Division Multiplexing
FEBE	Far End Block Error
FEC	Forward Error Correction
FECN	Forward Explicit Congestion Notification (FR)
FERF	Far End Reporting Failure
FIFO	First In, First Out
FM	Frequency Modulation
FOIRL	Fiber-Optic InterRepeater Link (Ethernet 802.3)
fps	Frames per second
FR	Frame Relay
FRAD	Frame Relay Assembler/Disassembler, or Access Device
FS	Frame Status field (FDDI)
FT1	Fractional T1
FTP	File Transfer Protocol
Gbit	Gigabits (billions of bits)
Gbps	Gigabits per second (109 bps)
GFC	Generic Flow Control
GFID	General Format Identifier
GFI	General Format Identifier (X.25)
GGP	Gateway-Gateway Protocol (DoD)
GOS	Grade of Service
GOSIP	Government Open System Interconnection Profile
GUI	Graphical User Interface
HCS	Header Check Sequence (DQDB)
HDTV	High Definition TeleVision
HDLC	High-Level Data Link Control (ISO)
HEC	Header Error Control
HOB	Head of Bus (DQDB) A or B
HSRP	Hot Standby Routing Protocol
HSSI	High-Speed Serial Interface
HTML	Hypertext Markup Language
HTTP	Hypertext Trasfer Protocol
Hz	Hertz or cycles per second

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ICF	Isochronous Convergence Function (DQDB)
ICIP	Inter-Carrier Interface Protocol (SMDS)
ICMP	Internet Control Message Protocol
IDRP	InterDomain Routing Protocol
IEC	InterExchange Carrier
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IGP	Interior Gateway Protocol
IGP	Interior Gateway Routing Protocol
IGRP	Interior Gateway Routing Protocol (CiscoS)
ILMI	Interim Local Management Interface
IMPDU	Initial MAC Protocol Data Unit (DQDB)
IMSSI	Inter-MAN Switching System Interface (DQDB)
I-MAC	Isochronous Media Access Control (FDDI)
intraLATA	intraLocal Access Transport Area
ISN	Initial Sequence Number (DoD)
IP	Internet Protocol (DoD)
IPCP	Internet Protocol Control Protocol (DoD)
IPX	Internetwork Packet Exchange protocol (Novell)
IS	Intermediate System (OSI)
ISDN	Integrated Services Digital Network
ISDU	Isochronous Service Data Unit (DQDB)
IS-IS	Intermediate System-to-Intermediate System (OSI)
ISO	International Standards Organization
ISP	Internet Service Protocol
ISSI	Inter-Switching System Interface (SMDS)
ISU	Isochronous Service User (SMDS)
IT	Integrated Technology
ITU	International Telecommunications Union
IVR	Integrated Voice Recognition
IXC	IntereXchange Carrier
kbit	kilobit (thousands of bits)
kbps	kilobits per second (103 bps)
km	kilometers (103 meters)
LAN	Local Area Network
LANE	LAN Emulation
LAP-B	Link Access Procedure - Balanced (X.25)
LAP-D	Link Access Procedure - D Channel (ISDN/Frame Relay)
LAP-F	Link Access Procedure - Frame Mode
LAT	Local Area Transport protocol (DEC)
LATA	Local Access Transport Area
LB	Letter Ballot
LCD	Liquid Crystal Display
LCGN	Logical Channel Group Number
LCP	Link Control Protocol
LEC	Local Exchange Carrier
LECS	LAN Emulation Configuration Server
LES	LAN Emulation Server
LLC	Logical Link Control (IEEE 802.X)
LME	Layer Management Entity (DQDB)
LMI	Local Management Interface (FR)
LSB	Least Significant Bit
LT	Line Termination
LTE	Line Terminating Equipment (SONET)
LU	Logical Unit (SNA)
m	meter
MAC	Media Access Control (IEEE 802.X)
MAN	Metropolitan Area Network (DQDB, FDDI)
Mbit	Megabits (millions of bits)
Mbps	Megabits per second (106 bps)
MCF	MAC Convergence Function (DQDB)

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MCP	MAC Convergence Protocol (DQDB)
MHz	Megahertz
MIB	Management Information Base (SNMP)
MIC	Media Interface Connector (FDDI)
MID	Message IDentifier (DQDB), Multiplexing IDentifier (ATM)
MIPS	Millions of Instructions Per Second
MMF	Multimode Fiber
MOP	Maintenance and Operation Protocol (DEC)
MOSPF	Multicast Open Shortest Path First
MPEG	Motion Picture Encoding Group
MPOA	MultiprotocolOver ATM
ms	millisecond (one-thousandth of a second, 10-3 seconds)
ms	microsecond (10-6 second)
MSAP	MAC Service Access Point (SMDS)
MSB	Most Significant Bit
MSDU	MAC Service Data Unit (SMDS)
MSS	MAN Switching System (SMDS)
MTU	Maximum Transmission Unit
MUX	Multiplexer
NANP	North American Numbering Plan
NBP	Name Binding Protocol
NCP	Network Control Protocol or Point (SNA)
NE	Network Element
NetBIOS	Network Basic Input/Output System protocol
NFS	Network File Server
nm	nanometer (10-9 meter)
NIC	Network Interface Card
NMP	Network Management Process (SMDS)
NMS	Network Management System or Station
NNI	Network-Node Interface (SONET)
NNI	Network-to-Network Interface (FR)
NOS	Network Operating System
NP	Network Performance
NPA	Numbering Plan Area
NRM	Normalized Response Mode (ISO)
NRZ	Non-return to zero
NRZI	Non-return to zero invert ones
ns	nanosecond (10-9 second)
OS	Operating System
OSI	Open Systems Interconnection
OSI CLNS	Connectionless Network System (OSI)
OSIRM OSI	Reference Model
OSPF	Open Shortest Path First
OTC	Operating Telephone Company
PA	Prearbitrated segment or slot (DQDB)
PABX	Private Automatic Branch Exchange
PAD	Packet Assembler/Disassembler (X.25)
PAF	Prearbitrated Function (DQDB)
PBX	Private Branch Exchange
PCN	Personal Communications Network
PCR	Peak Cell Rate
PCS	Personal Communications Services
PDC	Packet Data Channel (FDDI)
PDH	Plesiochronous Digital Hierarchy
PDN	Public Data Network
PDS	Packet Driver Specification for public domain
PDU	Protocol Data Unit (IEEE)
Ph-SAP	Physical layer SAP (DQDB)
PHY	Physical layer standard (FDDI)
PID	Protocol IDentification
PIM	Protocol Independent Multicast

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Ping	Packet Internet Groper
PIR	Protocol Independent Routing
PL PAD	Length (DQDB)
PLCP	Physical Layer Convergence Protocol (DQDB)
PM	Performance Monitoring
PMD	Physical Layer Medium Dependent standard (FDDI)
POH	Path Overhead (SONET)
POI	Path Overhead Identifier (DQDB)
PON	Passive Optical Network
PoP	Point of Presence
POTS	Plain Old Telephone Service
PPP	Point-to-Point Protocol (Internet)
Pps	Packets per second
PRI	Primary Rate Interface (ISDN)
PSPDN	Packet-Switched Public Data Network
PT	Payload Type
PTE	Path-Terminating Equipment (PTE)
PTT	Postal, Telegraph & Telephone Ministry/Administration
PU	Physical Unit (SNA)
PVC	Permanent Virtual Circuit or Channel (FR, X.25)
QA	Queued Arbitrated (DQDB) segment, slot, access function
QAF	Queued Arbitrated Function (DQDB)
QoS	Quality of Service
QPSX	Queued Packet and Synchronous Exchange
RBOC	Regional Bell Operating Company
RCP	Remote Console Protocol (DEC)
RDI	Remote Defect Indication (ATM)
REJ	Reject frame
RFC	Request for Comments
RIP	Routing Information Protocol
RISC	Reduced Instruction Set Computer
RJE	Remote Job Entry
RMT	Ring Management (FDDI)
RNR	Receive Not Ready
RQ	Request Counter (DQDB)
RR	Receive Ready frame
RSVP	Resource Reservation Protocol
RTMP	Routing and Management Protocol (Apple)
RTP	Routing Update Protocol
s	second
SA	Source Address field
SAP	Service Access Point (ISO)
SAPI	Service Access Point Identifier (ISO)
SAR	Segmentation and Re-assembly (ATM)
SAS	Single-Attach Station connection (FDDI)
SD	Start Delimiter
SDH	Synchronous Digital Hierarchy (ITU-T)
SDLC	Synchronous Data Link Control protocol (IBM)
SDU	Service Data Unit (DQDB)
SES	Severely Errored Seconds
SF	SuperFrame
SIG	SMDS Interest Group
SIP	SMDS Interface Protocol (SMDS)
SIR	Sustained Information Rate (SMDS)
SMDS	Switched Multimegabit Data Service
SMF	Single-Mode Fiber
SMT	System Management protocol (FDDI)
SMTP	Simple Mail Transfer Protocol
SN	Sequence Number
SNA	System Network Architecture (IBM)
SNAP	SubNetwork Access Protocol (SMDS)

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SNI	Subscriber Network Interface (SMDS)
SNMP	Simple Network Management Protocol (DoD)
SOH	Section Overhead
SONET	Synchronous Optical Network (ANSI)
SPE	Synchronous Payload Envelope (SONET)
SPF	Shortest Path First protocol
SPM	FDDI-to-SONET Physical Layer Mapping standard
SQL	Structured Query Language
SREJ	Select Reject frame
SRT	Source Route Transparent protocol
SS	Switching System (SMDS)
SSAP	Source Service Access Point (LLC)
SSCOP	Service-Specific Connection Oriented Protocol (ATM)
SSCS	Service-Specific Convergence Sublayer (ATM)
STE	Section Terminating Equipment (SONET)
STM	Synchronous Transfer Mode or Station Management (SDH)
STM-n	Synchronous Transport Module level n (SDH)
STP	Shielded Twisted Pair
STP	Spanning Tree Protocol (IEEE 802.1d)
STS-n	Synchronous Transport Signal Level n (SONET)
STS-Nc	Concatenated Synchronous Transport Signal Level N
SVC	Switched Virtual Circuit or Signaling Virtual Channel
SYN	Synchronous Idle
t	time
TA	Terminal Adapter
TAPI	Telephony Application Program Interface
TC	Transmission Convergence sub-layer of PHY layer (ATM)
TCP	Transmission Control Protocol (DoD)
TCP/IP	Transmission Control Protocol/Internet Protocol (DoD)
TDM	Time Division Multiplexing
TDMA	Time Division Multiple Access
TE	Terminal Equipment
TP	Transport Protocol (CCITT)
TP4	Transport Protocol Class 4 (ISO)
TR	Technical Report
TSAPI	Telephony Services Application Programmers Interface
UBR	Unspecified Bit Rate
UDP	User Datagram Protocol (DoD)
UNI	User-to-Network Interface
UNMA	Unified Network Management Architecture (AT&T)
UTP	Unshielded Twisted Pair
VBR	Variable Bit Rate
VC	Virtual Channel or Virtual Call
VCC	Virtual Channel Connection
VCI	Virtual Channel or Circuit Identifier (DQDB)
VC-n	Virtual Container-n (SDH)
VLSI	Very Large Scale Integration
VP	Virtual Path (ATM)
VPI	Virtual Path Identifier (ATM)
VPN	Virtual Private Network
VT	Virtual Tributary (SONET)
VTx VT	of size x (currently x = 1.5, 2, 3, 6)
VTx-Nc	Concatenated Virtual Tributary (SONET)
WAN	Wide Area Network
XNS	Xerox Network Systems protocol (XEROX)
ZIP	Routing and Management protocol (Apple)

4.13 Internet and email

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1. The two parts of a computer are
   - (A) Zip Drive and CD.
   - (B) Monitor and Keyboard
   - (C) Hardware and Software
   - (D) Bus and Power

2. The Central Processor Unit (CPU) is a
   - (A) Place where your files live.
   - (B) Main chip on the computer that makes everything go.
   - (C) Space where your computer does its processing.
   - (D) Disk Drive

3. What does RAM stand for?
   - (A) Random acess memory
   - (B) Read acess memory
   - (C) Random auxilary memory
   - (D) Random AntiMemory

4. A normal CD-ROM usually can store up to ..... data?
   - (A) 680 KB
   - (B) 680 Bytes
   - (C) 680 MB
   - (D) 680 GB

5. Which of the following required large computer memory?
   - (A) Imaging
   - (B) Graphics
   - (C) Voice
   - (D) All of above

6. Offline device is
   - (A) A device which is not connected to CPU
   - (B) A device which is connected to CPU
   - (C) A direct access storage device
   - (D) An I/O device

7. Which of the following programming language started from second generation?
   - (A) LISP
   - (B) C
   - (C) QBASIC

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(D) FORTRAN

8. Which one of the following input device is user-programmable?
   (A) Dumb terminal
   (B) Smart terminal
   (C) VDT
   (D) Intelligent terminal

9. Which is not consisted in a processor
   (A) ALU
   (B) CU
   (C) Memory
   (D) Registers

10. IBM 1401 is the first computer to enter in Nepal. It belonged to
    (A) First Generation
    (B) Second Generation
    (C) Third Generation
    (D) Fourth Generation

11. The Third Generation Computer was made with.....
    (A) Vacuum Tube
    (B) Discrete Components
    (C) IC
    (D) Bio Chips

12. Which of the following are the two main components of the CPU?
    (A) Control Unit and Registers
    (B) Registers and Main Memory
    (C) Control unit and ALU
    (D) ALU and bus

13. Disk space is the
    (A) Place where the computer does the processing.
    (B) Box that holds the guts of the computer.
    (C) Place where your files live.
    (D) Main memory of computer

14. A Mega =

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(A) 1 Million
(B) 10 Million
(C) 100 Thousand
(D) 1000 Thousand

15. A byte stores enough information for one
(A) File
(B) Keystroke (e.g.:'d')
(C) Word (e.g."boy")
(D) Movie

16. If you had a 1 Mb text file, how many keystrokes would you have?
(A) It depends on how many words you have.
(B) 1 Million
(C) 10 Million
(D) 1000 Million

17. What else do we measure in Megabytes (MB)?
(A) RAM
(B) Disk Space
(C) Both Disk Space and RAM
(D) Only RAM

18. Megahertz (MHz) measures
(A) Sound
(B) Speed
(C) Space
(D) None

19. UNIVAC is
(A) Universal Automatic Computer
(B) Universal Array Computer
(C) Unique Automatic Computer
(D) Unvalued Automatic Computer

20. The basic operations performed by a computer are
(A) Arithmetic operation
(B) Logical operation
(C) Storage and relative
(D) All the above

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21. C.D- R.O.M. is a
    - (A) Random Access Memory
    - (B) Volatile memory
    - (C) Optical memory
    - (D) None of the above

22. Laser Printer uses
    - (A) Raster Scan
    - (B) Camera Lanes
    - (C) Heat Sensitive paper
    - (D) None of the above

23. Bandwidth is maximum, along the following communication channel.
    - (A) Twisted pairs
    - (B) Optical fiber
    - (C) Co-axial cable
    - (D) Infrared

24. EBCDIC code developed by
    - (A) ANSI
    - (B) IBM
    - (C) SILICA
    - (D) Plastic

25. CPU chip is made of
    - (A) Carbon
    - (B) Copper
    - (C) flexible stack
    - (D) None of the above

26. Winchester disk means
    - (A) Disk stack
    - (B) Removable disk
    - (C) Flexible stack
    - (D) None of the above

27. A CPU's processing power is measured in
    - (A) IPS
    - (B) CIPS
    - (C) MIPS

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(D) KIPS

28. One Kilobyte means
    (A) 2^2 Bytes
    (B) 2^{10} Bytes
    (C) 2^{100} Bytes
    (D) None of the above

29. A billionth of a second is defined as
    (A) Mill Second
    (B) Micro second
    (C) Nano second
    (D) Pico second

30. A computer system that combines text, graphics, voice and video is known as
    (A) Multi user system
    (B) Multitasking system
    (C) Multimedia
    (D) None of the above

31. The range of frequencies available for data transmission is known as
    (A) PCI
    (B) Multitasking system
    (C) Simulation
    (D) None of the above

32. WAN Hardware does not include
    (A) Multiplexer
    (B) Router
    (C) Bridge
    (D) None of these

33. RAM chip was invented by
    (A) Intel
    (B) Motorola
    (C) IBM
    (D) None of these

34. What is diameter of CD-ROM

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(A) 12 Cm
(B) 12 inch
(C) 12 mm
(D) None of the above

35. Internet addresses are assigned by
(A) TETF
(B) IEEE
(C) INTERNIC
(D) None of the above

36. AMD's full name is
(A) Automated Micro Device
(B) Advanced Micro Device
(C) Arithmetic Multiple Device
(D) None of the above

37. Cyrix makes
(A) Monitor
(B) Microprocessor
(C) Printer
(D) None of the above

38. Hertz Means
(A) One cycle per Minute
(B) One cycle per second
(C) One cycle per milli second
(D) One cycle per hour

39. PCI was developed by
(A) Motorola
(B) ASCII
(C) Intel
(D) None of the above

40. The function of NIC is
(A) Link computer with memory
(B) Link computer with network
(C) Link computer with printer
(D) None of the above

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41. Laser printer uses
    - (A) PDL
    - (B) HTML
    - (C) COBOL
    - (D) None of the above

42. Printer resolutions are measured in
    - (A) Bits per inch
    - (B) Dots per inch.
    - (C) Dots per centimeter
    - (D) None of the above

43. Photo sensitive chip used in a video camera is known
    - (A) BCD
    - (B) CCD
    - (C) FDD
    - (D) None of the above

44. ..... is internet address.
    - (A) HTML
    - (B) URL
    - (C) HTTP
    - (D) None of the above

45. PTM is a .....
    - (A) Utility software
    - (B) System software
    - (C) Application software
    - (D) None of the above

46. Which is pre cursor of the internet?
    - (A) Gopher
    - (B) ARPANET
    - (C) IETF
    - (D) None of the above

47. Gateway works on ..... level of OSI model.
    - (A) 2
    - (B) 3
    - (C) 7

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(D) None of the above

48. ..... provides port number.
    (A) IETF
    (B) IANA
    (C) MIMC
    (D) None of the above

49. Storage capacity of floppy is maximum in .....
    (A) DSSD
    (B) DSDD
    (C) SSSD
    (D) All the above

50. The ISA is a ..... architecture.
    (A) 8 bit Data bus
    (B) 16 bit data bus
    (C) 32 bit data bus
    (D) 64 bit data bus

51. The serial mouse has a .....
    (A) 9-pin connector
    (B) 16-pin connector
    (C) 25-pin connector
    (D) 32 pin connector

52. Server is also known as .....
    (A) Front end
    (B) Back end
    (C) Connecting end
    (D) None of the above

53. POP is .....
    (A) Mail
    (B) Mail server
    (C) Mail protocol
    (D) None of the above

54. Inventor of WWW is .....

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(A) Bill Gates
(B) Sachin Tendulkar
(C) Tim Berner Lee
(D) None of the above

55. ISA has ..... number of address line.
(A) 18
(B) 24
(C) 16
(D) 20

56. The 5.25 inch floppy can ..... MB data.
(A) 2.8 MB
(B) 1.2 MB Data
(C) 1.4 M.B
(D) None of the above

57. Which one is not a Database Management system.
(A) Access
(B) Fox Pro
(C) Netscape
(D) Oracle

58. The .....was created in 1989 at the European particle. Physics aboratoryin Geneva, Switzerland.
(A) Arpanet
(B) WWW
(C) Firewalls
(D) folders

59. The operating system uses ..... to help the CPU coordinate processes.
(A) Webs
(B) Interrupt Requests (IRQ) I
(C) Firewalls
(D) Folders

60. Refresh rate of monitors is measured in
(A) Hertz
(B) measured in
(C) Megavolt
(D) Megahorse

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61. PCI is a type of .....
    - (A) Plug; and Play
    - (B) Browser
    - (C) Bus
    - (D) Software

62. PPP stands for
    - (A) Print to print protocol
    - (B) Point to point Protocol
    - (C) Print to Print protocol
    - (D) none of the above

63. Cache memory is
    - (A) Temporary and costly
    - (B) Point to point protocol
    - (C) High speed memory
    - (D) None of the above

64. A GUI is a
    - (A) Hardware
    - (B) Language interpreter
    - (C) Software interface
    - (D) An operating system

65. Which of the following is not a procedural language.
    - (A) PASCAL
    - (B) Basic
    - (C) Visual Basic
    - (D) None of the above

66. A .....works like an upside-down mouse.
    - (A) Joystick
    - (B) TGrackpad
    - (C) Trackpoint
    - (D) Trackball

67. On a CD-ROM data is stored in the form of .....& .....
    - (A) Lands and pits
    - (B) Dots and Dash
    - (C) High and Low

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(D) None of these

68. TCP/IP is
    (A) Software
    (B) Hardware
    (C) Network
    (D) None of the above

69. Computer virus is a .....
    (A) Hardware
    (B) Software
    (C) Both A &B
    (D) None of the above

70. Three types of memory chips are RAM, ROM and
    (A) EISA
    (B) RISC
    (C) CD-ROME
    (D) CMOS

71. Which one is not a multitasking operating system
    (A) MS-DOS
    (B) Windows
    (C) LINOX
    (D) UNIX

72. .....provides field for entering or comment of any length.
    (A) Counter field
    (B) Logical field
    (C) Memo field
    (D) Date field

73. The scroll lock key is a .....key.
    (A) Function
    (B) Numeric
    (C) Toggle
    (D) Cursor control

74. A PCM CIA hard drive uses.....

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(A) Type I slot
(B) Type II slot
(C) Type III slot
(D) Type IV slot

75. Tape is accessed
(A) Randomly
(B) Sequentially
(C) Direct
(D) None of the above

76. A devise that receives analog signal and converts them into digital data is known as
(A) Modulator
(B) Demodulator
(C) Multiplexer
(D) None of the above

77. Master Boot Record is also known as
(A) Partition Sector
(B) Master Partition table
(C) Both A and B
(D) None of the above

78. Electronic instructions that tells the hardware what to do are known as
(A) Modem
(B) Electronic pen
(C) Program
(D) Micro computer

79. Which of the following memories need refresh?
(A) SRAM
(B) DRAM
(C) ROM
(D) All of the above

80. The number of records contained within a block of data on magnetic tape is defined by the
(A) Block definition
(B) Record contain clause
(C) Blocking factor
(D) Record per block

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81. Mark I is also known as
    (A) American Sequence Controlled Calculator
    (B) Automatic Sequence Calculating Controller
    (C) American Sequence Controlled Computer
    (D) Automatic Sequence Controlled Calculator

82. Which of the following registers is loaded with the contents of the memory location pointed by the PC?
    (A) Memory address registers
    (B) Memory data registers
    (C) Instruction register
    (D) Program counter

83. Which of the following are the cheapest memory devices in terms of Cost/Bit?
    (A) Semiconductor memories
    (B) Magnetic Disks
    (C) Compact Disks
    (D) Magnetic Tapes

84. MIS is designed to provide information needed for effective decision making by?
    (A) Consumers
    (B) Workers
    (C) Foremen
    (D) Managers

85. Which is valid statement
    (A) 1 KB = 1024 Bytes
    (B) 1 MB = 1024 Bytes
    (C) 1 KB = 1000 Bytes
    (D) 1 MB = 1000 Bytes

86. Latency time is
    (A) Time to spin the needed data under head
    (B) Time to spin the needed data under track
    (C) Time to spin data under sector
    (D) All of above

87. Who built the first Mechanical Calculator
    (A) Joseph Marie Jacquard
    (B) John Mauchly
    (C) Blaise Pascal

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(D) Howard Aiken

88. The most important advantage of a video disk is
    (A) Compactness
    (B) Potential capacity
    (C) Durability
    (D) Cost effectiveness

89. Which of the following generation computers had expensive operation cost?
    (A) First
    (B) Second
    (C) Third
    (D) Fourth

90. An IBM system/38 represents the computer class of
    (A) Small-scale computer
    (B) Medium-scale computer
    (C) Large-scale computer
    (D) Super computer

91. Another word for a daisy wheel printer
    (A) Petal printer
    (B) Golf ball printer
    (C) Laser printer
    (D) Line printer

92. Cursor is a
    (A) Pixel
    (B) Thin blinking line
    (C) Pointing device
    (D) None of these

93. Which device is used to backup the data?
    (A) Floppy Disk
    (B) Tape
    (C) Network Drive
    (D) All of the above

94. Which of the following printers are you sure will not to use if your objective is to print on multi carbon forms?

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(A) Daisy wheel
(B) Dot matrix
(C) Laser
(D) Thimble

95. Which of the following items are examples of storage devices?
(A) Floppy / hard disks
(B) CD-ROMs
(C) Tape devices
(D) All of the above

96. ASCII and EBCDIC are the popular character coding systems. What does ASCII stand for?
(A) American Stable Code for International Interchange
(B) American Standard Case for Institutional Interchange
(C) American Standard Code for Information Interchange
(D) American Standard Code for Interchange Information

97. Which computers are used as servers for any medium sized organizations?
(A) Mainframe Computer
(B) Mini Computers
(C) Micro Computers
(D) Super Computers

98. Slide Rules was invented in
(A) 1614
(B) 1617
(C) 1620
(D) None of above

99. A typical personal computer used for business purposes would have.....of RAM.
(A) 4 KB
(B) 16 K
(C) 64 K
(D) 256 K

100. The ALU of a computer normally contains a number of high speed storage element called
(A) Semiconductor memory
(B) Registers
(C) Hard disks
(D) Magnetic disk

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101. Which was the computer conceived by Babbage?

(A) Analytical Engine
(B) Arithmetic Machine
(C) Donald Kunth
(D) All of above

102. The processing speed of first generation computers was

(A) milliseconds
(B) microseconds
(C) nanoseconds
(D) picoseconds

103. Model 5100 was ..... in 1957.

(A) The first PC built by IBM
(B) The first PC built by Apple
(C) The first PC built by Motorola
(D) The first PC built by Intel

104. VGA is

(A) Video Graphics Array
(B) Visual Graphics Array
(C) Volatile Graphics Array
(D) Video Graphics Adapter

105. A kind of scanner MICR is the short form of

(A) Magnetic Ink Character Reader
(B) Magnetic Ink Code Reader
(C) Magnetic Ink Cases Reader
(D) None of the above

106. Which of the following is not a class based on size?

(A) Mainframe Computer
(B) Micro Computer
(C) Mini Computer
(D) Digital Computer

107. Which 8-bit chip was used in many of today's TRS-80 computers?

(A) Z-8000
(B) Motorola 6809
(C) Z-8808

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(D) Z-80

108. Which of the following disk is fixed disk?

(A) Hard Disks
(B) Flash Disks
(C) Blu-Ray Disks
(D) DVDs

109. Which of the following professions has not been affected by personal computers?

(A) Medical
(B) Clerical and law
(C) Accounting
(D) None of the above

110. The word Abacus is derived from Abax, a word from

(A) Latin language
(B) Greek Language
(C) Sanskrit language
(D) Ancient Egypt

111. In latest generation computers, the instructions are executed

(A) Parallel only
(B) Sequentially only
(C) Both sequentially and parallel
(D) All of above

112. Which of the following memory medium is not used as main memory system?

(A) Magnetic core
(B) Semiconductor
(C) Magnetic tape
(D) Both A and B

113. An online backing storage system capable of storing larger quantities of data is

(A) CPU
(B) Memory
(C) Mass storage
(D) Secondary storage

114. A kind of serial dot-matrix printer that forms characters with magnetically-charged ink sprayed dots is called

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(A) Laser printer
(B) Ink-jet printer
(C) Drum printer
(D) Chan printer

115. Which of the following does not affect the resolution of a video display image?
(A) Bandwidth
(B) Raster scan rage
(C) Vertical and horizontal lines of resolution
(D) Screen size

116. Which of the following printing devices an output composed of a series of data?
(A) Wire matrix printer
(B) Band printer
(C) Wang image printer
(D) Both A and C

117. Which of the following is an example of fifth generation computer?
(A) PIM/m
(B) ICL 2950
(C) IBM 1401
(D) None of above

118. Magnetic disks are the most popular medium for
(A) Direct access
(B) Sequential access
(C) Both A and B
(D) None of above

119. Which of the following is not a third generation computer?
(A) IBM 360
(B) IBM 1401
(C) PDP-8
(D) HP2115

120. What is a compiler?
(A) A compiler does a conversion line by line as the program is run
(B) A compiler converts the whole of a higher level program code into machine code in one step
(C) A compiler is a general purpose language providing very efficient execution
(D) None of the above

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121. ..... computers are also called personal computers

(A) Mainframe Computer

(B) Mini Computers

(C) Micro Computers

(D) Super Computers

122. Which of the following is not input unit device?

(A) scanner

(B) camera

(C) plotter

(D) digitizer

123. Identify the correct statement

(A) IBM PCs used RISC CPU designs

(B) Macintosh used CISC CPU design

(C) IBM used CISC CPU design

(D) None of above is true

124. Which of the following statement is false?

(A) Mechanical analog computers have existed for thousands of years

(B) There are mechanical analog computers and electronic analog computers.

(C) All electronic computers are digital computers

(D) All of above are false

125. Which of the following require large computers memory?

(A) Imaging

(B) Graphics

(C) Voice

(D) All of Above

126. The two major types of computer chips are

(A) External memory chip

(B) Primary memory chip

(C) Microprocessor chip

(D) Both B and C

127. Microprocessors as switching devices are for which generation computers

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(A) First Generation

(B) Second Generation

(C) Third Generation

(D) Fourth Generation

128. What is the main difference between a mainframe and a super computer?

(A) Super computer is much larger than mainframe computers

(B) Super computers are much smaller than mainframe computers

(C) Supercomputers are focused to execute few programs as fast as possible while mainframe uses its power to execute as many programs concurrently

(D) Supercomputers are focused to execute as many programs as possible while mainframe uses its power to execute few programs as fast as possible.

129. ASCII and EBCDIC are the popular character coding systems. What does EBCDIC stand for?

(A) Extended Binary Coded Decimal Interchange Code

(B) Extended Bit Code Decimal Interchange Code

(C) Extended Bit Case Decimal Interchange Code

(D) Extended Binary Case Decimal Interchange Code

130. The brain of any computer system is

(A) ALU

(B) Memory

(C) CPU

(D) Control unit

131. Storage capacity of magnetic disk depends on

(A) tracks per inch of surface

(B) bits per inch of tracks

(C) disk pack in disk surface

(D) All of above

132. The two kinds of main memory are

(A) Primary and secondary

(B) Random and sequential

(C) ROM and RAM

(D) All of above

133. Which of the following devices can be sued to directly image printed text?

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(A) OCR
(B) OMR
(C) MICR
(D) All of above

134. The output quality of a printer is measured by
(A) Dot per inch
(B) Dot per sq. inch
(C) Dots printed per unit time
(D) All of above

135. In analog computer
(A) Input is first converted to digital form
(B) Input is never converted to digital form
(C) Output is displayed in digital form
(D) All of above

136. Which of the following memories needs refresh?
(A) SRAM
(B) DRAM
(C) ROM
(D) All of above

137. Through which device the main components of the computer communicate with each other?
(A) Keyboard
(B) System Bus
(C) Monitor
(D) Memory

138. What type of device is computer keyboard?
(A) Memory
(B) Output
(C) Storage
(D) Input

139. Which is the limitation of high level language?
(A) Lower efficiency
(B) Machine dependence
(C) machine level coding
(D) None of above

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140. An example of a digital device can be

(A) Digital clock

(B) Automobile speed meter

(C) Clock with a dial and two hands

(D) All of the above

141. Which of the following is not true?

(A) Transistors are much smaller

(B) Transistors produce low heat

(C) Transistors were less reliable

(D) Transistors were used in radios and other electronic devices

142. A characteristic of card systems is

(A) Slowness in processing data

(B) Using cards as records of transactions

(C) Needing a larger DP staff

(D) All of the above

143. The full form of EEPROM is

(A) Electrically Erasable Programmable Read Only Memory

(B) Easily Erasable Programmable Read Only Memory

(C) Electronic Erasable Programmable Read Only Memory

(D) None of the above

144. The original ASCII code used ..... bits of each byte, reserving that last bit for error checking

(A) 5

(B) 6

(C) 7

(D) 8

145. A computer programmer

(A) Does all the thinking for a computer

(B) Can enter input data quickly

(C) Can operate all types of computer equipments

(D) Can draw only flowchart

146. Fifth generation computer is also known as

(A) Knowledge information processing system

(B) Very large scale integration (VLSI)

(C) Both of above

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(D) None of above

147. The commonly used standard data code to represent alphabetical, numerical and punctuation characters used in electronic data processing system is called

(A) ASCII

(B) EBCDIC

(C) BCD

(D) All of above

148. Which of the following have low failure rate?

(A) mechanical devices

(B) electronic devices

(C) electro-mechanical devices

(D) None of above

149. Who designed the first electronics computer- ENIAC?

(A) Van-Neumann

(B) Joseph M. Jacquard

(C) J. Presper Eckert and John W Mauchly

(D) All of above

150. Who invented the high level language C?

(A) Dennis M. Ritchie

(B) Niklaus Writh

(C) Donald Kunth

(D) Coreman and Rivest

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Probable answer key.

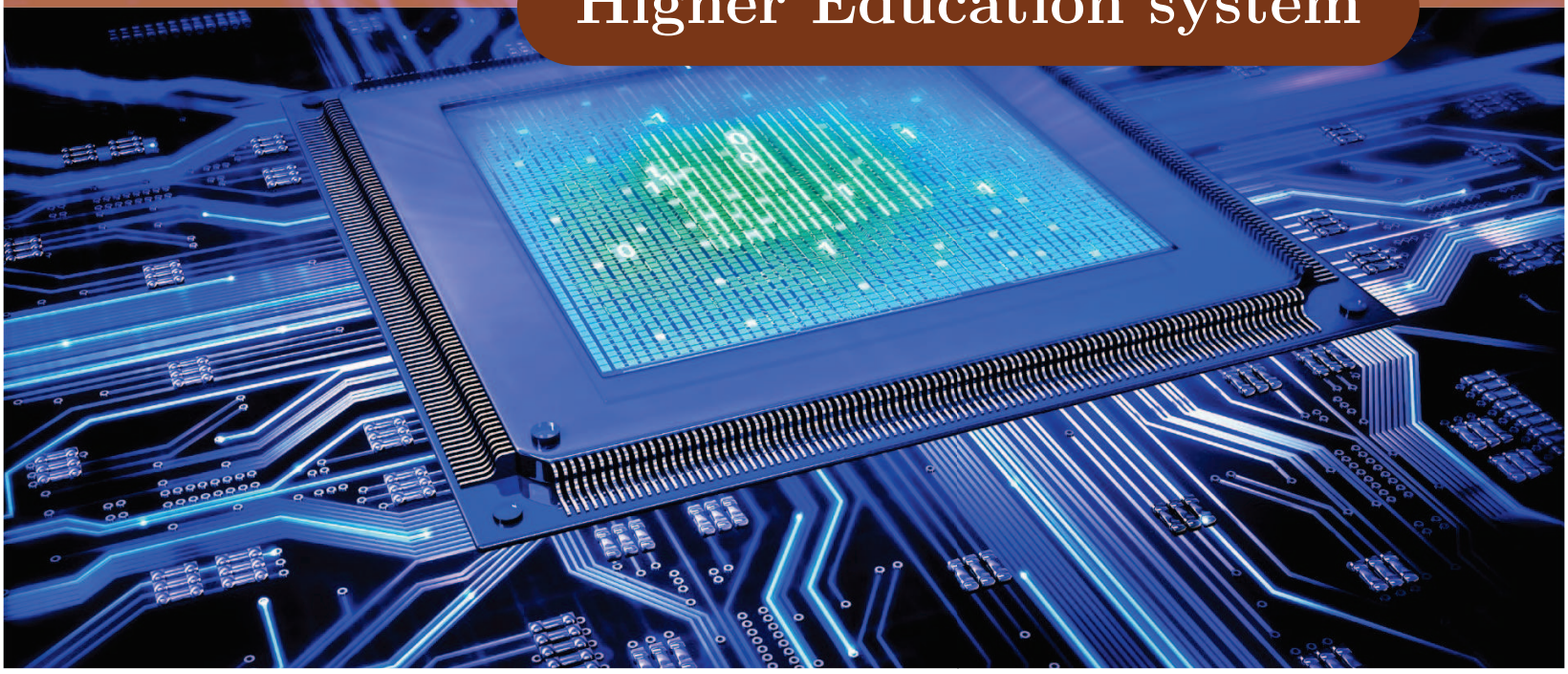
If you get any wrong answer please mail me at narayan.changder@gmail.com. I am still working on answer key. Dont only criticise, rather report right answer at above email or you can message me in facebook

Answers

1. C 2. B 3. A 4. C 5. D 6. A 7. D 8. D 9. C 10. B 11. C 12. C 13. C 14. A 15. B
16. B 17. C 18. B 19. A 20. D 21. C 22. A 23. B 24. B 25. C 26. A 27. C 28. B 29. C
30. C 31. B 32. C 33. C 34. C 35. C 36. B 37. B 38. B 39. C 40. B 41. A 42. B 43. A
44. B 45. C 46. B 47. C 48. B 49. B 50. B 51. A 52. B 53. C 54. C 55. B 56. B 57. C
58. B 59. B 60. A 61. C 63. C 64. C 66. D 67. A 68. A 69. B 70. D 71. A 72. C 73. C
74. C 75. B 76. B 77. C 79. B 80. C 81. D 82. C 83. C 84. D 85. A 86. A 87. C 88. B
89. A 90. A 91. B 92. B 93. D 94. C 95. D 96. C 97. B 98. C 99. D 100. B 101. A 102. A
103. A 104. A 105. A 106. D 107. D 108. A 109. D 110. A 111. C 112. C 113. C 114. B
115. D 116. D 117. A 118. C 119. B 120. B 121. C 122. C 123. C 124. C 125. D 126. D
127. D 128. C 129. A 130. C 131. D 132. C 133. A 134. B 135. B 136. B 137. B 138. D
139. A 140. A 141. C 142. D 143. A 144. C 145. A 146. A 147. D 148. B 149. C 150. A

Chapter 5

Higher Education system



Indian is one of the most popular country for higher education system. India's higher education system is the third largest in the world, after China and the United States. Higher education of india is one of the most developed in the entire world. Its scenario is improving in quantitative and qualitaive terms. Students from various parts of the world are coming to india for achieving higher education. Some institutions of India, such as:

- Indian Institute of Technology (IITs) and (IISc)
- All India institute of Medical Sciences (AIIMS)
- Indian Institute of Management (IIMs)

Have been globally acclaimed for their standard of education.

Following are the important bodies, which plays an important role in higher education system in India.

1. University Grants commission(UGC)
2. all India Council for technical education(AICTE)
3. Distance Education Council (DEC)
4. Indian Council for Agriculture Research (lCAR)
5. Bar Council of India (BCI)
6. National Council for Teacher Education (NCTE)
7. Rehabilitation Council of India (RCI)
8. Medical Council of India (MCI)
9. Pharmacy Council of India (PCI)

10. Indian Nursing Council (INC)
11. Dentist Council of India (DCl)
12. Central Council of Homeopathy (CCH)
13. Central Council of Indian Medicine (CCIM)

Central government is responsible to take the policies related to the higher education. It also gives different grant to the Central universities. Whether an educational system will be deemed or not is also decided by central government on the recommendation of the UGC. At present, there are 16 Central universities in the country.

Type of Institutions	Numbers
Central Universities	18
State Universities	275
Institutions established under States Legislature Act	5
Institution deemed to be University	96
Institutions of National Importance	13
Research Institutes	136
Total	543

Table 5.1: Number of Institutions

Jawaharlal Nehru's aim

Creating a country imbued with a scientific culture was Jawaharlal Nehru's aim. One such initiative was the All-India Institute of Medical Sciences as an institution of national importance by an Act of Parliament and has set the pace for medical education and research in Southeast Asia .

5.1 Skeleton of Indian education system

In this section we briefly discuss about the Indian education system. First, we will talk about higher education in India. Following four society have power to give higher education.

1. University
2. Institute of Technology
3. College
4. Open University

One can get degree from education system. Following are degrees, one may acquire after school leaving.

1. Higher Secondary School Certificate
2. Secondary School Certificate
3. Diploma
4. Bachelor's Degree
5. Postgraduate Diploma
6. Master's Degree
7. Master of Philosophy
8. Post-Master Degree
9. Doctorate
10. Doctor of Laws
11. Doctor of Literature
12. Doctor of Science

5.2 Ancient education system in India

From education point of view India was very rich country at ancient times too. Following system were widely used in ancient India.

5.2.1 Gurukul system

Gurukul (ashram) was a type of school in India, residential in nature, with pupils living in proximity to the teacher (guru). In a gurukul, students would reside together as equals, irrespective of their social standing, learnt from the guru and distribute work in themselves to help the guru in his day-to-day life. At the end of studies, pupil would be ready to offer gurudakshina (one time fees) to the guru. The gurudakshina is a traditional gesture of acknowledgment, respect and thanks.

Guru

In India the Guru or the teacher is held in high esteem. Indeed, there is an understanding that if the devotee were presented with the guru and God, first he would pay respect to the guru, since the guru had been instrumental in leading him to God.

5.2.2 Vedic University

Nalanda is one of the great Vedic university in India. Nalanda is the name of an ancient university in Bihar, India which was a Buddhist center of learning from 427 CE (AD) to 1197 CE (AD). It has been called as "one of the first great universities" in recorded history. There were universities like Taxila, Ujjain, Kanchi etc. for medicine and learning including mathematics and astronomy.

Vedic books

In compiling the vedic mantras, VED VYASA edited them into four books, the Rig-Veda, the Yajur-Veda, the Sama-Veda, and the Atharva-Veda

The Vedas are a large body of texts originating in ancient India. Composed in Vedic Sanskrit, the texts constitutes the oldest layer of Sanskrit literature and the oldest scriptures of Hinduism.Scholars have determined that the Rig Veda, the oldest of the four Vedas, was composed about 1500 B.C.

5.2.3 British and Indian Education system

Since English was increasingly being employed as the language of instruction, during 1852-1853 petitions were sent to the British Parliament in support of both establishing and adequately funding university education in India which resulted in the Education Dispatch of July 1854 which helped in shaping the Indian education system . Educational reforms in the early 20th century led towards the nationalisation of many universities.

Britishers and Indian education

Britishers did a lot to establish good and healthy education system in India.

1. Established a Department of Public Instruction in each province of British India.
2. Established teacher-training schools for all levels of instruction.
3. Increased the number of Government colleges ,vernacular schools and high-schools .
4. The Department of Public Instruction was in place by 1855.
5. By 1857 a number of universities were established modeled on the University of London.

Education of Indians had become a topic of interest among East India Company officials. The policy's goal was

1. to advance knowledge of Indians and
2. to employ that knowledge in the East India Company

5.2.4 Patha Bhawan

Rabindranath started an open-air school known as the Patha Bhavan at Shantiniketan that gradually developed into an international university named Visva Bharati where the cultures of the East and the West met in common fellowship and thereby strengthening the fundamental condition of world peace.

PATHA BHAVAN, the school of his ideals, whose central premise was that learning in a natural environment would be more enjoyable and fruitful.

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The main attractions of Shantiniketan include the various buildings of the Visva-Bharati campus. Chinese faculty,College of Arts and Crafts, Patha Bhavan (the school), School of Dance and Music and the prayer hall.

Some of the famous students of Visva-Bharati include India's former Prime Minister Ms Indira Gandhi ,world famous film director Mr.Satyajit Ray and Nobel Laureate Amartya Sen.

5.3 Post Independence education

India's first education minister recommended strong central government control over education throughout the country, with a uniform educational system and introduced right to education.

Right to education

Every child between the ages of 6 to 14 years has the right to free and compulsory education. The government schools shall provide free education to all the children. Private schools shall admit at least 25% of the children in their schools without any fee.

The Indian government lays great emphasis on primary education up to the age of fourteen years (referred to as Elementary Education in India.) The Indian government has also banned child labour in order to ensure that any children do get an opportunity to nurture. Education has also been made free for children for six to 16 years of age. The District Primary Education Programme (DPEP) was launched in 1994 with an aim to universalize primary education in India by reforming and vitalizing the existing primary education system

5.3.1 NCERT

The NCERT was established in 1961. It functions as a resource centre in the field of school education and teacher education. Publication of school textbooks and other educational material like teachers' guides/manuals etc. are its major functions.

NCERT

NCERT is an autonomous body fully funded by the Ministry of Human Resource and Development (MHRD)

There is a common educational structure (10+2+4) followed all over the country. Its similar to the USA but unlike to the one being followed in the UK

5.3.2 VES

Vocational education is imparted through Industrial Training Institutes (ITIs) and polytechnics.

Words of Indian Government

In the Words of Indian Government:

We give them roots, we give them wings
And great joys from, little things,
A hope that they will soar ,
A hope that they will try,
We are sure that one day ,
Our children will learn to fly.

5.4 Satutory body and their functions

The origin of the Indian Education Department dates back to pre-Independence days when for the first time a separate Department was created in 1910 to look after education. However, soon after India achieved its Independence on 15th August. 1947, a full fledged Ministry of Education was established on 29th August 1947. The nomenclature and responsibilities of the Education Department has undergone changes from time to time since Independence

5.4.1 University Grants Commission (UGC)

University Grants Commission (UGC) established by UGC Act, 1956, Ministry of HRD .

Statutory Mandate Coordination and determination of standards in higher education and research in the country

Primary Function Release of grants to universities and colleges

Other Functions Recognition of Universities and colleges (including eligibility for central grants) specification of degrees; Minimum standards of instruction, common pay scales, common facilities and institutional accreditation through NAAC

5.4.2 Distance Education Council (DEC)

Distance Education Council (DEC) established by Sec. 25 of IGNOU Act, 1985, Ministry of HRD .

Statutory Mandate Promotion, coordination and determination of standards of the open universities and distance education systems in the country.

Primary Function Release of grants to open universities and correspondence course institutes

Other Functions Initiated assessment and accreditation activities

5.4.3 All India Council for Technical Education

All India Council for Technical Education (AICTE) estalished by AICTE Act, 1987, Ministry of HRD,

Statutory Mandate Planning and coordinated development of technical education in the country

Primary Function Approval of degree and diploma programs in engineering, architecture, pharmacy and hotel management

Other Functions Funding for institutional and faculty development, pay scales and qualifications of teachers accreditation through NAAC

5.4.4 Medical Council of India (MCI)

Medical Council of India (MCI) established by MCI Act, 1953, Ministry of Health,

Statutory Mandate To establish standards in medical education and to define medical qualifications in India and abroad

Primary Function Registration of medical practioners and recognition of medical institutions

Other Functions Eligibility criteria for admissions; exam. for recognition of foreign qualifications for practice in India.

5.4.5 The Council of Architecture

The Council of Architecture (COA) established by The Architects Act, 1972, Ministry of Urban Development.

Statutory Mandate Regulate profession and practice of architects and town planners in India

Primary Function Registration of architects, maintaining standards of education, recognized qualifications and standards of practice

Other Functions Maintaining the register of architects and make recommendations with regard to recognition and de-recognition of a qualification.

5.4.6 Indian Nursing Council

Indian Nursing Council (INC) established by the INC Act, 1947, Ministry of Health.

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Statutory Mandate Uniform standards of training for Nurses

Primary Function Accepts qualifications awarded by universities within and outside India

Other Functions Collection and compilation of data relating to nurses, midwives, health visitors.

5.4.7 Rehabilitation Council of India

Rehabilitation Council of India (RCI) esablished by RCI Act, 1992, Ministry of Social Justice

Statutory Mandate Standardize and regulate the training of personnel and professions in the field of rehabilitation and special education.

Primary Function Recognition of institutions for physiotherapy and related fields.

Other Functions Registration of professionals, assessment and accreditations; promotion of barrier free environment.

5.4.8 National Council For Teacher Education

National Council For Teacher Education (NCTE) ,NCTE Act, 1993

Statutory Mandate Planned and Coordinated development of the teacher education in the country.

Primary Function Recognition of teacher education institutions.

Other Functions Lay down norms and standards

5.4.9 Indian Council for Agricultural Research

Indian Council for Agricultural Research (ICAR), Ministry of Agriculture . It is not a statutory body

Statutory Mandate Coordinate agricultural research and education

Primary Function Coordinate and fund agricultural education and research in 30 state and 1 central and several deemed universities for agriculture.

Other Functions Accredit agriculture universities, hold joint admission tests.

5.4.10 Bar Council of India

Bar Council of India (BCI) established by The Advocates Act, 1962, Ministry of Law

Statutory Mandate Lay down standards of professional conduct and standards of legal education.

Primary Function Lay down standards of professional conduct and standards of legal education.

Other Functions Listing of members of bar; listing of foreign universities whose qualifications are approved in India.

There are various Educational Statutory bodies in India, these are namely:

1. All India Council for Technical Education (AICTE)
2. All India Council of Technical Education (AICTE)
3. Central Council of Homeopathy (CCH)
4. Central Council of Indian Medicine (CCIM)
5. Central Board of Secondary Education (CBSE)

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6. Central Hindi Directorate
7. Central Institute of Educational Technology (CIET)
8. Central Institute of English and Foreign Languages (CIEFL)
9. Central Institute of Indian Languages (CIIL)
10. Central Tibetan Schools Administration (CTSA)
11. Commisssion for Scientific and Technical Terminology (CSTT)
12. Council of Architecture (COA)
13. Copyright Office, India
14. Distance Education Council (DEC)
15. Dentist Council of India (DCI)
16. Educational Consultants India Limited (EDCIL)
17. Education Support in India
18. Indian Council of Philosophical Research (ICPR)
19. Indian Council of Social Science Research (ICSSR)
20. Indian Institute of Advanced Study (IIAS)
21. Indian Council of Historical Research (ICHR)
22. Kendriya Hindi Sansthan
23. Kendriya Vidyalaya Sangathan (KVS)
24. Medical Council of India (MCI)
25. National Assessment and Accreditation Council (NAAC)
26. National Bal Bhavan
27. National Book Trust
28. National Council for Promotion of Sindhi Language (NCPSL)
29. National Council of Educational Research and Training (NCERT)
30. National Institute of Educational Planning and Administration (NIEPA)
31. National Institute of Open Schooling (NIOS)
32. National Institute of Pharmaceutical Education and Research (NIPER)
33. National Institute of Technical Teachers' Training and Research (NITTTR)
34. National Commission for Minority Educational Institutions (NCMEI)
35. Navodaya Vidyalaya Samiti (NVS)
36. National Council for Teacher Education (NCTE)
37. National Literacy Mission
38. Oversight Committee
39. Pharmacy Council of India (PCI)
40. Rehabilitation Council of India (RCI)
41. Rashtriya Sanskrit Sansthan
42. Sakshat - Education Portal, Government of India
43. Sarva Shiksha Abhiyan (SSA)
44. State Resource Centre for Non-Formal Education, Chennai
45. University Grants Commission (UGC)

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5.5 Quality and Quality Assessment

In order to evaluate performance of an institution and bring about a measure of accountability a mechanism of accreditation has been developed by UGC. This is an autonomous council under UGC called National Accreditation and Assessment Council (NAAC) with a purpose to carry out periodic assessment of universities and colleges. NAAC has evolved a methodology of assessment which involves self-appraisal by each university/college and an assessment of the performance by an expert committee.

Similarly, for technical education, AICTE has established its own accreditation mechanism for its institutions through the National Board of Accreditation (NBA).

NAAC has identified the following seven criteria to serve as the basis of assessment procedures:

1. Curricular Aspects
2. Teaching-learning and Evaluation
3. Research, Consultancy and Extension
4. Infrastructure and Learning Resources
5. Student Support and Progression
6. Governance and Leadership
7. Innovative practice

5.6 Higher Education : Some Concerns

India has significant advantages in the 21st century knowledge race:

1. It has a large higher education sector -the third largest in the world in student numbers, after China and the United States.
2. It uses English as a primary language of higher education and research.
3. It has a long academic tradition. Academic freedom is respected.
4. There are a small number of high quality institutions, departments, and centres that can form the basis of quality sector in higher education.
5. The fact that the States, rather than the Central Government, exercise major responsibility for higher education creates a rather cumbersome structure, but the system allows for a variety of policies and approaches.

5.7 Elementary Education in India

Education is important not only for development of one's personality, but also for the sustained growth of nation.It is the foundation on which the development of every citizen and the nation as a whole hinges. The quality of elementary education in India has also been a major cause of worry for government

5.7.1 Sarva Siksha Abhiyan

The current scheme for universalization of Education for All is the SARVA SHIKSHA ABHIYAN which is one of the largest education initiatives in the world. After the District Primary Education Programme (DPEP) of 1994, the govt. has now launched the "Sarva Shiksha Abhiyan" or SSA. Sarva Shiksha Abhiyan was launched in 2001 to universalize and improve the quality of elementary education in India. It has set 2007 as the deadline for providing primary education in India and 2010 as the deadline for providing useful and relevant elementary education to all children in the 6 to 14 age group.

Right to education

Every child between the ages of 6 to 14 years has the right to free and compulsory education. The government schools shall provide free education to all the children. Private schools shall admit at least 25% of the children in their schools without any fee.

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5.7.2 Education in Urban and Rural areas

Despite all the efforts of the government, universalization of education in India remains a distant dream. While the literacy rate is 65.38% according to 2001 census, the female literacy rate is 54.16%. While 80. 3% urban people are literate, 59.4% of the rural population is literate.

5.7.3 School education

Schooling system in India is a two tire system. First 10 years is a general study followed by two years of senior secondary education. The primary education system is also two tire system. The first five years is the primary stage and the coming next three years is upper primary stage or middle school.

5.7.4 Secondary education system

Secondary education can be instrumental in shaping and directing a child for his bright future. Secondary education serves as a link between primary and higher education. A child's future depends a lot on type of education the child receives.Significant feature of India's secondary school system is the emphasis on inclusion of the disadvantaged sections of the society. Another feature of India's secondary school system is its emphasis on profession based vocational training to help students attain skills for finding a vocation of his/her choosing.

The Secondary education is supported by the following organisations under the administrative control of the Union Department of Education: Some of the institutes are:

- National Council of Educational Research and Training (NCERT)
- Central Board of Secondary Education (CBSE)
- National Institute of Open Schooling (NIOS)

The National Policy on Education (NPE), 1986, has provided for environment awareness, science and technology education, and introduction of traditional elements such as yoga into the Indian secondary school system

NCERT

NCERT is an autonomous body fully funded by the Ministry of Human Resource and Development (MHRD). The NCERT was established in 1961. It functions as a resource centre in the field of school education and teacher education. Publication of school textbooks and other educational material like teachers guides/manuals etc. are its major functions. It aims at making environmental education an integral part of curriculum in school education.

5.7.5 Central board of secondary education

The CBSE was set up by a special resolution of the Government of India in 1929 at Ajmer with a view to play a useful role in the field of Secondary Education and to raise its standard.

The Main functions of the board are: to conduct Class X and XII examinations and grant certificates, to prescribe courses of instructions, prescribe conditions for examinations, and to affiliate institutions for the purpose of examinations. The CBSE also conducts all India entrance examinations at the under graduate level for pre-medical/pre-dental, engineering and architecture courses.

CBSE news

The CBSE has constantly been engaged in process of curriculum design, in-service teacher empowerment programmes and development of textual material.

CBSE has introduced CONTINUOUS AND COMPREHENSIVE EVALUATION (CCE) at the secondary level.The scheme of CCE discourages mechanical testing. It envisages employment of variety of tools and techniques for assessment in informal and formal settings which are more interesting, relevant and meaningful and involve learners for greater participation and learning.

It is a system of school based assessment that covers all aspects of student's development. It emphasizes two fold objectives. Continuity in evaluation and assessment of broad based learning. CCE will cover the scholastic and co scholastic areas of school education.

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5.8 American Education system

American education system requires that students complete 12 years of primary and secondary education prior to attending university or college. This may be accomplished either at public (or government-operated) schools, or at private schools. These 12 years of schooling (or their equivalent) may also be completed outside the USA, thus giving foreign students the opportunity to pursue the benefits of the American education system.

5.8.1 Bachelors in USA

A candidate who has successfully completed class XII is eligible for the Bachelors Programme or Under Graduate Study in USA. The bachelors degree or under graduate study usually lasts for 4 years. In some cases accelerated Programme can be completed in three years, while some professional fields require five years.

The decision of the major's to be taken is necessary only after the 2nd or Sophomore year. Many colleges give an Associate degree after the sophomore year or second year of a Bachelor's degree. It is the degree awarded after either a college transfer or a 'terminal', One to three year programme providing training for a specific occupation.

5.8.2 Masters in USA

Masters degree is the first Graduate degree in the liberal arts and Sciences and certain professional fields requiring 30 credit hours of full-time study within a year or 2 years. You can get your Master's degree by taking 8 courses of subjects with 3 credits each plus a thesis of 6 hours credit or 10 courses of subjects with 3 credits each without the thesis. Usually masters degree include M.S and M.A degrees

5.9 National policy of education

In our national perception, Education refines sensitivities and perceptions that contribute to national cohesion, a scientific temper and independence of mind and spirit - thus furthering the goals of socialism, secularism and democracy enshrined in our Constitution. The government is committed to providing education through mainstream schools for children with disabilities.The need for inclusive education arises precisely because it is now well understood that most children with disabilities can, with motivation and effort on the part of teaching institutions, become an integral part of those institutions.There is a common educational structure(10+2+3) followed all over the country.

Education level	Years
Pre primary	(FOR 1 YEAR)
Primary	(GRADE 1-5)
Middle	(GRADE 6-8)
Secondary	(GRADE 9-10)
Senior Secondary	(GRADE11-12)

5.10 Fashion Technology

India which has always been a centre for the textile and garment trade. Now the fashion industry has become so specialized that it encompasses a vast field of studies in design, concept management, design production management, quality control, planning, fabric design, printing, fashion accessory design, fashion merchandising, textile science, colour mixing, marketing and so on. National Institute of Fashion Technology was set up in 1986 under the aegis of the Ministry of Textiles, Government of India. It has emerged as the premier Institute of Design, Management and Technology, developing professionals for taking up leadership positions in fashion business in the emerging global scenario.

Global exchange

The online projects encourage our students to collaborate ,cooperate and communicate with the students all over the world. This use of cyber space has led to the globalisation of education.

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5.11 University grants commission

The University Grants Commission (UGC) of India is a statutory body set up by the Indian Union government in 1956, and is charged with coordination, determination and maintenance of standards of higher education. It provides recognition to universities in India, and disburses funds to such recognized universities and colleges. Its headquarters is in New Delhi, and six regional centres in Pune, Bhopal, Kolkata, Hyderabad, Guwahati and Bangalore.

1. encourages contact between students and faculty,
2. develops reciprocity and cooperation among students,
3. encourages active learning,
4. gives prompt feedback,
5. emphasizes time on task,
6. communicates high expectations, and
7. respects diverse talents and ways of learning

A Central University or a Union University in India is established by Act of Parliament and are under the purview of the Department of Higher Education in the Union Human Resource Development Ministry. In general, universities in India are recognized by the University Grants Commission (UGC), which draws its power from the University Grants Commission Act, 1956. The types of universities controlled by the UGC include:

State universities are run by the state government of each of the states and territories of India, and are usually established by a local legislative assembly act.

Deemed university or Deemed-to-be-University, is a status of autonomy granted by the Department of Higher Education on the advice of the UGC, under Section 3 of UGC Act, 1956.

Private universities are approved by the UGC. They can grant degrees but they are not allowed to have off-campus affiliated colleges.

Apart from the above universities, other institutions are granted the permission to autonomously award degrees.

5.11.1 Funding Agency

Government or Non-Government organization providing monetary grant for research. Follwing are the major funding agencies in India

1. University Grants Commission (UGC), New Delhi. www.ugc.ac.in
2. Indian Council of Social Science Research (ICSSR), New Delhi www.icssr.org
3. Department of Science and Technology (DST) New Delhi . www.dst.gov.in
4. Council of Scientific and Industrial Research (CSIR), New Delhi. www.csir.res.in
5. Department of Atomic Energy (DAE); BRNS. www.barc.ernet.in
6. Department of Biotechnology (DBT), New Delhi. www.dbtindia.nic.in
7. Department of Non Conventional Energy Sources (DNES), New Delhi. www.mnre.gov.in
8. Defence Research and Development Organization (DRDO). www.drdo.nic.in
9. Indian Council of Agricultural Research. www.icar.org.in
10. Ministry of Environment & Forest. www.envfor.nic.in/funding

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5.12 Central universities

A Central University or a Union University in India is established by Act of Parliament and are under the purview of the Department of Higher Education in the Union Human Resource Development Ministry. In general, universities in India are recognised by the University Grants Commission (UGC), which draws its power from the University Grants Commission Act, 1956. In addition, 15 Professional Councils are established, controlling different aspects of accreditation and coordination. Central universities, in addition, are covered by the Central Universities Act, 2009, which regulates their purpose, powers governance etc., and established 12 new universities. The list of central universities published by the UGC includes 46 central universities as on 20 May 2015.

The types of universities controlled by the UGC include:

I State universities are run by the state government of each of the states and territories of India, and are usually established by a local legislative assembly act.

II Deemed university, or "Deemed-to-be-University", is a status of autonomy granted by the Department of Higher Education on the advice of the UGC, under Section 3 of UGC Act, 1956.

III Private universities are approved by the UGC. They can grant degrees but they are not allowed to have off-campus affiliated colleges

Apart from the above universities, other institutions are granted the permission to autonomously award degrees. These institutes do not affiliate colleges and are not officially called "universities" but "autonomous organisations" or "autonomous institutes". They fall under the administrative control of the Department of Higher Education. These organisations include the Indian Institutes of Technology, the National Institutes of Technology, the Indian Institutes of Science Education and Research, the Indian Institutes of Engineering Science and Technology, the Indian Institutes of Management (though these award diplomas, not degrees), the National Law Schools, the All India Institute of Medical Sciences, and other autonomous institutes.

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Central universities of India

University	State	Location	Established	Specialization
Rajiv Gandhi University	Arunachal Pradesh	Itanagar	1985	General
Assam University	Assam	Silchar	1994	General
Tezpur University	Assam	Tezpur	1994	General
Central University of South Bihar	Bihar	Gaya	2009	General
Mahatma Gandhi Central University North Bihar	Bihar	Motihari	2014	General
Nalanda University	Bihar	Rajgir near Nalanda	2010	General
Guru Ghasidas University	Chhattisgarh	Bilaspur	1983	General
Indira Gandhi National Open University	Delhi	New Delhi	1985	Distance education
Jamia Millia Islamia	Delhi	New Delhi	1920	Islam
Jawaharlal Nehru University	Delhi	New Delhi	1969	General
University of Delhi	Delhi	New Delhi	1922	General
Central University of Gujarat	Gujarat	Gandhinagar	2009	General
Central University of Haryana	Haryana	Mahendragarh	2009	General
Central University of Himachal Pradesh	Himachal Pradesh	Dharamsala	2009	General
Central University of Jammu	Jammu and Kashmir	Jammu	2011	General
Central University of Kashmir	Jammu and Kashmir	Srinagar	2009	General
Central University of Jharkhand	Jharkhand	Ranchi	2009	General
Central University of Karnataka	Karnataka	Gulbarga	2009	General
Central University of Kerala	Kerala	Kasaragod	2009	General
Dr. Hari Singh Gour University	Madhya Pradesh	Sagar	1946	General
Indira Gandhi National Tribal University	Madhya Pradesh	Amarkantak	2007	General
Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya	Maharashtra	Wardha	1997	Hindi
Central Agricultural University	Manipur	Imphal	1993	Agriculture
Manipur University Manipur	Imphal	1980	General	
North Eastern Hill University	Meghalaya	Shillong	1973	General
Mizoram University Mizoram	Aizawl	2000	General	
Nagaland University	Nagaland	Lumami	1994	General
Central University of Orissa	Odisha	Koraput	2009	General
Pondicherry University	Puducherry	Pondicherry	1985	General
Central University of Punjab	Punjab	Bathinda	2009	General
Central University of Rajasthan	Rajasthan	Ajmer	2009	General
Sikkim University	Sikkim	Gangtok	2007	General
Central University of Tamil Nadu	Tamil Nadu	Tiruvarur	2009	General
Indian Maritime University	Tamil Nadu	Chennai	2008	Marine science

Central universities of India

University	State	Location	Established	Specialization
Allahabad University	Uttar Pradesh	Allahabad	1887	General
Babasaheb Bhimrao Ambedkar University	Uttar Pradesh	Lucknow	1996	General
Banaras Hindu University	Uttar Pradesh	Varanasi	1916	General
Rani Lakshmi Bai Central Agricultural University	Uttar Pradesh	Jhansi	2014	Agriculture
Rajiv Gandhi National Aviation University	Uttar Pradesh	Raebareli	2013	General
Hemwati Nandan Bahuguna Garhwal University	Uttarakhand	Srinagar	1973	General
Visva-Bharati University	West Bengal	Santiniketan	1921	General
Maulana Azad National Urdu University	Telangana	Hyderabad	1998	Urdu
University of Hyderabad	Telangana	Hyderabad	1974	General
Tripura University	Tripura	Agartala	1987	General
Aligarh Muslim University	Uttar Pradesh	Aligarh	1920	General
English and Foreign Languages University	Telangana	Hyderabad	1958	English and Foreign languages

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5.13 State universities

The state with the most state universities in India is Uttar Pradesh with 25 state universities. Of the union territories, there are state universities only in Chandigarh and Delhi.

5.14 Deemed universities

The state with the most deemed universities in India is Tamil Nadu with 28 deemed universities. There are no deemed universities in Assam, Chhattisgarh, Goa, Himachal Pradesh, Jammu and Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim or Tripura. Of the union territories, there are deemed universities in Chandigarh, Delhi and Puducherry.

Constitutional provisions about education

15	Right	Prohibition of discrimination.
21/A	Right	Free and compulsory education for 6-14 years kids
30/1	Right	Minority educational institutions.
51h	Duty	Develop scientific temper, humanism, spirit of inquiry and reform
51A(K)	Duty	Parent/guardian provide education to their 6-14 years kids.
45	DPSP	State shall give early childhood care and education for all kids upto 6 year.
46	DPSP	State to look after Educational and economic interests of SC, ST,OBC. 1. SC=15% 2. ST=7.5% 3. OBC=27% These % apply to central (not state) educational institutions. In state educational Institutes, reservation depends on population. E.g. Punjab has no ST reservation. Tamilnadu only 1% ST reservation..
86th	Amendment	1. 86th Constitutional amendment 2002 2. It inserts 21/A= kids have right to education. 3. It inserts 51A(k)=adults have duty to provide education to their kids. .
93rd	Amendment	1. 93rd Constitutional amendment act 2005 2. It amended art 15 (Fundamental Right) to provide reservation for SC,ST and OBC in private institutions. (including self-financed but excluding minority educational institutions.) 3. it nullified Supreme court's judgment in other case that State cannot impose reservation on private aided institutions. .

Food scheme in education

Midday meal	Kids	1. Class 1 to 8. Applicable to Govt.schools, Government aided schools, local body schools, EGS, AIE centre , Madrasas 2. Started in 1995. .
SABLA	Girls	1. Rajiv Gandhi Scheme for Empowerment of Adolescent Girls 2. To provide nutrition for growing adolescent girls by provision of food grains. 3. All girls will be given a kishori card which will be updated with details of the girl's growth and provision of the food grains. .

Different scheme in education

Term	Target	Provision	Notes
RTE'09.	Kids	Fundamental right	1. Art 21A / 86th amendment 2002 2. Right to education act passed in 2009. 3. Became operative from 1st April 2010 (april fool?) 4. Free and compulsory edu. Age 6-14 .
Sarva Shiksha Abhiyan (SSA)	Kids	Infra+services	1. Started in 2001. 2. RTE is being implemented via SSA. 3. alternative schools, 4. Bridging gender-social gaps in enrolment, learning. .
RMSA	Teens	Infra+services	1. Rahstriya Madhyamik Shiksha Abhiyan 2. Started in 2009. 3. To enhance access to secondary education. 4. To increase the enrollment rate from 52% (2005-06's number) to 75% within five years. 5. Provide secondary school within reasonable distance from any habitation. 6. Provide affordable (not free) secondary education to all. 7. universal access to secondary education by 2017 8. universal retention by 2020. .
Sakshar Bharat	Illiterate adults.	Infra+service	1. Earlier known as National Literacy mission (NLM) 2. For illeterates above 15+ age. 3. Setup Lok Shiksha Kendras (Adult Education Centres). 4. Primary focus is on Women. .
Kasturba Balika Vidhyalaya	Girls	Infra+service	Residential upper primary schools for girl SC,ST,OBC,Minority girlsTarget: scattered habitation.
NPEGEL	Girls at elementary level.	Service/ supervision	National Programme for Education of Girls at Elementary Level to reduce the school dropouts by giving special attention to weak girls. In villages, women's group are formed. These groups do follow up/supervision on girls enrollment, attendance, achievement.

Different scheme in education

Mahila Samakya	Rural women	Awareness	Educating rural women for empowerment. Under this scheme women's forums (Mahila Sangha) created. It provides space for rural women to meet, discuss issues, ask questions, make informed choices. Implemented in ten states.
Girls hostel for secondary+ higher	Girls	Infra (hostel)	1. Class 9 to 12 2. SC/ST/OBC/BPL 3. In educationally backward blocks. 4. This will be merged with RMSA in 12th FYP. .
IDEDSS	Disabled students	Services + cash to girls.	Inclusive Education for Disabled at Secondary Stage and enroll disabled students in highschool (class 9-12)
School Health Programme	kids	service	1. A wide range of activities to target healthiness among school students 2. Biannual health screenings and early management of disease,disability,etc. 3. Weekly Iron and Folic Acid Supplement (WIFS) to tackle anemia in boys and girls. 4. Immunization schemes,etc .
. Babu Jagjivan Ram Chhatrawas Yojana	highschool Teens collegians	Hostel, infra	1. Hostel Facilities to SC boys and girls in Middle and Higher Secondary Schools, Colleges, Universities. 2. Funds given to states, NGOs to create infrastructure.
Jalmani	Rural kids	Infra	1. Installation of standalone water purification systems in rural schools. 2. 100% central assistance. This is done by Ministry of Drinking Water and Sanitation.
Bal Shree scheme	Kids	teaching/training	1. Launched by national Bal bhavan. 2. Identify kids in four areas of creativity : art, performance, science, writing 3. And then train and nurture them. .
.			

Different scheme in education

EGS	Kids in remote areas	Teaching	1. Education guarantee scheme 2. 25 kids in the given habitation but no school within distance of 1 kms. (15 for hill, tribal, desert hemlet.)
AIE	Deprived kids child laborers street kids etc.	Teaching	Alternative education interventions
ICT in schools	All	e-learning	1. High speed internet connection. 2. Virtual classrooms, online teaching and other fancy stuff.

Different orgganization in education

National council for teacher education	Teachers	1. Norms for techer training institutes 2. Minimum qualification for appointment of teachers 3. Survey, research and other fancy stuff.
National bal bhavan	kids	1. Funded by HRD ministry 2. Develop creativity in kids aged 5-16. Dance, drama, painting, craft workshop etc. fancy stuff.
Kendriya vidhyalaya (KV)	Kids of transferable central Govt.employees +Defence personnel.	1. No fees for boys upto class 8 and SC/ST upto 12 2. 100 KV in North East 3. 100% centrally funded.
CBSE	Teens	Central Board of secondary education. 1. Board exams (10,12) 2. All India pre-Medical, dental, engineering exam 3. Entrance test for Navodaya Vidhyalaya 4. Designing syllabus

Different orgganization in education

NIOS	Teens	1. National institute of open schooling. 2. Distance education for secondary and senior secondary 3. Vocational courses 4. Largest open schooling org in the world
NCERT	Kids +Teens +UPSC aspirants	1. Established in 60s. 2. national council of educational research and training. 3. Teacher training through EDUSAT 4. Educational content via Gyan Darshan and Gyan Vani.
Jawahar Navodaya Vidhyalaya (JNV)	Rural kids	1. Identify bright rural students give them better schooling. (free textbook, uniform, hostel). 2. Class 6 to 12. 3. Admission based on entrance test. 4. 33% reservation for girls. 5. National integration by exchanging students from hindi, non-hindi belt. 6. Has 2 lakh + students, in 500+ JNV.
Jan Shikshan Sansthan	Adults	1. Vocational training to non-literate, neo-literature, school dropouts. 2. Tailoring, soft toys, cottage, leather etc.
UGC	Collegians	1. University grants Commission. 2. Statutory org. 3. Established in 50s 4. Coordination between union and states regarding higher education.
IGNOU	Collegians, UPSC aspirants	1. Established in 85. 2. Higher education for those who cannot attend regular college. 3. Gyandarshan=24 hr edu. Channel 4. Gyan Vani=Educational FM radio 5. EDUSAT=exclusive educational satellite.

Different orgganization in education

INDEST	e-library	1. Indian national digital library for sci-tech. 2. Under HRD ministry
NBT	readers	1. National Book trust. 2. Autonomous under HRD Ministry 3. Publication of books 4. Promotion of books abroad 5. Increase reading habit 6. Organize book fairs
WIPO	Pirates	1. World intellectual property organization. 2. Specialized agency of UN 3. Indias Commerce ministry coordinates with WIPO.
Model schools	Kids	1. These are based on Kendriya Vidhyalaya template. 2. Setup in Educationally backward blocks under 11th FYP.

Different CASH/scholarship/award in education

Dhanlakshmi	Girls	1. Conditional Cash Transfer for Girl Child following 3 conditions. 2. At birth and Registration of Birth. 3. Progress of Immunization and Completion of Immunization. 4. Enrolment and Retention in School. 5. The scheme is to change attitude of a thinking a girl child as financial burden.
Rajiv Gandhi National Fellowship Scheme	Collegians	1. Assistance to SC/ST students for M.Phil, PhD programmes. 2. UGC is the nodal agency.
National Overseas Scholarship	collegians	1. To SC,ST,artisans,tribals,weavers,etc. 2. For higher studies abroad (Masters/PhD) in the field of Engineering,Technology,Science.

Different CASH/scholarship/award in education

Dr.Ambedkar national scholarship scheme.	Class 10 student from SC/ST/poor family	One time cash award of Rs.1 lakh to 3 students scoring highest marks in class 10
Maharshi Badrayan Vyas Samman	30-40 yo Sanskrit Scholars.	Award for Research on Sanskrit / ancient Indian wisdom.

5.15 solved MCQ

1. To make teachers accountable. They should be given
   - (A) Freedom in the selection of content and methods of teaching
   - (B) Training in teaching and examining.
   - (C) Opportunities for professional growth
   - (D) Transfer to places where they want to serve.

2. Who is the custodian of fundamental rights of people?
   - (A) Supreme Court
   - (B) President
   - (C) Prime Minister
   - (D) State Assembly

3. The social heritage of people could be described by the following term
   - (A) Culture
   - (B) Social norm
   - (C) Transmission
   - (D) Human involvement

4. Which one of the following characteristics could be regarded as the outstanding aspect of a scientific culture?
   - (A) Generalisation
   - (B) Actualisation
   - (C) Qualification
   - (D) Quantification

5. In India, education means
   - (A) The assimilation of tradition in language
   - (B) Respectful behaviour to elders & teachers
   - (C) Customs
   - (D) All are important

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6. Which of the following standing committees of Parliament has no MP from Rajya Sabha?
   (A) Public Accounts Committee
   (B) Estimates Committee
   (C) Committee on Public Undertakings
   (D) Committee on Government Assurances

7. India is a
   (A) Secular State
   (B) Bilingual State
   (C) Communist State
   (D) Capitalist State

8. The Council of Ministers is responsible to the
   (A) President
   (B) Lok Sabha
   (C) Vice-President
   (D) Rajya Sabha

9. The judges of the Supreme Court are appointed by the
   (A) Prime Minister of India
   (B) Speaker of the Rajya Sabha
   (C) President of India
   (D) Ministry of Law & Justice

10. Which of the following are the ideals set forth in the Preamble?
    (A) Social, economic and political Justice
    (B) Equality of status and of opportunity
    (C) Liberty of thought, expression, belief, ith and worship
    (D) All of these

11. Of which fundamental right is a foreigner in India deprived of?
    (A) To seek justice in court
    (B) To seek finanacial security of life
    (C) To criticise policies of government
    (D) To vote at the time of 'Parliamentary election

12. The Legislative Council of a State is a
    (A) temporary body
    (B) permanent body
    (C) semi-permanent body

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(D) chamber of the nominated members

13. Which of the following is the federal feature of the Indian Constitution?
    (A) There is distribution of Powers in accordance with 2 lists
    (B) Written and rigid constitution
    (C) Independent Judiciary
    (D) All of these

14. The Tenth Schedule to the Constitution of India relates to
    (A) Panchayati Raj Institutions
    (B) Anti-defection Act
    (C) List of languages recognised by the Constitution
    (D) Procedure for amendment to the Constitution

15. Hearing is controlled by
    (A) Frontal lobes
    (B) Occipital lobes
    (C) Temporal lobes.
    (D) Parietal lobes

16. All the functions of educational measurements are concerned, directly or indirectly with
    (A) Avoidance of conflicts
    (B) Selection of teachers
    (C) Facilitation of learning
    (D) Improvement of administration

17. The most accurate statement about teaching machines is that
    (A) B F Skinner began the movement for their use
    (B) they were designed as an economy measure to replace teachers
    (C) they are not as efficient as teachers in reinforcing responses
    (D) they can be used for all learning programmes

18. A culturally disadvantaged child is best served by the school system that
    (A) places him/her in a class with other culturally disadvantaged children
    (B) gives him/her an annual intelligence test
    (C) trains teachers to understand his/her impoverished home background
    (D) assesses his/her strengths and needs and provide for an individualized learning plan

19. All of the following tend to erode local control of education in favour of national control, except The

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(A) National Science Foundation

(B) National Institute of Mental Health

(C) College Entrance Examination Board

(D) National Defence Education Act

20. A student fails a test for which he did not study. By ascribing his failure to the fact that the teacher does not like him he is utilizing

(A) conversion

(B) sympathism

(C) rationalization

(D) compensation

21. The project method of teaching is best associated with the philosophy of

(A) John Dewey

(B) Max Rafferty

(C) Robert Hutchins

(D) B F Skinner

22. Bhabha Atomic Research Centre (BARC) is situated at

(A) N. Hyderabad

(B) Bangalore

(C) Delhi

(D) Trombay (Mumbai)

23. Birla Institute of Technology is situated at

(A) Ranchi

(B) Jaipur

(C) Kota

(D) Hardwar

24. Central Forensic Science Laboratory is situated in

(A) Chandigarh

(B) Patna

(C) Patiala

(D) Ludhiana

25. In which of the following respects is a theory 'not' different from a belief?

(A) Antecedent consequent relationships'

(B) Acceptability

(C) Verifiability

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(D) Demonstrability

26. According to Swami Vivekananda, teacher's success depends on

(A) His renunciation of personal gain a" service to others

(B) His concentration on his work and if with a spirit of obedience to God.

(C) His professional training and creating

(D) His mastery of the subject and task controlling the students

27. The Montessori schools insist on

(A) The principle of sense training

(B) Creativeness, the main objective c education

(C) Complete discipline and supervision

(D) Well equipped school buildings

28. It is usually claimed that any subject that is taught in school has a disciplinary value. This means, that

(A) It requires strict discipline among students to learnt it

(B) It teaches certain habits and qualities to train the minds of students

(C) Every subject is the outcome of the disciplined thinking and experience of experts

(D) It requires special and disciplined methods of teaching

29. According to Alder, the primary cause for stresses and strains in an individual is

(A) The feeling of inferiority

(B) The desire for knowledge of the self

(C) The desire for gratification of the sex impulse

(D) The curiosity to know the mind of others

30. The Pancha Kosh Theory of Education was elaborated by

(A) Swami Vivekananda

(B) Patanjali

(C) Mahatma Gandhi

(D) Aurobindo

31. Which one of the following sets of special powers has been conferred on Rajya Sabha by the Constitution?

(A) To change the existing territory of a state and to change the name of a state

(B) To pass a resolution empowering the parliament to make laws in the State List and creation of one or more All-India services

(C) To amend the election procedure of the President and to determine the pension of the President after his retirement

(D) To determine the functions of the Election Commission and to determine the number of Election Commissioners

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32. It is often complained that there is brain drain in our country. The implication is that

(A) The brains of educated persons are having washed in unnecessary pursuits.

(B) Students brains are unnecessarily burdened with every education

(C) Education that is imparted is a string to the brains average students

(D) Educated and capable people are seeking jobs in other countries because of unemployment here

33. Historically speaking, Thornodike's theory of learning was translated into class room method following

(A) Trocbelian principles of child education.

(B) Herbatian steps with only slight modifications.

(C) John Looke's approach to children's state of mind

(D) The scientific principles recommended by Rousseau.

34. Rousseau who popularized the Naturalistic Philosophy of Education in the West belonged to

(A) The 17th Century

(B) The 16th Century

(C) The 15th 16th Centuries

(D) The 18th Century

35. A good piece of research is the product of

(A) A good research library

(B) Collective scholarship

(C) A penetrating and analytical mind

(D) A touch of genius

36. The horizontal enrichment programme of instruction means

(A) Selecting topics of equal difficulty level and presenting them together.

(B) Grouping children of similar abilities for teaching advanced knowledge

(C) Teaching topics in relation to other topics to suggest self study by students

(D) Enlisting the co-operation of all talented students to study together with a competitive spirit

37. Appetite and satiety centres of brain an present in

(A) Hypothalamus

(B) Cerebral hemisphere

(C) Cerebellum

(D) Medulla oblongata

38. The Indian Education Commission (1964-66) has recommended compulsory social service for school children as follows

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(A) 20 days for the lower secondary stage and 20 days for the higher secondary stage
(B) 10 days for the primary stage and 30 days the secondary stage
(C) 30 days for the lower secondary and 20 days for the higher secondary stage
(D) 10 days for the lower secondary stage and 20 days for the higher secondary stage

39. Who can amend the Constitution?
(A) President
(B) Parliament
(C) Prime Minister
(D) Union Cabinet

40. How many members of the Anglo-Indian community can be nominated to the Lok Sabha by the President?
(A) 2
(B) 5
(C) 10
(D) 12

41. When you put a question in the class to check the knowledge of students, the best method would be to
(A) Put more than one question at a time to stimulate students
(B) Frame the question as lengthy as you can
(C) To point to intelligent students first and then put the question
(D) To pose the question to the whole class and then select somebody to answer

42. Research is
(A) Data gathering
(B) Moving from a broad area to a narrow and focussed area
(C) A systematic process of finding the truth
(D) Data gathering, processing and analysis

43. If you were reading a series of articles about the teaching of reading, you would expect to be reading an article by
(A) Paul McKee
(B) Albert Harris
(C) Arthur Gates
(D) Frank Reissman

44. Of the following, the author of a widely used intelligence test is
(A) David Wechsler
(B) B F Skinner
(C) William Cruikshank
(D) Bruno Bettelheim

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45. Indian Institute of Science (IISc) is located in

(A) Chennai

(B) Kolkata

(C) Bangalore

(D) Mumbai

46. Indian Institute of Foreign Trade is situated in

(A) Lucknow

(B) Dehradun

(C) New Delhi

(D) Mumbai

47. National Institute of Immunology is situated in

(A) Delhi

(B) Hyderabad

(C) Goa

(D) Kochi

48. A set of test papers from a class of 29 students has been arranged in order from the highest to the lowest scores. The mark on the fifteenth paper is known as the

(A) median

(B) mean

(C) mode

(D) norm

49. Recreational reading should be

(A) reserved for the school library period

(B) assigned as homework

(C) a responsibility of the home, not the school

(D) an integral part of the language arts curriculum

50. When Jeewan receives his failing test mark, he tells the teacher, "You don't like me." This is an example of

(A) identification

(B) transference

(C) egocentrism

(D) projection

51. Of the following learning theories, the one that embodies the idea that learning takes place through insight is known as

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(A) Gestalt
(B) stimulus-response
(C) connectionist
(D) pragmatic

52. Overlearning tends to strengthen an individuals
(A) powers of retention
(B) endurance
(C) feeling of boredom
(D) motivation

53. How many Indian Institutes of Technology (IIT) are there in India?
(A) 16
(B) 4
(C) 6
(D) 3

54. How many Indian Institutes o Management (IIM) are there in India?
(A) 13
(B) 7
(C) 5
(D) 8

55. The theory of learning associated with connectionism was propounded by
(A) Socrates
(B) Pavlov
(C) Thorndike
(D) Kilpatrick

56. Evaluation in education insists on the following:
(A) Making tests more reliable and valid
(B) Conducting periodical tests to detect students' weaknesses
(C) Insisting on clear cut behavioural objectives of teaching
(D) Examining students objectively for selection purpose

57. The main purpose of the first degree in our universities should be to
(A) Bring students to frontiers of knowledge and from there should be research
(B) Equip students with necessary competencies for different work experiences
(C) Prepare students for social service and bring them to the threshold of knowledge
(D) Bring to the frontiers of research with necessary equipment of knowledge

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58. The idea of starting girls' University in our country started in the year 1970.
    - (A) As an initiative of the British rulers.
    - (B) Through the efforts of municipalities and local fund communities
    - (C) With the opening of the SNDT university at Bombay
    - (D) With the political awakening in the country by the push given by Mahatma Gandhi

59. A good communicator needs to be good at
    - (A) Speaking
    - (B) Listening
    - (C) The use of language
    - (D) The use of humour in speech

60. Which controls reflex action?
    - (A) Sympathetic nervous system
    - (B) Central nervous system
    - (C) Parasympathetic nervous system
    - (D) Sensory nerves

61. The salaries of the Judges of the Supreme Court are charged on the consolidated fund of India Because
    - (A) they may get salaries regularly every month
    - (B) their salaries may be free from legislative vote
    - (C) there may not be any cut in their salaries
    - (D) their financial position may be secure to enable them to dispense impartial justice

62. A member of the Union Public Service Commission holds office for a period of
    - (A) Five Years
    - (B) Seven years
    - (C) Six years or sixty five years of age whichever is more
    - (D) Six years or until he attains the age of sixty five whichever is earlier

63. Adult education's main objective is to
    - (A) Teach adults to be able to understand' what they read
    - (B) Enable the adults to read and write
    - (C) Help adults achieve literacy along it personal development
    - (D) Socialise the adults to move about freely

64. The idea of sense training in the Monte: method is based on
    - (A) The theory of transfer of training
    - (B) The behaviouristic theory of education
    - (C) The stimulus response theory of learning

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(D) The pragmatic aspects of education theories

65. Which of the following skills/qualities is most important for a researcher?
   (A) Desire to discover the truth
   (B) Communication skills
   (C) Ability to gather data
   (D) Ability to work hard

66. The term "Manpower Needs" in any country requires the
   (A) People should be educated in accordance with specified jobs requirements
   (B) Enrolments in educational institutions should be decided according
   (C) Capacities of men should be fully utilised for education and training
   (D) Education at all stages should be geared to promote the powers of the educates

67. Spinal nerves are usually
   (A) Mixed
   (B) Efferent
   (C) Afferent
   (D) Sensory

68. A mixed cranial nerve is
   (A) Facial
   (B) Abducens
   (C) Anditory
   (D) Oculomotor

69. Man is superior to other animals mainly due to
   (A) Large brain
   (B) Free forelimbs
   (C) Erect posture
   (D) Front eyes

70. Vocationalisation of education has the object of
   (A) Preparing students for a vocation along with knowledge
   (B) Giving more importance to vocation than general education
   (C) Converting liberal education into vocational education
   (D) Creating an educational bias among vocational people

71. The quorum of the Parliament is fixed at

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(A) one-tenth of the membership of the House
(B) one-third of the membership of the Iftuse
(C) one-half of the membership of the House
(D) four-fifths of the membership of the House

72. The Directive Principles
(A) aim at establishing welfare state of Gandhian conception
(B) aim at giving ideals to be incorporated at a later stage
(C) aim at giving support to the , Fundamental Rights
(D) A and B only

73. In India the executive is responsible dijelectly to the
(A) Legislature
(B) President
(C) Judiciary
(D) Lok Sabha

74. The Rajya Sabha is
(A) dissolved once in two years
(B) dissolved after every five years
(C) adjourned every six months
(D) not subject to dissolution

75. Ministers in the Union Cabinet are appointed by the
(A) Prime Minister
(B) President
(C) President of India on the advice of the Prime Minister
(D) None of these

76. The Council of Ministers headed by the Prime Minister is responsible to
(A) Prime Minister
(B) President
(C) Parliament
(D) Speaker of Lok Sabha

77. What is the literal meaning of secularism?
(A) Freedom to worship any God
(B) Death of religion
(C) Separation of religion from the state
(D) All of these

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78. The real powers in the Central Government are enjoyed, according to the Constitution of India by the
   (A) President of India
   (B) Vice-President of India
   (C) Prime Minister of India
   (D) Chief Ministers

79. The abbreviation SUPW means
   (A) Social Upsurge for Progress and Work
   (B) Scientific Utilisation for People and World
   (C) Socially Useful and Productive Work
   (D) Solution of Utilitarian Problems of Work

80. If a student becomes unconscious in the class what will you do first?
   (A) Telephoning student's parents and waiting for them
   (B) Rushing to the principal's office and convassing for help impatiently
   (C) Giving first aid to him and trying to contact any nearby doctor
   (D) Making arrangement to send him to his home

81. Effective teaching means
   (A) Love, cooperation, sympathy, affection and encouragement given to students
   (B) Corporal punishment given to students at the time of moral offences
   (C) Individualized instruction and open classroom discussion
   (D) Both A and C

82. School children are often victims of infection caused by
   (A) Mal-nutrition caused by undigested food particles
   (B) Invasion of the body by the plant and animal organisms
   (C) Carelessness of teachers in providing activities
   (D) Lack of proper exercises and drills

83. One can be a good teacher, if he
   (A) Has genuine interest in teaching
   (B) Knows his subjects
   (C) Knows how to control students
   (D) Has good expression

84. Drop outs are more likely to be
   (A) Vulnerable to the requirement of public assistance
   (B) Unemployed
   (C) Engaged in antisocial behaviour

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(D) All of these

85. Genu and splenium are associated with
    (A) Medulla oblongata's
    (B) Cerebrum
    (C) Cerebellum
    (D) Vermis

86. Parkinsons disease is of
    (A) Heart
    (B) Kidneys
    (C) Brain
    (D) Lungs

87. The professional requirements of a teacher as explained in the UNESCO publication is/ are
    (A) Innovativeness in approach and teaching strategies
    (B) Mastery over the subject and competency for teaching
    (C) Justice to the profession
    (D) All of the above

88. During depolarization, permeability of neuron increases towards
    (A) N+
    (B) Na+
    (C) Ag+
    (D) Mg++

89. Students should prefer those teachers who
    (A) Give important questions before examination
    (B) Dictate notes in the class
    (C) Can clear their difficulties regarding subject-matter
    (D) Are themselves disciplined

90. Students learn more from a teacher who is
    (A) One who communicates his ideas precisely and clearly?
    (B) Affectionate
    (C) Gently
    (D) Hard working

91. The most important skill of teaching is

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(A) making students understand what the teacher says

(B) Keeping students relaxed while teaching

(C) Covering the course prescribed in his subject

(D) Taking classes regularly

92. A technical educational cess was recommended to be levied in our country' the first time by

(A) The Secondary Education Commission

(B) The International Education Commission

(C) The University Education Commission

(D) The Technical Education Commission

93. The best way to react to wrong answer by a student is

(A) To scold him for not having learnt lesson

(B) To explain why the answer is wrong

(C) To ignore the wrong answer and pass on to the next question

(D) To ask another student to give the corn answer

94. The trial and error method of learning according to Thorndike could be classified as under

(A) The principle of multiple responses

(B) The law of exercise

(C) The principle of partial activity

(D) The principle of Associative learning

95. Liberalism in education, when it was claimed by universities of the world since the 19th century, meant

(A) Freedom to be given to education from the clutches of religion

(B) Favoring liberal education as opposed to special education

(C) Academic freedom for teachers in instruction

(D) Administrative freedom to universities to run the institution

96. The term 'Evaluation' and 'Assessment' could be discriminated as follows :

(A) Assessment is limited to coverage achievement whereas evaluation is qualitative in character

(B) Evaluation is concerned with the effective aspects of achievement whereas assessment judges the cognitive aspects

(C) Evaluation involves the measurement as well as diagnosis of students' attainments, whereas assessment is concerned with only scholastic attainments.

(D) Assessment is an attempt to measure the pupil as whole whereas evaluation is concerned with his achievement only

97. Naturalism in education means

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(A) Introduction of physical sciences in education

(B) Giving more importance to mind than to matter

(C) Making discrimination between mind and consciousness

(D) Supporting both mind and consciousness equally

98. In a class of ten pupils the grades in a spelling test were

$$97 - 97 - 97 - 92 - 92 - 85 - 76 - 73 - 65 - 60.$$

The mode of those scores is

(A) 92

(B) 97

(C) 97 minus 60 divided by 2

(D) the sum of the scores divided by 10

99. Of the following intelligence tests, the one which is individually administered is the

(A) WISC

(B) Pintner-Cunningham Primary

(C) Army Alpha

(D) Kuhlman-Anderson

100. With respect to the development of skills, all of the following are correct except that

(A) pupils of the same mental age should learn at the same rate

(B) group instruction facilitates the learning process

(C) learning individual instruction is often required

(D) workbooks can be an invaluable learning aid

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Answers

1. A 2. A 3. A 4. D 5. D 6. B 7. A 8. B 9. C 10. D 11. D 12. B 13. D 14. B 15. C 16. C
17. A 18. D 19. B 20. C 21. A 22. D 23. A 24. A 25. B 26. A 27. A 28. B 29. A 30. D 31. B
32. D 33. B 34. D 35. C 36. C 37. C 38. C 39. B 40. A 41. D 42. D 43. D 44. A 45. C 46. C
47. A 48. A 49. D 50. D 51. A 52. A 53. A 54. A 55. C 56. C 57. A 58. C 59. C 60. C 61. D
62. D 63. C 64. A 65. D 66. A 67. B 68. C 69. D 70. A 71. A 72. D 73. A 74. D 75. C 76. C
77. C 78. C 79. C 80. C 81. D 82. B 83. A 84. D 85. C 86. C 87. D 88. C 89. C 90. D 91. A
92. A 93. B 94. A 95. C 96. C 97. A 98. B 99. A 100. A

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Chapter 6

People and Environment



Our human society is supported by environment all over the years till today. Environment and people have mutual understanding and interdependence, basically all the living creatures is dependent on environment for their primary or secondary needs. Our main motive is to protect the environment rather than to destroy it so that it will sustain life for our future generations. We are destroying the environment by cutting the trees, making big industry. The world have already got signal about the destruction of the environment and if it continues then all the living creatures will wipe out from the planet. With this realization in mind, people are now working to save the environment. Today, whole world is trying to make green technology so that the environment is not under great pressure.

6.1 Environment

We human beings need water, fresh air and other essential ingredients to survive, which are part of our environment. As because we need nature or environments to survive , environmental resources like water, air, food, energy, land must be preserved in their natural from. Most of the natural resources like minerals, water, petroleum products are extracted from the nature continuously. Ecologist and scientist have recognized that if this processe going to be a continuous process then very soon in near future our natural environment will be degraded. Our natural resources is not reversible, if we extract them continuously it is not possible that it will reproduce again fully in near future.

6.1.1 Definition of environment

Everything in our surroundings which effect us during our lifetime is collectively known as our environment. In another words "*Environment is sum total of water, air , land and interrelationships among themselves and also with the human being, other living organisms and property*".

Definition of environment

Other definition of environment are given below.

1. The surroundings or conditions in which a person, animal, or plant lives or operates.
2. The natural world, as a whole or in a particular geographical area, especially as affected by human activity.
3. The natural environment encompasses all living and non-living things occurring naturally on Earth or some region thereof. It is an environment that encompasses the interaction of all living species. Climate, weather, and natural resources that affect human survival and economic activity.

6.1.2 Components of environment

The environment is the physical and biological habitat that surrounds us, which we can feel by using our five organs. Broadly, we can classify environment as two types

1. **Physical environment**— the physical environment is also called Abiotic environment. For example, physical environment consist of air, water, and land etc.

2. **Living environment**— all the living organism surrounding ourselves is fall into the category of living environment. This is also called the Biotich environment

Earth's environment can be further subdivided into the following four segments

1. Atmosphere
2. Lithosphere
3. Hydrosphere
4. Biosphere

6.1.2.1 Atmosphere

Atmosphere creates a protective shell over the earth. The atmosphere, which is a gaseous cover, protects the earth from cosmic radiations and provides life sustaining Oxygen, the macronutrient Nitrogen and Carbon dioxide needed for photosynthesis. The composition of atmosphere is shown in below table.

Gas	Volume
Nitrogen	78.1
Oxygen	20.9
Water vapour	0.1-5
Argon	0.9
Carbon dioxide	0.03
Trace constituents[1]	Balance

Table 6.1: the most common components of Earth's atmosphere

The Structure of the Atmosphere

The atmosphere is broadly divided into four major zones

1. Troposphere
2. Stratosphere
3. Mesosphere
4. Thermosphere

Characteristics of these zones are pictorially shown in figure 6.1.

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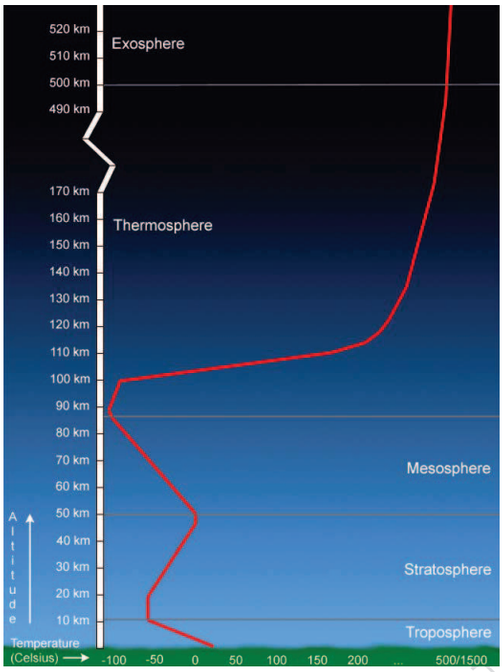


Figure 6.1: Structure of earth's atmosphere

1. **Troposphere**—The troposphere layer is near to the ground level of earth. In this layer, the composition of gases is nearly same throughout the layer. Most of the naughty activity of weather happens in this layer. The transition layer between troposphere and stratosphere is called *Tropopause*.

2. **Stratosphere**—The layer above the troposphere is called stratosphere where temperature increases with height. These layer is also known as "*Ozone layer*" because ozone gas is found in higher densities here. Stratosphere is hot layer because ozone absorbs radiant energy from the sun. The transition between the stratosphere and mesosphere is called *Stratopause*.

3. **Mesosphere**—Layer above the stratosphere is called mesosphere where temperature decreases with height. This layer is very cold. The transition layer between mesosphere and thermosphere is called *Mesopause*.

4. **Thermosphere**—Thermosphere is the layer above the mesosphere. In this layer, temperature increases with height. Here density of air is less and eventually we enter into space.

Figure 6.2 shows relationship between component and sub componenet among the four major Environmental components viz. Lithosphere, Hydrosphere, Atmosphere and Biosphere.

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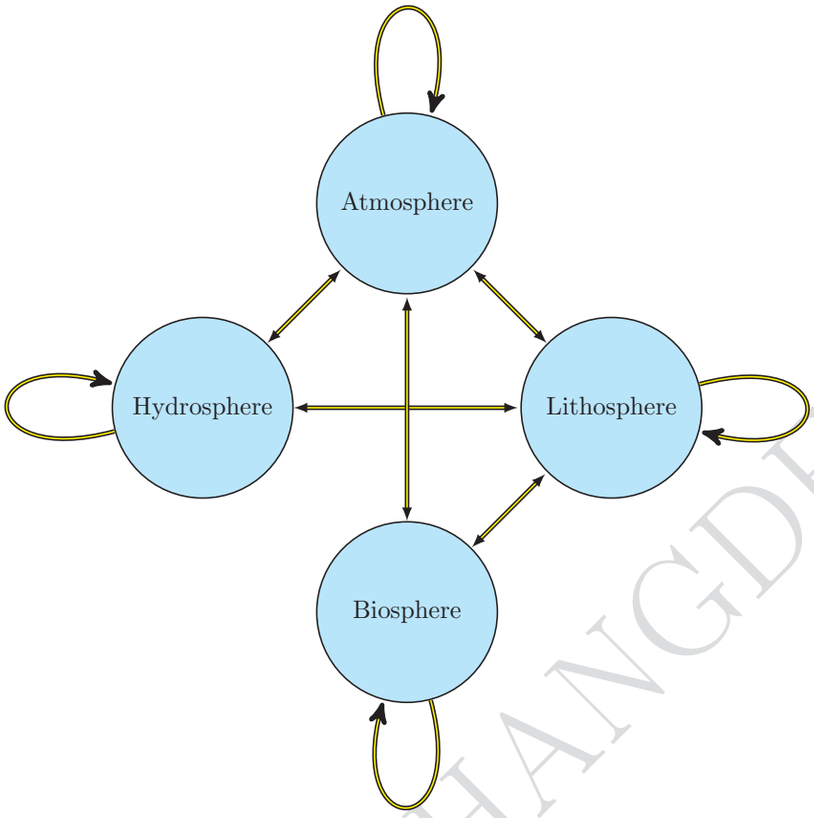


Figure 6.2: Relationship between component and sub componenet

6.1.2.2 Lithosphere

The crust of the earth containing rock, soil and sediments is called lithosphere. The soil is composed of inorganic and organic matter and water. The main minerals in lithosphere are composed of the elements silicon, calcium, potassium, aluminium, iron, manganese etc. The organic constituents are mainly organic compounds of N, P and S.

6.1.2.3 Hydrosphere

Hydrosphere layer comprised of 3/4th portion on earth. It mainly contains both surface and groundwater. Major constituents of hydrosphere are oceans, lakes, streams, rivers, water vapour and glacier. The distribution of water among these resources is as under table 6.2

water source	Volume in %
oceans and seas	96-97 %
glaciers and polar ice	2-3 %
Freshwater	$< 1\%$

Table 6.2: The most common components of hydrosphere

6.1.2.4 Biosphere

Biosphere encircles the earth's surface where all the living things exist. This layer extend from 10,000 m below sea level to 6000 m above sea level. The biosphere covers parts of other segments of the environment viz. Lithosphere, Hydrosphere and Atmosphere. Biosphere is a biological environment where living organism interacting with physical environment for example soil, water and air.

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6.2 How to Save Our Environment

In today's world, people, students, industrialist and the institution are trying to use green technology or basically they are going green to save the environment.We can also save our environment up to certain extent as follows:

1. Recycle everything.
2. Don't use electrical appliances if you can do it by hand.
3. Use cold water in the washer.
4. Re-use brown paper bags to line your trash can.
5. Re-use bread bags and produce bags.
6. Store food in re-usable containers.
7. Return hangers to the dry cleaners.
8. Donate unwanted goods.
9. Don't leave water running needlessly.
10. Turn your heat down and wear a sweater.
11. Turn off the lights and electrical appliances.
12. Flush the toilet less often.
13. Turn down the heat before you go on vacation.
14. Recycle your Christmas tree.
15. Start a compost pile.
16. Put up birdfeeders, birdhouses, and birdbaths.
17. Pull weeds instead of using herbicides.
18. Use only organic fertilizers.
19. Take extra plastic and rubber pots back to the nursery.
20. Plant short, dense shrubs close to your home's foundation for insulation.
21. Use mulch to conserve water in your garden.
22. Keep your car tuned.
23. carpool.
24. Use public transit.
25. Ride your bike or walk.
26. Buy a more fuel-efficient car (such as a hybrid or bio-diesel).
27. Recycle your engine oil.
28. Keep your tires properly inflated to save gas.
29. Keep your wheels properly aligned to save your tires.
30. Don't litter our roads and highways.
31. Recycle office and computer paper, cardboard, etc.
32. Use scrap paper for informal notes to yourself and others.
33. Print or copy on both sides of the paper.
34. Use smaller paper for smaller memos.
35. Re-use manila envelopes and file folders.
36. Use washable dishes and glassware at the office.
37. Avoid buying products in plastic or styrofoam containers.
38. Think twice about buying "disposable" products.
39. Buy disposable paper products instead of plastic ones.
40. Buy only energy-efficient appliances.
41. Bring your own bags.
42. Buy locally grown food and locally made products.
43. Don't buy products made from endangered animals.
44. Join a conservation organization.
45. Volunteer your time to conservation projects.
46. Donate to conservation projects.
47. Switch to a vegetarian diet.
48. Encourage your family and friends to conserve.
49. Write your legislators about conservation issues in your community or state.
50. Teach children to respect nature and the environment

6.3 How Do We Destroy the Environment?

Our environment is precious for ourselves and our future generation. So we must protect and do our best to keep our environment clean and healthy. It is our responsibilty to make sure that the air is clean, the land and water are free of contaminates and toxins. We should protect our planet from harmness and we should not harming it by poisoning it with chemicals, toxins and other industrial pollutants. We only have one home, so why should we

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be so careless with it? What about our children and what about their children? What will their environment look and smell like? . Now we should know, what makes to destroy our peaceful environment. There are lots of ways a human can destroy our environment. Here are top 10 causes for the environmental damages.

1. **High quantity of Exhaust gases**— the biggest reason for environmental degradation is the exploration of poisonous gases from industry. Some of the dangerous gases are CO_2, SO_2 and NH_3. Of course there are many more, and these are the main culprits for ozone holes and global warming.

2. **Deforestation**— Human beings have been cutting down trees indiscriminately to create land for farming and housing to meet the needs of the ever-increasing human population. As the human population has increased, human requirement of firewood, furniture and wood for industrial and agricultural uses also increased. This has resulted in large-scale cutting of trees, leading to deforestation.

   Many birds and animals have been rendered homeless due to loss of their habitat. As a result, many of them have had to migrate to different places. Many species of birds and animals like tiger and panther cannot survive except in forest.

   Many carnivorous animals have turned man-eaters, as they do not get sufficient food in the forest. Destruction of habitat leads to extinction of some species. The disturbs the balance in nature.

3. **High number of industries such as mining**— mining industry is one of the culprit for damaging our environment mainly because of it releases particular matter, which qualifies as Respirable Particulate Matter (RPM); the particulate matter which can enter our lungs and can harm the entire respiratory system.

4. **Chemical effluents**— Effluents are another by-product of industries which poses threat to the environment. Leather and tanning industries, petroleum industries and chemical manufacturing industries create major waste products which are released directly into nearby streams without treatment, creating river pollution and causing harm to aquatic life.

5. **Transport**— the cars becomes available more and more, the number of vehicles on the road are increasing. Amount of gas created by cars directly affects human. Smog is a nuisance that is created because of vehicular pollution, and Hydro-Carbons released from engines are the cause of creation of lower level ozone that is harmful to humans.

6. **Unprecedented Construction**— unprecedented construction trap solar radiation by concrete and cement . Concrete and cement trap heat extremely well.

7. **Secondary Pollutants**— Secondary pollutants are ones that are not directly emitted; however they get created when primary pollutants react amongst themselves. Major amongst them is the creation of ozone from reaction between non-burnt Hydrocarbons and Nitrous Oxides.

8. **Agricultural policy**— soil degradation is a continuous policy which leads to the desertification and degradation of soil quality. Moreover, overloading the land by using chemical fertilisation and poison makes our environment degraded.

9. **Increasing population**— The increasing population creates a load that the entire environment has to support, not only in terms of food and lodging, but also in terms of the amount of waste that it generates.

10. **Hunting**— Human beings have destroyed large number of birds and animals by hunting. Hunting is done either for sport, for food or for greed. Tigers, panthers, deers, crocodiles, snakes, etc., are killed for their skins. Elephants are killed for their tusks, peacocks for feathers and a large variety of birds and animals hunted for food. Indiscriminate hunting of animals can lead to their extinction. Scientists say if immediate measures are not taken then about 25% of all the animal species will become extinct in the next 25 years.

6.4 Ecosystem

To survive in the earth, all the living beings create groups and they compete with each other. An ecosystem is a complex set of relationship among the living resources, habitats, and residents of an area. Ecosystem consists of plants, animals, birds, water, soil and people. A healthy ecosystem is called sustainable. This means all the elements in the system is in balance and are capable of reproducing themselves. Ecology is the study of interrelationship among plants and animals and their interactions with the physical environment.

We can classify ecology into two broad categories

1. **Autoecology**— it is the study of an individual species. For example, behaviour, adaptation and interaction of a particular species in its own environment. Autoecology is also known as species ecology.

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2. **Synecology**— it is the study of communities and their interaction with the environment. Synecology is also known as ecology of communities.

Examples of large eco systems are rain forests, deserts, salt marshes, coral reefs, lakes and ponds, open ocean, grass lands etc.

6.4.1 Types of ecosystem

The main two kinds of ecosystem are terrestrial and aquatic. Any other sub ecosystem falls under one of these two categories.

6.4.1.1 Terrestrial ecosystem

One can find terrestrial ecosystem anywhere except heavily saturated places. It is further classified into following categories

1. Forest ecosystem
   - Tropical evergreen forest
   - Tropical deciduous forest
   - Temperature evergreen forest
   - Temperature deciduous forest
   - Taiga
2. The desert ecosystem
3. Grassland ecosystem
4. Mountain ecosystem

1. **Forest ecosystem**— They are the ecosystems in which an abundance of flora, or plants, is seen so they have a big number of organisms which live in relatively small space. Therefore, in forest ecosystems the density of living organisms is quite high. A small change in this ecosystem could affect the whole balance, effectively bringing down the whole ecosystem.
   (a) **Tropical evergreen forest:** tropical evergreen forest are areas where mean rainfall of 80 for every 400 inches annually happen. Here forest is dense and it comprises of tall trees of different heights.
   (b) **Tropical deciduous forest:** Here, shrubs and dense bushes rule along with a broad selection of trees. This type of forest is found in quite a few parts of the world while a large variety of fauna and flora are found there.
   (c) **Temperate evergreen forest:** Those have quite a few number of trees as mosses and ferns make up for them. Trees have developed spiked leaves in order to minimize transpiration.
   (d) **Temperate deciduous forest:** The forest is located in the moist temperate places that have sufficient rainfall. Summers and winters are clearly defined and the trees shed the leaves during the winter months.
   (e) **Taiga:** It is situated just before the arctic regions, the taiga is defined by evergreen conifers. As the temperature is below zero for almost half a year, the remainder of the months, it buzzes with migratory birds and insects.
2. **Desert ecosystem**— Desert ecosystem is located in the regions where annual rainfall is very less. The area of desert ecosystem is 17% of the total land area on our planet. Due to the extremely high temperature, low water availability and intense sunlight, fauna and flora are scarce and poorly developed. The vegetation is mainly shrubs, bushes, few grasses and rare trees.
3. **Grassland ecosystem**— Grassland ecosystem is located in both the tropical and temperature region of the world. It has variety of grasses, harps, insects depending on climatic conditions and temperature. The grasslands are degraded day by day because of overgrazing. The two main kinds of grasslands ecosystems are:
   (a) **Savanna**— The tropical grasslands are dry seasonally and have few individual trees. They support a large number of predators and grazers.
   (b) **Prairies**— It is temperate grassland, completely devoid of large shrubs and trees. Prairies could be categorized as mixed grass, tall grass and short grass prairies.
4. **Mountain ecosystem**— Mountain land provides a scattered and diverse array of habitats where a large number of animals and plants can be found. At the higher altitudes, the harsh environmental conditions normally prevail, and only the treeless alpine vegetation can survive. The animals that live there have thick fur coats for prevention from cold and hibernation in the winter months. Lower slopes are commonly covered with coniferous forests.

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6.4.1.2 Aquatic ecosystem

The aquatic ecosystem is the ecosystem found in a body of water. It encompasses aquatic flora, fauna and water properties, as well. There are two main types of aquatic ecosystem

1. Marine
2. Freshwater

1. **The Marine Ecosystem**— Marine ecosystems are the biggest ecosystems, which cover around 71% of Earth's surface and contain 97% of out planet's water. Water in Marine ecosystems features in high amounts minerals and salts dissolved in them. The different divisions of the marine ecosystem are:

    - **Oceanic**— A relatively shallow part of oceans which lies on the continental shelf.
    - **Profundal**— Deep or Bottom water.
    - **Benthic**— Bottom substrates.
    - **Inter-tidal**— The place between low and high tides.
    - Estuaries
    - Coral reefs
    - Salt marshes
    - Hydrothermal vents where chemosynthetic bacteria make up the food base.

    Many kinds of organisms live in marine ecosystems: the brown algae, corals, cephalopods, echinoderms, dinoflagellates and sharks.

2. **The Freshwater Ecosystem**— Contrary to the Marine ecosystems, the freshwater ecosystem covers only 0.8% of Earth's surface and contains 0.009% of the total water. Three basic kinds of freshwater ecosystems exist:

    - **Lentic**— Slow-moving or till water like pools, lakes or ponds.
    - **Lotic**— Fast-moving water such as streams and rivers.
    - **Wetlands**— Places in which the soil is inundated or saturated for some lenghty period of time. The ecosystems are habitats to reptiles, amphibians and around 41% of the world's fish species. The faster moving turbulent waters typically contain a greater concentrations of dissolved oxygen, supporting greater biodiversity than slow moving waters in pools.

6.4.2 Characteristics of ecosystem

Following are the typical characteristics of any ecosystem.

1. It is normally an open system with a continuous, but variable influx and loss of materials and energy.
2. An ecosystem is an overall integration of the whole mosaic of interacting organisms and their environment.
3. It is a basic, functional unit with no limits of boundaries.
4. It consists of biotic and abiotic components interacting with each other.
5. Its functional unit is capable of energy transformation, circulation and accumulation.
6. An ecosystem is the smallest unit of biosphere.
7. Different types of ecosystem are present in different areas.

6.4.3 Component of ecosystem

The structure of an ecosystem is basically a description of the species of organisms that are present, including information on their life histories, populations and distribution in space. The structure of ecosystem provides information about the range of climatic conditions that prevail in the area. From structural point of view all ecosystems consist of following four basic components.

1. Abiotic Substances
2. Producers/autotrophs
3. Consumers/heterotrophs
4. Decomposers

We can classify the parts of an ecosystem by listing them under the headings "abiotic" and "biotic".

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Abiotic Substances	Biotic Substances
Sunlight	Primary producers
Temperature	Herbivores
Precipitation	Carnivores
Water or moisture	Omnivores
Soil or water chemistry (e.g., P, NH4+)	Detritivores

Table 6.3: Abiotic and Biotic components

1. **Abiotic components**— These include basic inorganic and organic compounds of the environment or habitat of the organism. The inorganic components of an ecosystem are carbon dioxide, water, nitrogen, calcium, phosphate, all of which are involved in matter cycles (biogeochemical cycles).

   The organic components of an ecosystem are proteins, carbohydrates, lipids and amino acids, all of which are synthesized by the biota (flora and fauna) of an ecosystem and are reached to ecosystem as their wastes, dead remains, etc, The climate, temperature, light, soil, etc., are other abiotic components of the ecosystem.

2. **Poducers/autotrophs**— Producers are autotrophic organisms like chemosynthetic and photosynthetic bacteria, blue green algae, algae and all other green plants. They are called ecosystem producers because they capture energy from non-organic sources, especially light, and store some of the energy form of chemical bonds, for the later use.

3. **Consumers/heterotrophs**— They are heterotrophic organisms in the ecosystem which eat other living creatures. There are herbivores, which eat plants, and carnivores, which eat other animals. They are also called phagotrophs or macroconsumers. Sometimes herbivores are called primary macroconsumers and carnivores are called secondary Macroconsumers.

4. **Decomposers**— Reducers, decomposers, saprotrophs or Macroconsumers are heterotrophic organisms that breakdown dead and waste matter. Fungi and certain bacteria are the prime representatives of this category. Enzymes are secreted by their cells into or onto dead plant and animal debris. These chemicals digest the dead organism into smaller bits or molecules, which can be absorbed by the fungi or bacteria (saprotrophs).

   The decomposers take the energy and matter that they harvest during this feeding process for their own metabolism. Heat is liberated in each chemical conversion along the metabolic pathway.

   No ecosystem could function long without decomposers. Dead organisms would pile up without rotting, as would waste products. It would not be long before an essential element, phosphorus, for example, would be first in short supply and then gone altogether, because the dead corpses littering the landscape would be hoarding the entire supply.

   Thus, the importance of the decomposers to the ecosystem is that they tear apart organisms and in their metabolic processes release to the environment atoms and molecules that can be reused again by autotrophic organisms. They are not important to the ecosystem from the energy point of view but from the material (nutrient) point of view. Energy cannot be recycled, but matter can be.

   Energy must be fed into ecosystem to keep up with the dissipation of heat or the increase in entropy.

6.4.4 Functions of ecosystem

Ecosystem functions are the biological, geochemical and physical processes and components that take place or occur within an ecosystem. Following are the four main functions of ecosystem.

1. Regulating functions
2. Supporting functions
3. Provisioning functions
4. Cultural functions

Regulating function is also subdivided into following categories.

a) Gas regulation
b) Climate regulation
c) Disturbance regulation
d) Water regulation
e) Soil retention
f) Nutrient regulation
g) Water treatment and assimilation
h) Pollination
i) Biological control
j) Barrier effect of vegetation

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Supporting functions is subdivided into two categories

a) Supporting habitats
b) Soil formation

Provisioning functions is subdivided as follows.

a) Food
b) Raw materials
c) Water supply
d) Genetic resources
e) Provision of shade and shelter
f) Pharmacological resources

Cultural functions contains landscape opportunity

6.4.5 Energy flow in the ecosystem

All organisms require energy for growth, maintenance, reproduction, locomotion, etc. Hence, for all organisms there must be:

1. A source of energy
2. A loss of usable energy

The diagram below shows how both energy and inorganic nutrients flow through the ecosystem. Nutrients (shown by dashed arrows) cycle through ecosystems in a closed loop, while energy (shown by dark arrows) is released at each stage.

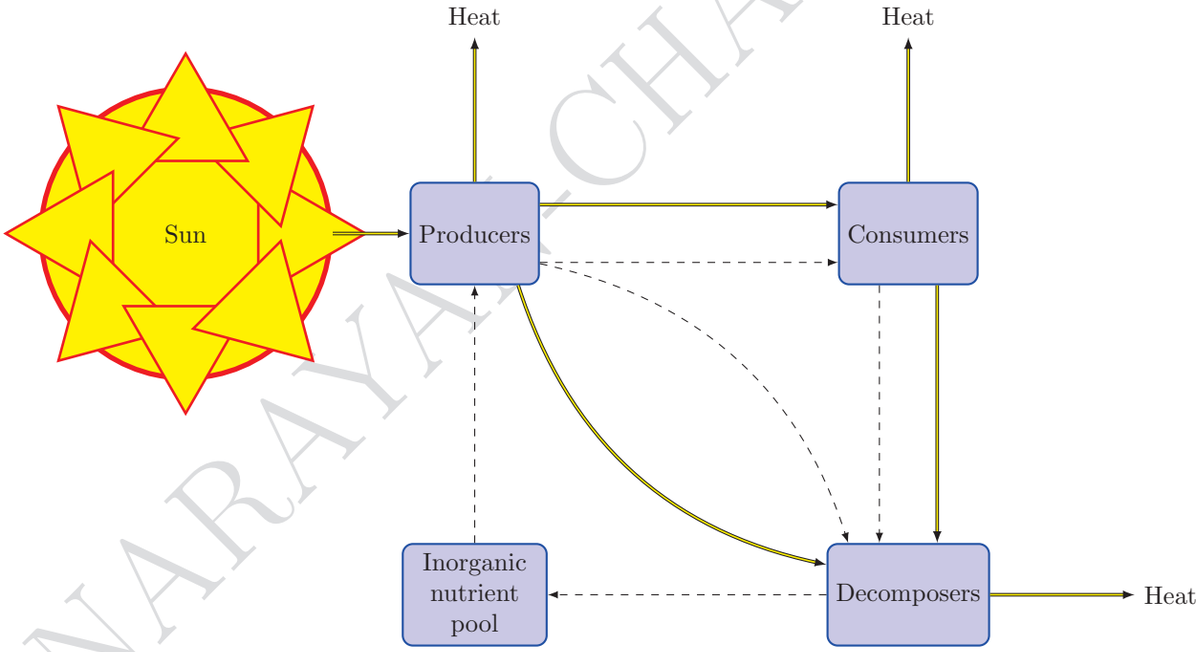


Figure 6.3: Energy flow in ecosystem

In the flow of energy and inorganic nutrients through the ecosystem, a few generalizations can be made:

1. The ultimate source of energy (for most ecosystems) is the sun
2. The ultimate fate of energy in ecosystems is for it to be lost as heat.
3. Energy and nutrients are passed from organism to organism through the food chain as one organism eats another.
4. Decomposers remove the last energy from the remains of organisms.
5. Inorganic nutrients are cycled, energy is not.

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6.4.6 Biogeochemical cycle

While energy does not cycle through an ecosystem, chemicals do. The inorganic nutrients cycle through more than the organisms, however, they also enter into the atmosphere, the oceans, and even rocks. Since these chemicals cycle through both the biological and the geological world, we call the overall cycles biogeochemical cycles. Each chemical has its own unique cycle, but all of the cycles do have some things in common.

The most important and common biogeochemical cycles are :

1. Hydrological Cycle
2. Carbon Cycle
3. Nitrogen Cycle
4. Oxygen Cycle
5. Sulphur Cycle
6. Phosphorous Cycle

1. **Hydrological cycle**— In the hydrological cycle or water cycle, energy is supplied by the sun, which drives evaporation whether it be from ocean surfaces or from treetops. There is a constant and continuous exchange of water between air, land, sea and living beings. The energy of Sun makes water to vapour (clouds). Clouds moved from one place to another place. Cloud condenses from gas state and falls into the earth, this process is known as precipitation. The process in which liquid water becomes gaseous is called evaporation. hydrological cycle is the continuous and balanced process of evaporation, precipitation, transpiration and runoff of water.

2. **Carbon cycle**—Carbon is an essential component of all plant, animal and organic matter. The chief reservoirs for carbon dioxide are in the oceans and in rock.The atmosphere is an important source of carbon which is present in the form of carbon dioxide.Both plants and animals carry on CO_2 in respiration, but only plants (and other producers) can carry on photosynthesis. Carbon dioxide dissolves readily in water. Once there, it may precipitate (fall out of solution) as a solid rock known as calcium carbonate (limestone). The dead organic matter from plants and animals are decomposed by microorganisms releasing Carbon dioxide to the atmosphere. Burning of fossil fuels releases large quantities of carbon dioxide.

3. **Nitrogen cycle**—The nitrogen cycle is one of the most difficult of the cycles to learn, simply because there are so many important forms of nitrogen, and because organisms are responsible for each of the interconversions. Nitrogen and its compounds form a vital ingredient in all forms of life in the biosphere. The main source of nitrogen is atmosphere, which is about 78% nitrogen. Nitrogen is a non-reactive gas. To break up the nitrogen gas, it needs lots of energy to combine with other things such as carbon or oxygen. Nitrogen gas cannot be directly absorbed by plants or producers. In order to be absorbed by the plants it has to be converted into water soluble compounds with elements like hydrogen, carbon and oxygen. This process is known as fixation of nitrogen. Fixation of nitrogen takes place by electrical storms, bacteria and algae. Synthetic fixation of Nitrogen is done by the manufacture of nitrogenous fertilizers through ammonia conversion route.

4. **Oxygen cycle**— Oxygen is released to the atmosphere by autotrophs during photosynthesis and taken up by both autotrophs and heterotrophs during respiration. In fact, all of the oxygen in the atmosphere is biogenic; that is, it was released from water through photosynthesis by autotrophs. It took about 2 billion years for autotrophs (mostly cyanobacteria) to raise the oxygen content of the atmosphere to the 21% that it is today; this opened the door for complex organisms such as multicellular animals, which need a lot of oxygen.

5. **Sulphur cycle**— Sulphur is mainly found on Earth as sulfates in rocks or as free sulfur. The largest deposits of sulfur in the United States are in Louisiana and Texas. Sulfur also occurs in combination with several metals such as lead and mercury, as PbS and HgS. Sulfur appears as the yellow aspects of soil in many regions.

   Sulfur and its compounds are important elements of industrial processes. Sulfur dioxide (SO_2) is a bleaching agent and is used to bleach wood pulp for paper and fiber for various textiles such as wool, silk, or linen. SO_2 is a colorless gas that creates a choking sensation when breathed. It kills molds and bacteria. It is also used to preserve dry fruits, like apples, apricots, and figs, and to clean out vats used for preparing fermented foods such as cheese and wine.

6. **Phosphorous Cycle**— Phosphorus (P) is another one of the essential elements that cycle through the ecosystem. It is an element that is found in the ground and then taken up by plants and animals. Phosphorus starts its existence as phosphate ions (PO_4) in the rocks of the world. When it rains, the phosphates and other minerals are removed from the rocks and distributed in soils and the water all over the planet.

6.4.7 Ecological succession

"Ecological succession" is the observed process of change in the species structure of an ecological community over time. Within any community some species may become less abundant over some time interval, or they may even

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vanish from the ecosystem altogether. Similarly, over some time interval, other species within the community may become more abundant, or new species may even invade into the community from adjacent ecosystems. This observed change over time in what is living in a particular ecosystem is "ecological succession"

6.4.7.1 Types of succession

There are two main types of Ecological Succession

1. **Primary Succession**— The process of creating life in an area where no life previously existed. The development of an ecosystem in an area that has never had a community living within it occurs by a process called PRIMARY SUCCESSION. An example of an area in which a community has never lived before, would be a new lava or rock from a volcano that makes a new island.
2. **Secondary Succession**— It is the process of re-stabilization that follows a disturbance in an area where life has formed an ecosystem. Following are impotant point about secondary succession.
   (a) Organisms are destroyed but the soil is safe.
   (b) The soil already contains the seeds of weeds, grasses, and trees. More seeds are carried to the area by wind and birds.
   (c) Succession begins again but the primary species are different.
   (d) Because soil is present, this succession is faster.

Changes during succession

A summary of changes that occur during succession.

1. Pioneer species colonize a bare or disturbed site. Soil building.
2. Changes in the physical environment occur (e.g., light, moisture).
3. New species of plants displace existing plants because their seedlings are better able to become established in the changed environment.
4. Newly arriving species alter the physical conditions, often in ways that enable other species to become established.
5. Animals come in with or after the plants they need to survive.
6. Eventually a climax community that is more or less stable will become established and have the ability to reproduce itself.
7. Disturbances will start the process of succession again.

6.4.8 Food chain

All energy comes from the sun.Plants harness the sun's energy by photosynthesis.We call plants producers because they produce energy from the sun directly.Many animals eat only plants-they are vegetarians. We call animals that eat plants primary (first) consumers.The next group, called the secondary consumers are carnivores or omnivores. They eat the primary consumers.

6.4.8.1 Animal Adaptation

Everything that affects an animal makes up its environment - where it lives, the weather and all the living things it comes into contact with.Every living thing, including people, has an effect upon the environment.All living things have to be suited to their environment if they are to survive. Fish have streamlined bodies, fins and specially shaped tails to help them move quickly and easily through the water. Squirrels have sharp, strong claws for gripping tree trunks and branches and strong teeth for eating nuts.

The top of the food chain.

Some animals are said to be at the top of the food chain. This is because they are not hunted by other animals. No other animal hunts the lion. The lion is at the top of the food chain

1. A food chain shows which animals eat other animals or plants.

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2. Plants don't eat things.
3. A food chain starts with what gets eaten and the arrows point towards what does the eating.
4. Food chains only go in one direction.

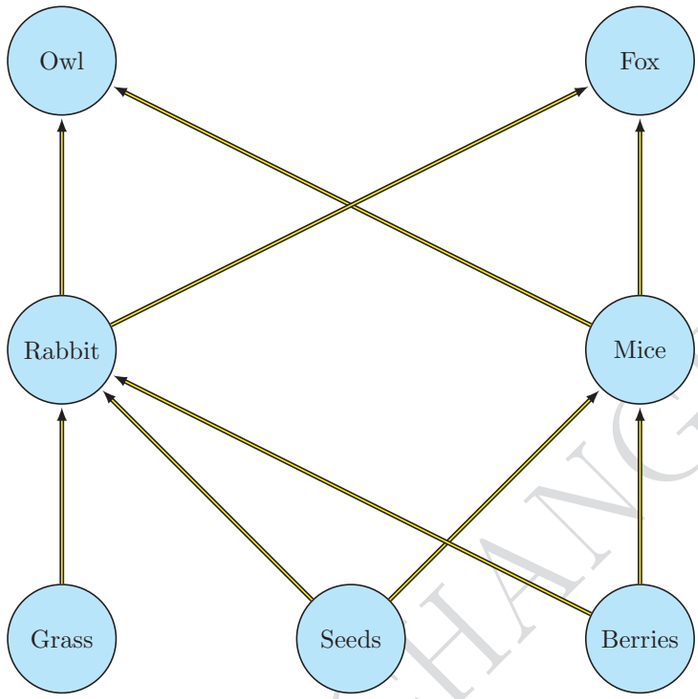


Figure 6.4: Food chain

6.4.8.2 Types of food chain

A food chain is a simplified way to look at the energy that passes from producers to consumers. Types of fod chain is as follows:

1. **Aquatic**— Water-related food chains with sea plants and animals
2. **Terrestrial**— Land-related food chains with land plants and animals

6.4.9 Food web

In the wild, animals may eat more than one thing, so they belong to more than one food chain. To get the food they need, small herbivores may eat lots of different plants, and carnivores may eat many different animals. We can show this by using a food web, which is just a more complicated version of a food chain.

6.4.10 Some basic definitions

In this section we will learn some basic definition.

1. **Living things**— All living things (organisms) need food (nourishment) to live. Living things in an ecosystem depend on each other for food.
2. **Carnivores**—Some animals, like the kingfisher, eat only other animals. These animals are called "carnivores".
3. **Herbivores**—Some animals do not eat other animals. They survive on plants and are known as "herbivores".
4. **Omnivores**—Some animals, like us, eat both plants and animals. These animals are called "omnivores".
5. **Consumers**— "Consume" means "eat". Animals are consumers because they "eat" (consume) food provided by plants or other animals.

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6. **Producers**—Plants are living organisms. They need nourishment to survive.But plants do not eat other plants or animals. Plants are called producers, because they produce their own food using sunlight
7. **Predator**— A predator eats other animals.Cats eat fish. The cat is a predator, because it eats other animals. The bear is a predator, because it eats other animals. People are predators too.
8. **Prey**—Any animal which is hunted and killed by another animal for food is prey.Some animals are predators, some are prey - some are both.The predator eats the prey, and the prey gets eaten by the predator.
9. **Decomposers**—Microorganisms that are able to break down large molecules into smaller parts.Decomposers return the nutrients that are in a living thing to the soil.
10. **Food Chains**—A food chain shows what is eaten. Food chains always start with a plant. A food chain is the path by which energy passes from one living thing to another.

Food web is a more realistic way of looking at the relationship of plants and animals in an environment. Several food chains linked together. A predator from one food chain may be linked to the prey of another food chain

6.4.11 Ecological pyramid

An ecological pyramid is a graphical representation designed to show the number of organisms, energy relationships, and biomass of an ecosystem. Succeeding levels in the pyramid represents the dependence of the organisms at a given level on the organisms at lower levels. Three Types of Ecological Pyramids are

1. Pyramids of Production (Energy)
2. Pyramids of Biomass
3. Pyramids of Numbers

6.4.12 Institutions in environment

This is a list of environmental research institutes. These organizations undertake research on the sustainable management of resources, including water, energy and biodiversity.

1. Centre for Energy and Environmental Markets (CEEM)
2. Cooperative Research Centre
3. Environment Institute, University of Adelaide
4. Hawkesbury Institute for the Environment (HIE), University of Western Sydney
5. McMaster Institute of Environment and Health (MIEH)
6. International Center for Tropical Agriculture (CIAT) (Centro Internacional de Agricultura Tropical)
7. Environmental Assessment Institute (EAI)
8. Global Biodiversity Information Facility (GBIF) (secretariat)
9. National Environmental Research Institute of Denmark (NERI)
10. Estonian Environmental Research Centre (EERC)
11. Estonian Environmental Research Institute (operates within the EERC)
12. European Molecular Biology Laboratory (EMBL)
13. Finnish Environment Institute
14. Curie Institute (Paris)
15. Helmholtz Centre for Environmental Research
16. Wuppertal Institute for Climate, Environment and Energy
17. Center for Environmental Nuclear Research (CENR)
18. Center for Environmental Planning and Technology (CEPT)

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19. Indian Agricultural Research Institute (IARI)
20. National Environmental Engineering Research Institute (NEERI)
21. The Energy and Resources Institute (TERI)
22. Israel Institute for Biological Research (IBR)
23. Institute of Ecosystem Study (CNR-ISE)
24. Institute of Cetacean Research (ICR)
25. Energy Research Centre of the Netherlands (ECN)
26. GNS Science (formerly the Institute of Geological and Nuclear Sciences)
27. Curie Institute (Warsaw)
28. National R&D Institute for Industrial Ecology - ECOIND
29. Mir Environmental Effects Payload (MEEP)
30. Korea Environment Institute (KEI)
31. National Institute of Environmental Research (NIER)
32. Stockholm Environment Institute.
33. Chartered Institute of Environmental Health (CIEH)
34. Durrell Institute of Conservation and Ecology
35. European Bioinformatics Institute (EBI)
36. Institute of Biological, Environmental and Rural Sciences (IBERS), Wales
37. Institute of Zoology (IoZ)
38. National Institute for Environmental eScience (NIEeS)
39. Oxford Environmental Change Institute
40. UCL Institute for Sustainable Resources (ISR)
41. Botanical Research Institute of Texas (BRIT)
42. Center for Environmental Legal Studies (CELS), USA
43. Conard Environmental Research Area (CERA), Iowa
44. Cooperative Institute for Arctic Research, Alaska
45. Cooperative Institute for Climate and Ocean Research (CICOR)
46. Cooperative Institute for Climate Applications and Research (CICAR)
47. Cooperative Institute for Climate Science (CICS)
48. Cooperative Institute for Limnology and Ecosystems Research (CILER)
49. Cooperative Institute for Marine and Atmospheric Studies (CIMAS)
50. Cooperative Institute for Mesoscale Meteorological Studies (CIMMS)
51. Cooperative Institute for Research in Environmental Sciences (CIRES)
52. Cooperative Institute for Research in the Atmosphere (CIRA)
53. Cornell Laboratory of Ornithology, New York
54. The Earth Institute, Columbia University, New York
55. Earth System Research Laboratory (ESRL)

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56. Energy and Environmental Research Center (EERC), North Dakota
57. Environmental and Energy Study Institute (EESI), Washington DC
58. Florida Environmental Research Institute (FERI)
59. Florida Institute of Oceanography (FIO)
60. Global Energy Network Institute (GENI), California
61. Global Environment Facility (GEF), Washington DC (secretariat)
62. Institute on the Environment, University of Minnesota (IonE), St. Paul, MN
63. Integrated Taxonomic Information System (ITIS-North America), Washington DC (secretariat)
64. National Severe Storms Laboratory (NSSL)
65. National Snow and Ice Data Center (NSIDC)
66. Pacific Marine Environmental Laboratory (PMEL)
67. Property and Environment Research Center (PERC), Montana
68. Smithsonian Environmental Research Center (SERC)
69. UCLA Institute of the Environment, University of California at Los Angeles.
70. USC Wrigley Institute for Environmental Studies (WIES)
71. Yale Center for Environmental Law and Policy

6.5 Effects of human activities on environment

Natural environment is of crucial importance for social and economic life. We use the living world as

1. A resource for food supply
2. An energy source
3. A source for recreation
4. A major source of medicines
5. Natural resources for industrial products

Humans impact the environment in several ways. Common effects include decreased water quality, increased pollution and greenhouse gas emissions, depletion of natural resources and contribution to global climate change. Some of these are the direct result of human activities, whereas others are secondary effects that are part of a series of actions and reactions.

6.5.1 Agriculture

Modern agriculture is responsible for the loss of much wildlife and their habitats , through reduction and fragmentation of habitats and wildlife populations. The drainage of wetlands, the destruction of hedgerows and the intensive use of fertilizers and pesticides can all pose a threat to wildlife. Developing means of farming and agriculture is the reason humans live in the world they do today. It is a necessary means of survival, without which there would be famines all over the world. For thousands of years, agricultural was a natural process that did not harm the land it was done on. In fact, farmers were able to pass down their land for many generations and it would still be fertile as ever. However, modern agricultural practices have started the process of agricultural pollution. This process causes the degradation of the eco-system, land and environment due to the modern day by-products of agriculture.

No single cause can be attributed to the widespread agricultural pollution we face today. Agriculture is a complex activity in which the growth of crops and livestock have to be balanced perfectly. The process of agricultural pollution stems from the many stages their growth goes through. Folowing are the basic causes of agriculture pollution.

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1. **Pesticides and Fertilizers**— To begin with, the earliest source of the pollution has been pesticides and fertilizers. Modern day pesticides & fertilizers have to deal with the local pests that have existed for hundreds of years along with the new invasive species. And so, they are laden with chemicals that are not found in nature.

   Once they has been sprayed, it does not disappear completely. Some of it mixes with the water and seeps into the ground. The rest of is absorbed by the plant itself. As a result, the local streams that are supplied water from the ground become contaminated, as do the animals that eat these crops and plants.

2. **Contaminated Water**—Contaminated water used for irrigation is one further source of pollution. Much of the water we use comes from ground water reservoirs, canals and through the rains. While plenty of it is clean and pure water, other sources are polluted with organic compounds and heavy metals. This happens due to the disposal of industrial and agricultural waste in local bodies of water.

   As a result, the crops are exposed to water which has small amounts of mercury, arsenic, lead and cadmium dissolved in it. The process of agricultural pollution becomes harder to fight when such water poisons the livestock and causes crop failure.

3. **Soil Erosion and Sedimentation**— Further problems are caused by soil erosion and sedimentation. Soil is comprised of many layers and it is only the topmost layer that can support farming or grazing. Due to inefficient farming practices, this soil is left open for erosion and leads to declining fertility each year. Whether eroded by water or wind, all this soil has to be deposited somewhere or the other.

6.5.2 Land pollution

Land pollution, in other words, means degradation or destruction of earth's surface and soil, directly or indirectly as a result of human activities. Anthropogenic activities are conducted citing development, and the same affects the land drastically, we witness land pollution; by drastic we are referring to any activity that lessens the quality and/or productivity of the land as an ideal place for agriculture, forestation, construction etc. The degradation of land that could be used constructively in other words is land pollution.

Land Pollution has led to a series of issues that we have come to realize in recent times, after decades of neglect. The increasing numbers of barren land plots and the decreasing numbers of forest cover is at an alarming ratio. Moreover the extension of cities and towns due to increasing population is leading to further exploitation of the land. Land fills and reclamations are being planned and executed to meet the increased demand of lands. This leads to further deterioration of land, and pollution caused by the land fill contents. Also due to the lack of green cover, the land gets affected in several ways like soil erosion occurs washing away the fertile portions of the land. Or even a landslide can be seen as an example.

Below are the sources of land pollution:

1. **Deforestation and soil erosion**— Deforestation carried out to create dry lands is one of the major concerns. Land that is once converted into a dry or barren land, can never be made fertile again, whatever the magnitude of measures to redeem it are. Land conversion, meaning the alteration or modification of the original properties of the land to make it use-worthy for a specific purpose is another major cause. This hampers the land immensely. Also there is a constant waste of land. Unused available land over the years turns barren; this land then cannot be used. So in search of more land, potent land is hunted and its indigenous state is compromised with.

2. **Agricultural activities**— With growing human population, demand for food has increased considerably. Farmers often use highly toxic fertilizers and pesticides to get rid off insects, fungi and bacteria from their crops. However with the overuse of these chemicals, they result in contamination and poisoning of soil.

3. **Mining activities**— During extraction and mining activities, several land spaces are created beneath the surface. We constant hear about land caving in; this is nothing but natures way of filling the spaces left out after mining or extraction activity.

4. **Overcrowded landfills**—Each household produces tonnes of garbage each year. Garbage like aluminum, plastic, paper, cloth, wood is collected and sent to the local recycling unit. Items that can not be recycled become a part of the landfills that hampers the beauty of the city and cause land pollution.

5. **Industrialization**— Due to increase in demand for food, shelter and house, more goods are produced. This resulted in creation of more waste that needs to be disposed of. To meet the demand of the growing population, more industries were developed which led to deforestation. Research and development paved the way for modern fertilizers and chemicals that were highly toxic and led to soil contamination.

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6. **Construction activities**— Due to urbanization, large amount of construction activities are taking place which has resulted in large waste articles like wood, metal, bricks, plastic that can be seen by naked eyes outside any building or office which is under construction.

6.5.3 Waterlogging and its effect

Waterlogging refers to the saturation of soil with water. Soil may be regarded as waterlogged when the water table of the groundwater is too high to conveniently permit an anticipated activity, like agriculture. In agriculture, various crops need air (specifically, oxygen) to a greater or lesser depth in the soil. Waterlogging of the soil stops air getting in.

Adverse Effect of Water Logging

1. Depletion of oxygen in root zone and increase of CO2 due to water logging. An aerobic condition adversely affects micro-organisms while harmful organisms proliferate and restrict the plant growth.
2. Physical or chemical and biological activities in the soil are disturbed due to low temp as a result of water logging. Thus pest and diseases infestation problem arises.
3. Water logging makes field operations difficult on impossible.
4. The adverse effects of water logging get accelerated when the capillary water brings salts from lower horizon of soil or they are present in the ground water used for irrigation.
5. Water logging adversely affect the soil water plant relationship there by creating ecological imbalance.
6. Secondary salinization caused by the salts which are brought up from lower horizon strict the uptake of moisture and nutrients in the plant roots and create toxic effect in the root system.
7. Due to excess soluble salts the physical condition of soil deteriorates. Highly deteriorated alkali soils have very low infiltration rates. Most rainfall goes as runoff, causing crop damages in adjoining area.
8. Crops yields reduced and some times crop failure due to inadequate uptake of moisture and nutrients and due to the injurious effect of salts or deteriorated soil condition.
9. Fodders grown in slat-affected soils may contain high molybdenum in or selenium and low amount of zinc. The nutritional imbalance may cause disease in live stock.

6.5.3.1 Organic farming

Organic farming system in India is not new and is being followed from ancient time. It is a method of farming system which primarily aimed at cultivating the land and raising crops in such a way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (biofertilizers) to release nutrients to crops for increased sustainable production in an eco friendly pollution free environment.

As per the definition of the United States Department of Agriculture (USDA) study team on organic farming "organic farming is a system which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives etc) and to the maximum extent feasible rely upon crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection".

FAO suggested that "Organic agriculture is a unique production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity, and this is accomplished by using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm inputs".

Characteristics of organic farming

The key characteristics of organic farming include.

1. Protecting the long term fertility of soils by maintaining organic matter levels, encouraging soil biological activity, and careful mechanical intervention
2. Providing crop nutrients indirectly using relatively insoluble nutrient sources which are made available to the plant by the action of soil micro-organisms

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3. Nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock manures
4. Weed, disease and pest control relying primarily on crop rotations, natural predators, diversity, organic manuring, resistant varieties and limited (preferably minimal) thermal, biological and chemical intervention
5. The extensive management of livestock, paying full regard to their evolutionary adaptations, behavioural needs and animal welfare issues with respect to nutrition, housing, health, breeding and rearing
6. Careful attention to the impact of the farming system on the wider environment and the conservation of wildlife and natural habitats

6.6 Natural resources

The Earth is rich in natural resources that we use everyday. These resources are any valuable material of geologic origin that can be extracted from the earth.

6.7 Energy resources

Energy is the ability to do work. The word 'work' means transferring energy from one place to another. energy is neither destroyed nor created. It can only be changed. Sources of energy for the modern industrial economy is shown.

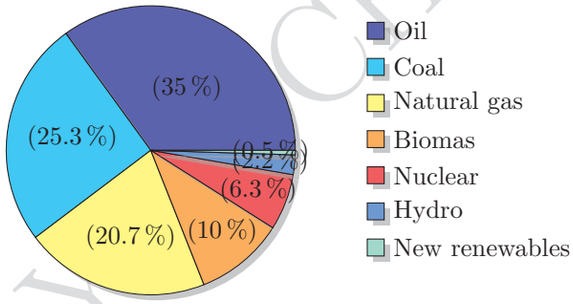


Figure 6.5: World energy production

6.7.1 Renewable and nonrenewable energy resources

Energy is the ability to do work. All forms of energy are stored in different ways. Energy sources we use every day. These sources are divided into 2 groups.

Nonrenewable source: A nonrenewable resource is a natural resource that cannot be re-made or re-grown at a scale comparable to its consumption. Coal, petroleum, and natural gas are considered nonrenewable because they can not be replenished in a short period of time. These are called fossil fuels.Nuclear fission uses uranium to create energy. Nuclear energy is a nonrenewable resource because once the uranium is used, it is gone.Example of nonrenewable energy are:

1. Oil
2. Coal
3. Natural gas
4. Nuclear

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Renewable source Renewable resources are natural resources that can be replenished in a short period of time.Example of renewable energy are:

1. Solar
2. Geothermal
3. Wind
4. Biomass
5. Water
6. wave and tidal power

6.7.2 Fossil fuels

Fossils fuels gives 85% of the world's commercial energy. Fossil fuels is highly combustible substances formed from remains of organisms from past geologic ages. Fossil fuels we burn today were formed from the tissues of organisms that lived 100-500 million years ago. Fossil fuels are produced only when organic materials is broken down in an anaerobic environment , one that has little or no oxygen. Bottoms of deep lakes, swamps, and shallow seas organic matter is eventually converted into crude oil, natural gas, or coal. It is said that we are using a million years worth of geological production every day.

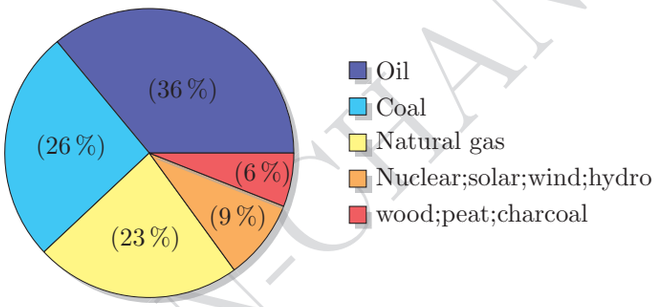


Figure 6.6: Commercial energy production

6.7.3 Coal energy

Coal is organic matter (woody plant material) that was compressed under very high pressure to form dense, solid carbon structures.

History of coal use

1. The Romans used coal for heating in the second and third centuries in Britain
2. The Chinese have used coal for 2,000 - 3,000 years
3. Commercial mining began in the 1700s
4. The invention of the steam engine expanded coals market
5. Coal helped drive the Industrial Revolution and the steel industry
6. In the 1880s, people used coal to generate electricity

Coal is mined from the surface and from below ground.

Subsurface mining In this case underground deposits are reached by digging networks of tunnels deep underground

Strip mining Here heavy machinery removes huge amounts of earth to expose and extract the coal

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Mountaintop removal in some cases, entire mountaintops are cut off to obtain the coal.
Formation of coal as follows

1. **Peat** is compressed to form lignite , which is also known as brown coal
2. **Lignite** is compressed and volatile compounds are lost to form bituminous coal –soft coal
3. **Bituminous** coal is further compressed and heated to form anthracite– hard coal

6.7.4 Solar energy

It is the Ultimate Renewable Resource. It originates with the thermonuclear fusion reactions occurring in the sun. The surface receives about 47% of the total solar energy that reaches the Earth. Only this amount is usable.

Advantages of solar energy

Following are the main advantages of solar energy

1. All chemical and radioactive polluting byproducts of the thermonuclear reactions remain behind on the sun, while only pure radiant energy reaches the Earth.
2. Energy reaching the earth is incredible. By one calculation, 30 days of sunshine striking the Earth have the energy equivalent of the total of all the planets fossil fuels, both used and unused

Disadvantages of solar energy

Following are the main Disadvantages of solar energy

1. Sun does not shine consistently.
2. Solar energy is a diffuse source. To harness it, we must concentrate it into an amount and form that we can use, such as heat and electricity

Final though about coal energy

1. Argument that sun provides power only during the day is countered by the fact that 70% of energy demand is during daytime hours. At night, traditional methods can be used to generate the electricity.
2. Our goal is to decrease our dependence on fossil fuels.
3. Currently, 75% of our electrical power is generated by coal-burning and nuclear power plants.
4. It mitigates the effects of acid rain, carbon dioxide, and other impacts of burning coal and counters risks associated with nuclear energy.
5. Itis pollution free, indefinitely sustainable.

6.7.5 Wind energy

The earth's winds are caused by pressure differences across the earths surface due to uneven heating. An estimated 1% to 3% of energy from the Sun that hits the earth is converted into wind energy. The principle of wind is simple. The poles recieve less energy than the equater does from the sun. Also land heats up and cools down more quickly than the seas. This difference between the seas and the land causes a global atmospheric convection system.

Local Winds: During the day the air over the land is heated more than the air over the sea. Opposite during the night.

Day pattern: Wind blows from sea to land

Night pattern: Wind blows from land to sea

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6.7.6 Ocean thermal energy

Energy is available from the ocean by

1. Tapping ocean currents
2. Using the ocean as a heat engine
3. Tidal energy
4. Wave energy

ocean energy is replenished by the sun and through tidal influences of the moons and suns gravitational forces. Near-surface winds induce wave action and cause wind-blown currents at about 3% of the wind speed. Tides cause strong currents into and out of coastal basins and rivers. Ocean surface heating by some 70% of the incoming sunlight adds to the surface water thermal energy, causing expansion and flow. Wind energy is stronger over the ocean due to less drag, although technically, only seabreezes are from ocean energy.

The ocean as a heat engine

1. There can be a 20° difference between ocean surface temps and the temp at 1000m
2. The surface acts as the heat source, the deeper cold water acts as a heat sink.
3. Temperature differences are very steady
4. Florida, Puerto Rico, Hawaii and other pacific islands are well suited to take advantage of this idea, called OTEC (Ocean Thermal Energy Conversion)

6.7.7 Wave energy

Wave power is the transport of energy by ocean surface waves, and the capture of that energy to do useful work —for example, electricity generation, water desalination, or the pumping of water (into reservoirs). A machine able to exploit wave power is generally known as a wave energy converter (WEC).

History of wave energy

1. 1799: First patent of a device designed to use ocean waves to generate power
2. 1910: First oscillating water column was built by Bochaux-Praceique to power his house
3. 1940s: Yoshio Masuda experimented with many concepts of wave power
4. 2004: Wave power was delivered to an electrical grid for the first time

6.7.8 Tidal energy

Most of the energy sources we have been discussing derived their energy from the sun originally. Tides are driven by gravity. Gravity is a force that exists between any two objects based upon their mass and the distance between them

$$Fg = GmM/R2$$

where M and m are the masses of the two objects, R is the distance between them and G is the gravitational constant $=6.67300 \times 10^{-11} m^3 kg^{-1} s^{-2}$

The moon and Earth exert a force of gravity on each other. The motion of the moon around the Earth counteracts the Earth's pull, so the moon does not fall into the Earth. The moon's pull on the Earth causes any material that can flow on the Earth's surface, like large bodies of water, to pile up underneath the moon.

The sun also causes tides the Earth, thought the effect is small, unless the sun and moon line up and work together (Spring tide) or are at right angles to each other and work against each other (neap tides). In areas where there are natural basins on the coastline, water flows in and out of these basins.

History of tidal energy

1. 787: simple technique of a waterwheel by the Spanish, French, and British
2. 1966: "La Rance" tidal power plant went in operation.
3. 2001: British Parliament states "the world can no longer neglect the massive potential of wave and tidal energy"
4. 2002-present: Large investments in research and prototypes spark proposals in Turkey, China, and United States; among others

So there are regular, predictable motions in the oceans which could be used as an energy source.

6.7.9 Hydropower

Electricity produced from the water is called the hydropower or hydro-electric power. The falling water turns the water wheel or the turbine and electricity is generated. It is the most convenient and versatile form of energy. It plays a key role in agriculture and industrial development and nation's growth and productivity can be analyzed through the quantity of its energy consumption.

Since first five year plan, India is given much emphasis on generation of hydro-electric power from major hydro and mini hydel projects. These hydel projects also help in irrigation and fish culture. Hence they are called multipurpose projects. Some of the important power projects are given below.

6.7.9.1 The Major Hydro Electricity Projects in India

Sivsamundra project of the river the Can very in Karnataka was the first major hydro-electric project in Asia. It was constructed in 1902. Then many major hydropower projects came into being. During first five year plan, much emphasis was given on generation of hydroelectricity and construction of a number of major river valley projects. Some of the important major hydropower projects are discussed below.

1. **Bhakra Nangal project**— The Bhakra Nangal project, on the river the Sutlej, with its four power stations at Nan gal, Bhakra, Ganguwal and Kotla is an important hydro power project. It has an installed capacity of 1.2 million KW. It supplies electricity to Punjab, Haryana and Delhi.

2. **The Damodar valley project**— The Damodar valley project, with its three hydel power stations at Tilaiya, Matron and Panchet is built on the river the " Damodar. It has an installed capacity of 104 mw (megawaits) electricity. It supplies power to Bihar and West Bengal.

3. **The Hirakud dam project**—The major hydroelectricity power project in Orissa is the Hirakud Dam Project on the river the Mahanadi. Its capacity of generating power is 270.2 MW. The Rourkela Steel Plant mainly gets power supply from it.

4. **The Riband project**— It is essentially a hydroelectric project. It has an installed capacity of 300 MW. On the boarders of Uttar Pradesh and Madhya Pradesh water is stored in form of a large lake and power is generated.

5. **The Chambal valley project**—On the river the Chambal, two power houses are constructed, one at Gandhi Sagar Dam in Madhya Pradesh and the other one at Kota in Rajasthan. The total installed capacity from both the power houses is 180 MW.

6. **The Koyana hydro electric project**—It is one of the largest projects in Maharashtra. The water of the Koyana, a tributory of the Krishna is utilized for power generation. The total capacity installed is 540 MW. It supplies electricity mainly to Bombay-Poona industrial belt.

7. **The Tungabhadra project**—This is a joint collaboration of Andhra Pradesh and Karnataka. The power house is built on the river the Tungabhadra.These are few hydroelectric projects. Apart from these, there are other projects like the Gandak hydroelectric project on the river the Gandak, and Parambikulam Aliyar on the river the Periyar. Some hydroelectric projects are there that are either completed or are on the verge of completion.

   Dulhasti, Uri and Salal (stage-II) (all in Jammu and Kashmir) hydroelectric projects, Chamera Stage-I (Himachal Pradesh) and Tanakpur hydro-electric project (UP) are important among them.

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6.7.10 Geothermal energy

Geothermal energy is the heat energy stored beneath the surface in the form of hot spring! And geysers it is the exploitation of heat energy of earth within the upper 10 km of the earth crust. Heat from the molten core of the earth offers a huge and sustainable energy source.

Origin of geothermal energy

The limitless heat from the interior of earth is used to convert water into steam. In volcanic regions of the earth, the hot rock is relatively close to the surface. Also in such regions sometimes, the natural groundwater comes in contact with the hot rock and the heated water or steam may find its way to the surface through natural steam vents.
In such regions, holes can be drilled into the hot rock groundwater structure and make the rising steam to drive turbo generators to produce electric power.

We utilise this type of heat for power generation. For developing countries, the overall' projected potential was estimated at 400×1018 joule for geothermal energy with the projected capacity in 1990. Efforts are being made to use this energy for generating power and creating refrigeration. Geothermal energy can either be used to produce electricity in power station or can be used directly as primary heat.

Geothermal energy is a proven economical resource with energy technology. It has some environmental problems:

1. The steam brings hydrogen sulphide gas to the surface and pollutes the air unless controls are instituted.
2. Water contains many salts and minerals capable of causing water pollution.
3. The earth in a geothermal field may subside as the water is pumped out.

Geothermal energy is fast emerging as a significant source of electricity in several countries, mainly in the Indian oceans and the Pacific region. Indonesia is setting up two geothermal power plants, each of 55 MW capacities in Java.

6.7.11 Biomass energy

Biomass is organic material which has stored sunlight in the form of chemical energy. Biomass fuels include wood, wood waste, straw, manure, sugar cane, and many other byproducts from a variety of agricultural processes.

Biomass is a renewable energy source because the energy it contains comes from the sun. Through the process of photosynthesis, chlorophyll in plants captures the sun's energy by converting carbon dioxide from the air and water from the ground into carbohydrates, complex compounds composed of carbon, hydrogen, and oxygen. When these carbohydrates are burned, they turn back into carbon dioxide and water and release the sun's energy they contain. In this way, biomass functions as a sort of natural battery for storing solar energy. As long as biomass is produced sustainably—with only as much used as is grown—the battery will last indefinitely.

From the time of Prometheus to the present, the most common way to capture the energy from biomass was to burn it, to make heat, steam, and electricity. But advances in recent years have shown that there are more efficient and cleaner ways to use biomass. It can be converted into liquid fuels, for example, or cooked in a process called "gasification" to produce combustible gases. And certain crops such as switchgrass and willow trees are especially suited as "energy crops," plants grown specifically for energy generation.

6.7.12 Nuclear fuels

Nuclear energy is energy that is generated through the use of Uranium, a natural metal that is mined all over the world. Nuclear energy is created through complex processes in nuclear power stations, and the first nuclear power station was established in 1956 in Cumbria, England. Today, many military operations and vessels use nuclear power plants and nuclear energy for their energy source, and nuclear energy is used in many other capabilities such that it provides 16% of the Earth's energy requirements.

Nuclear energy is created through chemical reactions that involve the splitting or merging of the atoms of nuclei together. The process of splitting an atom's nucleus is termed fission, and the process of merging the nuclei if atoms is termed merging. Converting nuclear masses into energy forms is known through the popular chemical equation of $E = mc^2$, where E is known as the amount of energy released, m is known as the mass of the nuclei, and c is the value of the speed of light. The power from nuclear energy was first discovered in 1896 by Henri Becquerel, a French physicist who saw that some photographic plates that had been stored near uranium turned dark, or black, like X-Ray plates did. Thus, Uranium was seen as a resource for nuclear energy.

Nuclear energy is created in nuclear power stations, where uranium rods are the fuel used to create the energy or heat. The process through fission, where neutrons in the Uranium smash into the nucleus of atoms of Uranium. The Uranium nuclei will then split in half and release an energy that comes in a form of heat. At this point, carbon

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dioxide in gas form will be pumped into the reactors with the Uranium, removing the heat from the system. The gas turns very hot, and this heat is used to heat water into steam. The steam created from this process will drive the turbines which in turn drive the generators that produce the nuclear energy.

The nuclear power reactor that is creating all of these reactions is controlled through rods of boron, known as control rods. These Boron rods absorb the neutrons. The rods will be lowered into the reactor to absorb neutrons and slow down the process of fission. In order to generate more power, the rods are raised again so that even more neutrons can crash into the atoms of Uranium.

Creating nuclear energy is a complex chemical process that can be very dangerous. It does however have many advantages. Nuclear energy is more affordable to create than coal energy, and does not use as much fuel in the process. It also produces less waste, and does not produce carbon dioxide or smoke. These benefits mean that nuclear energy is more advantageous than coal energy, as the production of nuclear energy does not contribute to environmental hazards or the greenhouse effect.

6.8 Environmental pollution

Man is one of the species who inhabit the earth.he is the only one who has interfered with various natural processes for use of both biological & physical resources to meet his multiple demands,man has polluted all the three realms of the earth-lithosphere,hydrosphere & atmosphere.it is essential for us to know about environment & its pollution.

6.8.1 Air-pollution

Air pollution is the addition of gases, chemicals, and particle matter into the atmosphere. Air pollution primarily comes from burning fossil fuels such as natural gas, petroleum, and coal.

6.8.2 Types of air pollution

In general air can be polluted by two way.

1. **Primary pollutants:** primary pollutants are the one which consist of materials such as dust, gases, liquids and other solid material around that enter the atmosphere through natural and human made activities. The main pollutants are carbon monoxide, sulphur oxide, nitrogen oxides.

2. **Secondary pollutant:** secondary pollutants consist of primary pollutants which reacted with each other and makes our air polluted. In megacities, the emissions from road car and industries combine themselves and makes photochemical smoge with the help of light energy from the sun. Also the indoor pollutants have been identified some of the more common indoor air pollutants include smoke from cigarettes and cooking, asbestos etc. At high concentrations, these pollutants can cause dizziness. Headaches, coughing. Sneezing. Nausea, burning eyes, chronic fatigue like symptoms. Some indoor pollutants, like asbestos and smoke, can cause disease and premature death

6.9 Controlling air pollution

Different strategy and have been used to reduce atmospheric pollution by different countries. Following are some general recommendations for developing hail the atmosphere and it should be adopted by all the nations over the world.

1. Rather than controlling air pollution, we should prevent the pollution
2. We must use clean wheels in cars and other auto mobiles
3. We have to use non-pollutant energy like solar energy, wind power and hydro prior
4. We have to control the population growth of the world
5. Encourage mass transit and less polluting forms of transportation (e. g. switch from air travel to rail travel).

6.10 Biological productivity of the Earth

Biological productivity of the Earth is degrading day by day, though human's beings are making lots of effort to raise the production. Following points are worth to note as indicator given by world watch Institute

1. Cropland area in world has been increased to the early 1980's but little increase is likely from here on

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2. World grain land area has decreased since 1970.
3. The growth rate for forests is declining day byday.
4. Annual increases in world grain production have been falling over the last five decades, despite human people are using fertilizer at high rate.
5. The rate of increase in world irrigated land area is tapering.
6. The productivity of land did not rise much

6.10.1 Water pollution

Water pollution occurs when harmful substances are released into the water in large quantities which cause damage to people, wildlife, or habitat or indirectly into water bodies .Water pollution affects plants and organisms living in the bodies of water; and, in almost all cases the effect is damaging either to individual species and also to the biological communities.

6.10.1.1 Water pollution sources

Chemical & other contaminants are basic sources of water pollution.Contaminants may include organic and inorganic substances

6.10.1.2 Effect of water pollution

1. Water pollution is a major problem in the global context. It has been suggested that it is the leading worldwide cause of deaths and diseases, and that it accounts for the deaths of more than 14,000 people daily.
2. An estimated 700 million Indians have no access to a proper toilet, and 1,000 Indian children die of diarrhea sickness every day.
3. Some 90% of China's cities suffer from some degree of water pollution, and nearly 500 million people lack access to safe drinking water.
4. In addition to the acute problems of water pollution in developing countries, industrialized countries continue to struggle with pollution problems as well.

Interactions between groundwater and surface water are complex. Consequently, groundwater pollution is not as easily classified as surface water pollution.

Inorganic water pollutants include:

1. Acidity caused by industrial discharges (especially sulphur dioxide from power plants)
2. Ammonia from food processing waste
3. Chemical waste as industrial by-products
4. Fertilizers containing nutrients–nitrates and phosphates,which are found in storm water run off from agriculture, as well as commercial and residential use.
5. Heavy metals from motor vehicles (via urban storm water runoff) and acid mine drainage
6. Silt (sediment) in runoff from construction sites, logging, slash and burn practices or land clearing sites
7. Macroscopic pollutionlarge visible items polluting the watermay be termed "floatables" in an urban storm water context, or marine debris when found on the open seas, and can include such items as:
8. Trash: (e.g. paper, plastic, or food waste) discarded by people on the ground, and that are washed by rainfall into storm drains and eventually discharged into surface waters
9. Nurdles: small ubiquitous waterborne plastic pellets
10. Shipwrecks: large derelict ships.

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Others polutants

Pathogens are another type of pollution that prove very harmful. They can cause many illnesses that range from typhoid and dysentery to minor respiratory and skin diseases. Pathogens include such organisms as bacteria, viruses, and protozoan. These pollutants enter waterways through untreated sewage, storm drains, septic tanks, runoff from farms, and particularly boats that dump sewage.

Three last forms of water pollution exist in the forms of petroleum, radioactive substances, and heat. Petroleum often pollutes waterbodies in the form of oil, resulting from oil spills.

Thermal pollution Thermal pollution is the rise or fall in the temperature of a natural body of water caused by human influence. A common cause of thermal pollution is the use of water as a coolant by power plants and industrial manufacturers. Elevated water temperatures decreases oxygen levels (which can kill fish) and affects ecosystem composition. Thermal pollution can also be caused by the release of very cold water from the base of reservoirs into warmer rivers.

6.10.1.3 Purification of water

Purification of water involves physical, biological and chemical processes such as:

1. Filtration
2. Sedimentation
3. Chlorination
4. Slow sand filters
5. Activated Sludge
6. Flocculation

- **Filtration:**Filtration is a mechanical or physical operation which is used for the separation of solids from fluids (liquids or gases) by interposing a medium through which only the fluid can pass.
- **Sedimentation:** Sedimentation is the tendency for particles in suspension or molecules in solution to settle out of the fluid in which they are entrained, and come to rest against a wall.
- **Chlorination** Chlorination is the process of adding the element chlorine to water as a method of water purification to make it fit for human consumption as drinking water. Water which has been treated with chlorine is effective in preventing the spread of water born disease.
- **Slow sand filters** Slow sand filters are used in water purification for treating raw water to produce a potable product. They are typically 1 to 2 metres deep, can be rectangular or cylindrical in cross section and are used primarily to treat surface water.
- **Activated Sludge:** Activated sludge is a process dealing with the treatment of sewage and industrial wastewaters and developed around 1912-1914.Atmospheric air or pure oxygen is introduced to a mixture of primary treated or screened sewage (or industrial wastewater) combined with organisms to develop a biological floc which reduces the organic content of the sewage
- **Flocculation:** Flocculation is, in the field of chemistry, a process where colloids come out of suspension in the form of floc or flakes. The action differs from precipitation in that, prior to flocculation, colloids are merely suspended in a liquid and not actually dissolved in a solution.

Water pollution solution

1. Industrial effort : Industry is responsible for a large amount of pollutants including ones that pollute water.
2. Legislation has been passed forcing industry to make efforts to clean up their waste. Through reducing the waste that they produce, it has been possible to reduce the amount of pollutants that enter the water cycle .
3. Municipal treatment plants are designed to control conventional pollutants: BOD and suspended solids

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Well-designed and operated systems (i.e., secondary treatment or better) can remove 90 percent or more of these pollutants. Some plants have additional sub-systems to treat nutrients and pathogens. Most municipal plants are not designed to treat toxic pollutants found in industrial wastewater

4. Farming solution : Choosing organic options can help to reduce the amount of water pollution. These items are grown without the use of chemicals. Those chemicals, when used, enter the water cycle. Organic products don't introduce those chemicals to the water cycle.

Water pollution may be analyzed through several broad categories of methods: physical, chemical and biological. Most involve collection of samples, followed by specialized analytical tests. Some methods may be conducted without sampling, such as temperature

6.10.2 Soil pollution

The introduction of substances, biological organisms, or energy into the soil, resulting in a change of the soil quality, which is likely to affect the normal use of the soil or endangering public health and the living environment.

Soil contaminants are spilled onto the surface through many different activities. Most of these are the result of accidents involving the vehicles that are transporting waste material from site of origin to a disposal site.

Others involve accidents involving vehicles (automobiles, trucks and airplanes) not transporting wastes, but carrying materials, including fuel, that when spilled contaminate the soil.

6.10.3 Marine pollution

Marine pollution occurs when harmful, or potentially harmful, effects result from the entry into the ocean of chemicals, particles, industrial, agricultural and residential waste, noise, or the spread of invasive organisms. Most sources of marine pollution are land based. The pollution often comes from nonpoint sources such as agricultural runoff, wind-blown debris and dust. Nutrient pollution, a form of water pollution, refers to contamination by excessive inputs of nutrients. It is a primary cause of eutrophication of surface waters, in which excess nutrients, usually nitrogen or phosphorus, stimulate algae growth.

There are five main kinds of marine pollution, namely:

1. Pollution from land-based sources, such as rivers, estuaries, pipelines and outfall structures;
2. Pollution from exploitation of the mineral resources of the sea-bed;
3. Pollution from ships, i.e. the disposal of wastes or other matter incidental to or derived from the normal operations of ships;
4. Pollution by dumping, i.e. the deliberate disposal of wastes or other matter from ships, aircraft, platforms or other man-made structures at sea;
5. Pollution through the atmosphere.

6.10.4 Noise pollution

By definition, noise is "sound without value" or "any noise that is undesired by the recipient". Thus, the kind of environmental impact of noise pollution is slightly different from other kinds of pollution.

Generally, there is much more noise in the urban areas because of larger concentration of population as well as industrial and other activities like transportation vehicular movements, etc. Non-industrial sources of noise can come from public address systems for religious or political propaganda, recreation, hawkers or other street noise. Noise can also arise from the natural sources like thunder.

Noise as a potent menace can be evaluated in terms of a 'noise level' scale, or in decibels (dB). However, the health hazard is a matter of perceived noise level decibels (pNdB), which according to the W.H.O.'s prescribed optimum noise level as 45 dB by day and 35 by night; and anything above 80 dB is hazardous.

The hazards of noise pollution are many and varied. For example, people exposed to noise levels reaching 110 db may reveal mental trauma, deafness, physical fatigue and hypertension, cardiovascular disease, insomnia, peptic ulcer, eczema and asthma. Psychologists are of the opinion that prolonged exposure to noise for a day alone, may lead to severe mental disorientation, and in a few cases, result in a violent behavior.

The noise properties and their reasonable level, in general, can be controlled only through enlightened and co-operative authorities. However, in a few cases, noise pollution can be minimized only through rigorous law and conscious efforts of the law enforcement department.

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- **Sources of Noise Pollution**— The indoor sources of Noise Pollution are loudly played music stereos, radio, televisions, grinding machines, etc. The outdoor sources of Noise Pollution commonly referred to as environmental noise comes from airplane, machines, trains, vehicles, industries, etc.

- **Effect on Human Health**— It may affect the mind, health and behaviour. It may cause physically discomfort and temporary or permanent damage to hearing. It causes headache and irritability. Loud speakers not only disturb the student in their studies but also the peace of locality. It may cause deafness, stress and high-blood pressure.

- **Effect on Animal Health**— Animals suffer badly due to noise pollution. At times, it can also lead to death. Noise has impact on the living pattern of the animals and it may push the rare species to extinction. Like humans, they also suffer from temporary or permanent disability of hearing.

Legislation and public co-operation are essential to check noise pollution. Nobody should be permitted to create noise in silent zones. Noise-producing traffic vehicles should be prevented from plying on the roads. Crackers that create extremely disturbing sound should be discouraged. Standards for noise control measures should be set up for industry and community. The existing ordinances and acts against dangerous form of environmental pollution should be revised from time to time depending upon the changing nature of the sources.

6.10.5 Thermal pollution

An increase in the optimum water temperature by industrial process (steel factories, electric power houses and atomic power plants) may be called as "Thermal Pollution." Many industries generate their own power and use water to cool their generator.

This hot water is released into the system from where it was drawn, causing a warming trend of surface water. If the system is poorly flushed, a permanent increase in the temperature may result. However, if the water is released into the well flushed system, permanent increase in temperature does not occur.

Many organisms are killed instantly by the hot water resulting into a high mortality. It may bring other disturbance in the ecosystem. The egg of fish may hatch early or fail to hatch at all. It may change the diurnal and seasonal behaviour and metabolic responses of organisms. It may lead to unplanned migration of aquatic animals. Macrophytic population may also be changed. As temperature is an important limiting factor, serious changes may be brought about even by a slight increase in temperature in a population. For minimising thermal pollution, hot water should be cooled before release from factories and removal of forest canopies and irrigation return flows should be prohibited.

The various causes of thermal pollution are as follows

1. **Coal-fired Power Plants**—Some thermal power plants use coal as fuel. Coal-fired power plants constitute the major source of the thermal pollution.

2. **Industrial Effluents**—Industries generating electricity require large amount of Cooling water for heat removal. Other industries like textile, paper, and pulp and sugar industry also release heat in water, but to a lesser extent.

3. **Nuclear Power Plants**—Nuclear power plants emit a large amount of unutilized heat and traces of toxic radio nuclear into nearby water streams. Emissions from nuclear reactors and processing installations are also responsible for increasing the temperature of water bodies.

4. **Hydro Electric Power**—Generation of hydro-electric power also results in negative thermal loading of water bodies.

5. **Domestic Sewage**— Domestic sewage is often discharged into rivers, lakes, canals or streams without waste treatment. The municipal water sewage normally has a higher temperature than receiving water. With the increase in temperature of the receiving water the dissolved oxygen content (DO) decreases and the demand of oxygen increases and anaerobic conditions occur.

Control of thermal pollution is necessary as its detrimental effects on aquatic ecosystem may be detrimental in the future. Viable solutions to chronic thermal discharge into water bodies are as follows:

1. **Cooling Ponds**—Cooling ponds or reservoirs constitute the simplest method of controlling thermal discharges. Heated effluents on the surface of water in cooling ponds maximize dissipation of heat to the atmosphere and minimize the water area and volume. This is the simplest and cheapest method which cools the water to a considerable low temperature. However, the technique alone is less desirable and inefficient in terms of air-water contact.

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2. **Cooling Towers**—Using water from water sources for cooling purposes, with subsequent return to the water body after passing through the condenser is termed as cooling process. In order to make the cooling process more effective, cooling towers are designed to control the temperature of water. In-fact, cooling towers are used to dissipate the recovered waste heat so as to eliminate the problems of thermal pollution.

3. **Artificial Lake**—Artificial lakes are man-made bodies of water which offer possible alternative to once through cooling. The heated effluents may be discharged into the lake at one end and the water for cooling purposes may be withdrawn from the other end. The heat is eventually dissipated through evaporation.

   These lakes have to be rejuvenated continuously. A number of methods have been suggested and developed for converting the thermal effluents from power plants into useful heat resources for maximing the benefits.

6.10.6 Nuclear hazards

The principal sources that are of environmental concern are the nuclear weapons and nuclear power reactors in the event of mishaps. Before we consider these hazards in detail we with examine the effects of the nuclear radiations on the life system.A number of nuclear explosions have already been made during recent past in different part of world. Irrespective of judgments about the ethics of this practice, these tests occurred, injecting substantial amounts of radioactivity into the environment. Nuclear explosions are very rapid and based on a rough estimate, in an explosion about 50 per cent of the energy goes to the blast, 33 per cent as heat and the rest 17 per cent or so to radioactivity.

The radioactive dust that falls to the earth after atomic explosion is called radioactive fallout. The estimated percept dose to world population from fallout of past nuclear explosions is 10 microsievert per year.

Radioactive substances are among the most toxic substances known. Radium is 25,000 times more lethal than arsenic. The cell, which is the fundamental unit of life, is the primary site of radiation damage. If too many cells are damaged, the symptoms show up in the growing tissues as in the case of loss of hair, ulceration of the mouth, the reddening and hemorrhaging of the skin and lowering of the blood count. If these symptoms grow more severe, death will result.

1. **Somatic effects**—These are the direct results of action of radiation on the body cell and tissues. Uranium mineworkers, painters of radium dials and Radiologists suffer most. These effects may be' immediate or delayed. More evidence of degree and kind of damage from radiation came from studies of the Nagasaki and Hiroshima survivors. If one survives the phase of radiation illness in the 50 to 500 rad. range, the other illness one is likely to become a victim are-cardiovascular disorder, cataract, leukemia, sterility, premature ageing and shortenings of life span. All these are somatic effects.

2. **Genetic effects**—There is another more serious type of effect of ionizing radiations, known as genetic effect. This arises from the damage to the sex cells. If a sex cell is damaged and if that sex cell is one of the pair that goes into the production of a fertilized ovum, it will give rise to an offspring with various kinds of major or minor physical defects.

6.10.7 Solid waste management

Wastes are chemical by-products of an industry, a factory or a chemical plant. They may result from household activity/a hospital or a research laboratory. Solid waste is the solid chemical produced by any of these sources, which may be dangerous to human health and pollute the environment. Waste may be classified into two categories:

1. **Toxic waste (intrinsic characteristic)**— Toxicity is the capacity of a substance to produce injury after entering the metabolic processes of the consumers (an animal, a plant or a human being). The changes may be pathogenic/mutagenic/tetragonic or carcinogenic.

2. **Hazardous waste (extrinsic characteristic)**—Hazardous means the potential of a substance to pose threat to life. Hazardous wastes have the properties like toxicity, ignitibility, corrosiveness, reactivity, radioactivity or explosiveness. Hence, the term hazardous is brooder that includes "toxic" word in its spectrum.

Waste management has become an important environmental and public health issue, which concerns many countries in the world; waste management can be done by the following four methods:

1. **Waste minimization (by minimization the quantity of waste)**— Three major waste minimization techniques are:

   (a) **Process modification**— Industrial processes can be altered in such a way that the use of raw materials is optimized and the amount of waste is reduced.

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(b) **Waste concentration**—The large amount of waste can be minimized by concentration processes like evaporation, precipitation or decantation technique. Volume of waste can be minimized by this technique.

(c) **Waste segregation**—Segregating the waste streams from non-hazardous streams can minimize the volume of waste.

2. **Treatment of waste**— The aim of treatment of waste is to modify the physical and /or chemical properties of the wastes so that they are rendered harmless. Selection of treatment process depends upon nature of waste, economic and energy consideration,

   a) **Biological treatment**— Solid waste minimization is done by biological treatment of the waste before disposal. This treatment include three processes

   - **Conditioning**— In this process, the solid is exposed to atmosphere for a stipulated period until the desired constancy is reached.
   - **Digestion**—Waste is treated with bacteria in this process. The bacteria break down the long chain compounds into simpler ones.
   - **Composting**—In this process the waste is converted into the usable stable material.

3. **Recycling of wastes**—Many substances in the solid wastes (glass, wood fibre from the paper products and metals) are variable and can be utilized after recycling the waste. The two processes are often used to recycle the waste.

   (a) Reuse of the waste

   (b) Recycling of the waste

4. **Disposal of waste material**— There are four different ways of disposal of solid waste material:

   (a) Landfill disposal

   (b) Incineration (burning of waste products)

   (c) dumping at sea (for prevention of ground water pollution, disposal of waste is controlled by international legislation and by national legislation).

   (d) Underground disposal (underground disposal may provide an environmentally and economically viable option for radioactive wastes).

6.10.8 Municipal sewage

Municipal solid waste consists of household waste, construction and demolition debris, sanitation residue, and waste from streets. This garbage is generated mainly from residential and commercial complexes. With rising urbanization and change in lifestyle and food habits, the amount of municipal solid waste has been increasing rapidly and its composition changing. In 1947 cities and towns in India generated an estimated 6 million tonnes of solid waste, in 1997 it was about 48 million tonnes. More than 25% of the municipal solid waste is not collected at all; 70% of the Indian cities lack adequate capacity to transport it and there are no sanitary landfills to dispose of the waste. The existing landfills are neither well equipped or well managed and are not lined properly to protect against contamination of soil and groundwater.

The type of litter we generate and the approximate time it takes to degenerate

Type of litter	Approximate time it takes to degenerate the litter
Organic waste such as vegetable and fruit peels, leftover foodstuff, etc.	a week or two.
Paper	10-30 days
Cotton cloth	2-5 months
Wood	10-15 years
Woolen items	1 year
Tin, aluminium, and other metal items such as cans	100-500 years
Plastic bags	one million years?
Glass bottles	undetermined

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6.11 Acid rain

in the heavily industrialized area, due to the excessive amount of nitrogen and sulphur emanating from the industry, rainfall became acidic. Whenever the rainfall contains too much acidic element, it is called acid rain.

6.11.1 Causes and implications of acid rain

the most prominent ingredient of acid rain is nitrogen and sulphur. This nitrogen and sulphur came from either industry or car. As a result of acid rain, forests and lakes are dying day by day and also productivity of agriculture are degraded in current decade. The whole world are concerned about acid rain. To mitigate the problem of acid rain ,we have to depend on small farm and gardens, no artificial fertilisers or pesticides and many more.

6.12 Pollution of air

Air pollution refers to the degradation of quality of the air as measured by biological, chemical, or physical criteria. Air pollution happens when some substance of a became high and up to make air highly toxic. Air can be polluted by means of gases, liquid or solid and also it can come from natural sources or it can be human made. Example of natural sources for air pollution are volcanic emissions, dust, forest fire etc. Human made air pollution includes emissions from industry, agriculture, transportation et cetera

6.13 Volcano

A volcano is a vent or chimney which transfers molten rock known as magma from depth to the Earth's surface. Magma erupting from a volcano is called lava and is the material which builds up the cone surrounding the vent.

A volcano is active if it is erupting lava, releasing gas or generates seismic activity. A volcano is dormant if it has not erupted for a long time but could erupt again in the future. Once a volcano has been dormant for more than 10 000 years, it is termed extinct.

The explosiveness of a volcanic eruption depends on how easily magma can flow and the amount of gas trapped within the magma. Large amounts of water and carbon dioxide are dissolved in magma causing it to behave in a similar way to gas expanding in fizzy drinks, which forms bubbles and escapes after opening. As magma rises quickly through the Earth's crust, gas bubbles form and expand up to 1000 times their original size.

Volcanoes can be different in appearance with some featuring perfect cone shapes while others are deep depressions filled with water. The form of a volcano provides a clue to the type and size of its eruption which is controlled by the characteristics and composition of magma. The size, style and frequency of eruptions can differ greatly but all these elements correlated to the shape of a volcano

6.13.1 What effects do volcanoes have?

Volcanic ash is very good for soil, so plants grow quickly and strong after a volcano. Following are the effects of volcano

1. Volcanoes can change the weather. They can cause rain, thunder and lightning. Volcanoes can also have long-term effects on the climate, making the world cooler.
2. Fast-moving lava can kill people and falling ash can make it hard for them to breathe. They can also die from famine, fires and earthquakes which can be related to volcanoes. People can lose their possessions as volcanoes can destroy houses, roads and fields.
3. Lava can kill plants and animals too. The Mount St Helens volcano in 1980 killed an estimated 24,000 animals including 11,000 hares, 6,000 deer, 300 bobcats, 200 black bears and 15 mountain lions.

6.13.2 Secondary And Tertiary Effects Of Volcanism

Besides the primary effects of volcano in our world, it can have secondary and tertiary effects. Following are the few indirect effect of volcano.

1. Mudflows (Lahars)
2. Debris Avalanches and Debris Flows.
3. Flooding.
4. Tsunamis.
5. Volcanic Earthquakes
6. Volcanic Tremors

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7. Atmospheric Effects.
8. Famine and Disease

6.13.3 Benefit of volcanism

Volcanism on the earth is responsible for changing the atmosphere and hydrosphere by emanating different gases. It has been observed that in the volcanism area soils becomes active and fertilized. The machine heat produced by volcanism can be used to produce geothermal energy. An active volcano is one which eruptive activity within pre-recorded history. An active volcano does not mean that it is erupting continuously.

1. at present there are about 600 volcanos is active on earth surface.
2. Yellowstone Caldera is about 600, 000 years old and is deeply eroded. It is also considered as a dormant volcano.
3. the lifetime of a volcano may be in the order of million years, dormant volcanoes can become active at any time. Dormant volcano is most dangerous because people living at the vicinity of this volcano cannot predict when the eruption will happen.

6.14 Land pollution

Pollution is the introduction of harmful materials into the environment. Sometimes naturally occurring substances can be unsafe if their presence causes damage or disrupts natural cycles in the ecosystem. For example, fertilizers can benefit plants by supplying necessary nutrients, but overapplication can kill plants with the potential that drift or runoff will affect other nontargeted areas. The once-useful fertilizer now becomes a pollutant. Land pollution means degradation or destruction of earth's surface and soil, directly or indirectly as a result of human activities.

6.14.1 Causes of Land Pollution

Below are the sources of land pollution

1. Deforestation and soil erosion
2. Agricultural activities
3. mining activities
4. overcrowded landfills
5. industrialisation
6. construction activities
7. nuclear waste
8. sewage treatment

6.14.2 Effects of Land Pollution

following are the main effects of land pollution is in our environment.

1. soil pollution
2. changing climate patterns
3. impact on environment
4. effect on human health
5. pollution in the year
6. effect on wildlife
7. destruction of tourist
8. Impact on our future generation.

6.14.3 Solutions for Land Pollution

1. Make people aware about the concept of Reduce, Recycle and Reuse.
2. Reduce the use of pesticides and fertilizers in agricultural activities.
3. Avoid buying packages items as they will lead to garbage and end up in landfill site.
4. Ensure that you do not litter on the ground and do proper disposal of garbage.
5. Buy biodegradable products.
6. Do Organic gardening and eat organic food that will be grown without the use of pesticides.
7. Create dumping ground away from residential areas.

Several creatures survive under the land too. Disrupting the harmony of the land, is disrupting their habitat. This has led to several creatures reaching the endangered status like the Gilberts Potoroo in Australia. We walk and survive on land. It is literally the base of our ecosystem. It is in our good interest to take care of it and nurture it.

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6.15 Tsunami

A tsunami (pronounced tsoo-NAH-mee) is a series of waves, made in an ocean or other body of water by an earthquake, landslide, volcanic eruption, or meteorite impact. Tsunamis can cause huge destruction when they hit coastlines.

A few minutes before a tsunami wave hits, the water near shore may move away, exposing the ocean floor. Often the first wave may not be the largest, and additional waves may arrive at the coast every 10 to 60 minutes. They move much faster than a person can run. The danger from a tsunami can last for several hours after the arrival of the first wave. Unlike other waves, tsunami waves typically do not curl and break.

6.16 Solved excercises

1. Consider the following about the Himalayan orogeny

   (A) The orogeny resulted from the southward movement

   (B) The orogeny began about 25 million years ago

   (C) The orogeny closed about 1 million years ago

   (D) The Himalayas have a root of relatively light crustal rocks projecting into the denser mantle.

2. Which of the following combinations is correct?

   (A) A and B

   (B) C and D

   (C) A and C

   (D) B and D

3. A seismogram records the following types of earthquake waves.

   I L - waves

   II P - waves

   III S - waves

   The correct chronological sequence of the arrival of these waves is

   (A) B,C and D

   (B) B, A and C

   (C) C,A and B

   (D) A,B and C arrive at the same time

4. Which one of the following statement is true of braided streams?

   (A) Width and depth of the channel are equal

   (B) Width of the channel is greater than its depth

   (C) Width of the channel is unrelated to its depth

   (D) Width of the channel is less than its depth

5. In which of the following frequency ranges the human ear is most sensitive to noise:

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(A) 1 - 2 KHz

(B) 100 - 500 Hz

(C) 10 - 12 KHz

(D) 13 - 16 KHz

6. Assertion (A) : Aerosols have potential for modifying the climate. Reason (R): Aerosols interact with both short wave and infra - red radiations.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A) .

(B) Both (A) and (R) are true but (R) is not the correct explanation of (A) .

(C) (A) is true and (R) is false

(D) (A) is false but (R) is true

7. Which of the following grows rapidly resulting in the shrinkage of water bodies?

(A) Phytoplankton

(B) Zooplankton

(C) Algae

(D) Macrophytes

8. Which species of chromium is toxic in water?

(A) Cr^{+2}

(B) Cr^{+3}

(C) Cr^{+6}

(D) Cr^{0}

9. Chemical compounds having same crystal structure are called

(A) Polymorphic

(B) Pseudomorphic

(C) Isomorphic

(D) None of the above

10. Micas having an atomic structure defined as continuous sheets of tetrahedrons, sharing 3-oxygen atoms, are called:

(A) Inosilicate

(B) Phyllosilicate

(C) Tectosilicate

(D) Sorosilicate

11. If the population growth follows a logistic curve, the maximum sustainable yield:

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(A) is equal to half the carrying capacity

(B) is equal to the carrying capacity

(C) depends on growth rate

(D) depends on the initial population

12. Fluidized - bed combustion of coal is an efficient method of controlling which of the following air pollutants:

(A) CO

(B) SPM and NOx

(C) NOx and SOx

(D) CO, SPM and SOx

13. An increase of 10 ppm in the concentration of CO, in atmosphere represents approximately an addition of carbon of amount:

(A) 1.2 Kilotons

(B) 2.12 Megatons

(C) 21.2 Geiga tons

(D) 2120 tons

14. Winds blowing down an incline often due to cold air drainage are called:

(A) Anabatic winds

(B) Mountain winds

(C) Cyclonic winds

(D) Katabatic winds

15. Mixing height is:

(A) the height of ground based inversion

(B) the height at which geostrophic balance occurs

(C) the height of constant solar flux layer

(D) the height upto which atmosphere is churned by convection

16. For a comprehensive EIA study, it is to be conducted for:

(A) The whole year

(B) Any three seasons including monsoon

(C) Three seasons excluding monsoon

(D) The worst season

17. In initial environmental examination, the following are considered:

(A) No quantitative data

(B) Primary data

(C) Secondary data

(D) On site data for at least a season

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18. Which of the following forest types is most widespread in India?
    (A) Tropical evergreen forest
    (B) Tropical deciduous forest
    (C) Temperate forest
    (D) Scrub forest

19. The presence of pneumatophores is seen in:
    (A) Desert plants
    (B) Climbers and lianas
    (C) Trees of tropical moist forests
    (D) Mangroves

20. Ramsar convention is related to conservation of:
    (A) Tiger
    (B) Elephants
    (C) Crop genetic diversity
    (D) Wetlands

21. A significant effect of climate change on account of global warming on terrestrial plants will be on:
    (A) Stomatal mechanism
    (B) Amino acid composition of cereal grains
    (C) Phenology
    (D) Bark formation in trees

22. A tree, which is popular in social forestry programme in India, is:
    (A) Shorea robusta
    (B) Ailanthus excelsa
    (C) Cedrus deodara
    (D) Callistemon lanceolatus

23. The great Indian Rhino has its natural home in:
    (A) Kaziranga National Park
    (B) Corbett National Park
    (C) Sunderbans
    (D) Kanha National Park

24. According to the Botanical Survey of India, the total number of plant species in India is about:
    (A) 45,000
    (B) 75,000
    (C) 17,000

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(D) 30,000

25. Assertion (A) : Bt cotton is a transgenic crop which has been introduced iri India, but is being opposed on environmental grounds. Reason (R): CrylAc protein in Bt cotton has been found to be toxic and allergenic to human beings.
    (A) Both (
    (B) and (R) are true and (R) is the correct explanation of (A) .
    (C) Both (A) and (R) are true but (R) is not correct explanation of (A).
    (D) (A) is true but (R) is false
    (E) (A) is false but (R) is true

26. Oxygen toxicity (in humans) is caused by:
    (A) Inhalation of molecular oxygen
    (B) Generation of free radicals
    (C) Interactions of singlet oxygen with membrane
    (D) None of the above

27. $C_2F_3C_{13}$ gas:
    (A) absorbs ultraviolet radiations
    (B) affects troposphere ozone
    (C) forms aerosols in stratosphere
    (D) absorbs infrared radiations

28. Which of the following shows bioaccumulation and contaminate food chains?
    (A) Pesticides
    (B) Polychlorinated biphenyls
    (C) PAN
    (D) All of the above

29. Removal of which of the following impurities from contaminated water requires the of coagulants:
    (A) Colloidal impurities
    (B) dissolved solids
    (C) micro organisms
    (D) all of the above

30. The most efficient method of biodegradable urban solid waste management is:
    (A) Landfills
    (B) Pelletisation
    (C) Gasification
    (D) Composting

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31. Pollutants in soil can be broken down by micro organisms. The process is called:

    (A) Probiotics

    (B) Bioremediation

    (C) Bioaugmentation

    (D) None of the above

32. A thermodynamic function of state which is constant during a reversible isobaric isothermal process is:

    (A) Geothermal potential

    (B) Thermodynamic efficiency

    (C) Enthalpy

    (D) Gibb's free energy

33. t - statistic is useful for testing:

    (A) Variances

    (B) Overall goodness of fit of a regression model

    (C) null hypothesis for a regression coefficient

    (D) constancy of the mean

34. 1 metric ton of average coal in energy terms is equivalent to:

    (A) 2000 cubic feet of natural gas

    (B) 24000 cubic feet of natural gas

    (C) 1.5 barrels of oil

    (D) 2.0 barrels of oil

35. In marine environment Carbonate Compensation Depth (CCD) is defined as depth at which:

    (A) Carbonate begins to dissolve

    (B) Carbonate begins to precipitate

    (C) Carbonate begins to precipitate

    (D) Bicarbonate begins to dissolve

36. In an idealised Magneto hydrodynamic power plant, the maximum power output varies with fuel velocity (u) as:

    (A) U

    (B) U2

    (C) U3

    (D) U1/2

37. In humid climate, weathering of various types "of rocks occurs. Identify the correct sequence in order of decreasing weathering:

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(A) Basalt ¿ Dunite ¿ Granite

(B) Basalt ¿ Granite ¿ Dunite

(C) Dunite ¿ Granite ¿ Basalt

(D) Dunite ¿ Basalt ¿ Granite

38. The lion - tailed macaque is endemic to:

(A) Andaman and Nicobar islands

(B) Lakshadweep

(C) Nilgiri

(D) Arunachal Pradesh

39. Which of the following concepts can be used to study the rate of acceleration of the Universe?

I) Supernovae Explosions.
II) Dark Matter.
III) Dark Energy.
IV) Black Holes.

(A) I & III only.

(B) I & II only.

(C) II, III & IV only.

(D) I, III & IV only.

40. Which of the following can be a trigger for Coral Bleaching?

I) Increase in ocean temperature.
II) Decrease in ocean temperature.
III) Decline in Zooplankton levels.
IV) Changes in salinity.
V) Elevated sea levels due to global warming.

(A) All except II

(B) All except II & IV

(C) All except V

(D) None of the above.

41. Ganga Action plan was launched in.

(A) 1985

(B) 1986

(C) 1987

(D) 1988

42. NRCP was launched in...

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(A) 1994
(B) 1995
(C) 1996
(D) 1997

43. It represent the permanent loss of hearing and no recovery?
(A) NISTS
(B) NIPTS
(C) NICCS
(D) NIDTS

44. Nagli is a
(A) Animal
(B) Cotton
(C) Crop
(D) None of these

45. Solar, Wind are the examples of
(A) Renewable
(B) Non- renewable
(C) Both
(D) None of these

46. Jog waterfall, the highest waterfall in India, is located in
(A) Kerala
(B) Karnataka
(C) Maharashtra
(D) Madhya Pradesh

47. The first man to reach the South Pole on I December 14, 1911 was
(A) Commander Robert, E. Peary of U.S.
(B) Racald Amundsen from Norway
(C) The Navigator Ferdinand Magellan
(D) Sir Francis Drake of England

48. Freely suspended magnetic needle stands in which direction?
(A) North-West direction
(B) North-South direction
(C) North-East direction
(D) South-West direction

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49. In what regions can the sun be seen at midnight?

(A) The tropical zone

(B) Warm temperate regions

(C) The Arctic and Antarctic regions

(D) Anywhere at the time of lunar eclipse

50. The Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal, usually known as the Basel Convention:

I) It is an international treaty that was designed to reduce the movements of hazardous wastes from developed to less developed countries.

II) It does not address the movement of radioactive waste.

(A) I only.

(B) II only.

(C) Both I and II

(D) None of these

51. Which among the following planets intersects the orbit of Neptune?

(A) Mercury

(B) Pluto

(C) Earth

(D) Uranus

52. Which of the following countries is called the "Country of white elephants"?

(A) Kuwait

(B) Thailand

(C) South Africa

(D) India

53. Where is the famous shore temple located?

(A) Puri

(B) Visakhapatnam

(C) Mamallapuram

(D) Chennai

54. The largest continent in the world is:

(A) North America

(B) Africa

(C) Asia

(D) Europe

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55. 'Radcliff Line' is a boundary line between

(A) India and Bangladesh

(B) India and Bhutan

(C) India and China

(D) India and Pakistan

56. Which of the following statements are correct with regard to Red tide a term used to describe Harmful Algal Blooms (HABs) in marine coastal areas.

I) These blooms are not associated with tides.

II) HABs tint the seawater to a reddish color.

III) Not all algal blooms are harmful, even those involving red discoloration.

(A) I & III only.

(B) I & II only.

(C) II & III only.

(D) I, II & III

57. Which of the following statements is/are correct:

I) Ozone Depletion causes reduction in stratospheric and upper tropospheric temperatures.

II) Increase in Green House Gases causes reduction in stratospheric and upper tropospheric temperatures.

(A) I only.

(B) II only.

(C) Both I and II

(D) None on these

58. Which of the following statements is/are correct with regard to Ozone Depletion:

I) Ozone hole is measured in terms of ozone concentrations, which is expressed in Dobson units.

II) The major cause for Ozone Depletion is the presence of CFCs in stratosphere CFCs are entirely man made and not found naturally.

(A) I only.

(B) II only.

(C) Both I and II

(D) None of these

59. Which of the following pairs is not correctly matched?

(A) Panna : Diamond

(B) Neyveli : Lignite

(C) Mysore : Marble

(D) Sambhar : Salt

60. Where does the primitive community. of Bushman live?

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(A) Sahara desert
(B) Thar desert
(C) Kalahari desert
(D) Attacama desert

61. Difference of longitudinal of two places on the earth is 15. What will be the difference in its local time?
(A) No difference
(B) 1 hour
(C) 2 hours
(D) 15 hours

62. Among the following cities, which one is nearest to the Tropic of Cancer?
(A) Delhi
(B) Kolkatta
(C) Jodhpur
(D) Nagpur

63. Which one among the following languages has largest number of speakers in the world?
(A) Bengali
(B) French
(C) Japanese
(D) Portuguese

64. Where was electricity introduced in India?
(A) Kolkata
(B) Darjeeling
(C) Mumbai
(D) Chennai

65. Which of the following statements is/are correct with regard to Vitamin D:
I) Vitamin D is produced in the skin by ultraviolet light.
II) Higher levels of Vitamin D are associated with higher morbidity.
III) Body has no mechanism to prevent sunlight from producing too much Vitamin D

(A) I & III only.
(B) I & II only.
(C) II & III only.
(D) I, II & III

66. If the Arctic Ice was somehow replaced with dense forest, which of the following situation may arise:

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(A) It will accelerate Global Warming.
(B) It will decelerate Global Warming.
(C) It may or may not affect Global warming.
(D) It will have no affect on Global Warming.

67. The capital of Laos is
(A) Vientiane
(B) Ankara
(C) Abu Dhabi
(D) Hanoi

68. Which strait separates India from Sri Lanka?
(A) Mandeb
(B) Magellan
(C) Malacca
(D) Palk

69. Which of the following is the largest island?
(A) Sumatra
(B) Madagascar
(C) Honshu
(D) Cuba

70. Which of the following district is on the international border of India
(A) Gorakhpur
(B) West Khasi Hills
(C) Kinnaur
(D) Kullu

71. Which one of the following is not the vegetation in Selva forests?
(A) Epiphytes
(B) Xerophytes
(C) Liana
(D) Hydrophytes

72. How far the axis of earth is inclined of its orbital surface?
(A) 23
(B) 66
(C) 180
(D) It is not inclined

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73. Recently Chinese scientists have developed Carbon Aerogel. Which of the following is/are correct about it:

I) It is the second lightest material after Graphite aerogel.
II) It has excellent elasticity.
III) It is expected to play an important role in pollution control.
IV) It is expected to become ideal material for sound absorption.

(A) II, III & IV only.
(B) II & IV only.
(C) I & III only.
(D) I, II, III &

74.

75. Lantana know as Phool Lakhri in local parlance is a shrub found in abundance in Himachal Pradesh. Which of the following statements are correct about it?

I) It is a toxic weed and has affected the mountain diversity of the state.
II) Lantana species are widely cultivated for their flowers.
III) It is endemic to India.
IV) It is considered as potential fire hazard and it is combustible even when green.

(A) I, II & IV only.
(B) II & IV only.
(C) I & III only.
(D) I, II, III &

76.

77. Which of the following is only star?

(A) Moon
(B) Venus
(C) Earth
(D) Sun

78. Israel has common borders with

(A) Lebanon, Syria, Jordan and Egypt
(B) Lebanon, Syria, Tutkey and Jordan
(C) Cyprus, Turkey, Jordan and Egypt
(D) Turkey, ,Syria, Iraq and Yemen

79. Which one of the following is the longest glacier of India?

(A) Pindari
(B) Gangotri
(C) Siachen
(D) Zemu

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80. Nubian desert is in

(A) Ethopia

(B) Egypt

(C) Sudan

(D) Somalia

81. The longest highway in India runs from

(A) Kolkata to Jammu

(B) Jammu to Kanya Kumari

(C) Ambala to Nagercoil

(D) Varanasi to Kanya Kumari

82. Which of the following statements are correct about C & Ku Band that are used for satellite communications transmissions:

I) The frequency of Ku Band is greater than C band.

II) C band performs better under adverse weather conditions in comparison to Ku band.

III) C band has a higher likelihood of terrestrial interference in comparison to Ku Band.

(A) I, II & III

(B) I & II only.

(C) I & III only.

(D) II & III only.

83. Which of the following statements are true regarding Soda Lake:

I) Soda lakes are highly acidic lakes.

II) Soda lakes are highly productive ecosystems.

III) A critical geological condition for the formation of Soda Lake is the absence of soluble calcium or magnesium.

IV) Lonar and Sambhar lakes are examples of Soda lakes in India.

(A) I, II & III only.

(B) I & IV only.

(C) II, III & IV only.

(D) III & IV only.

84. Which of the following is/are the Industrial uses of Hydraulic Fracturing:

I) Arousing production from oil and gas wells.

II) To dispose of waste by injection into deep rock formations.

III) As a method to measure the stress in the Earth.

(A) I, II & III

(B) I only.

(C) I & III only.

(D) II & III only.

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85. The new alluvial deposits found the Gangetic plain are known as

(A) Bhabar

(B) Bhangar

(C) Khadar

(D) Terai

86. Which water body separates Australia from New Zealand?

(A) Cook Straits

(B) Tasman Sea

(C) Munro Sound

(D) Great Barrier Reef

87. Kodaikanal, the famous hill-station of South India is situated on:

(A) Palni Hills

(B) Anaimalai Mountain

(C) Nilgiri Mountain

(D) Carmdamon Hills

88. The samallest continent of the world is

(A) Europe

(B) Antarctica

(C) South America

(D) Australia

89. The earthquake waves which have transverse movements are known as

(A) Primary waves

(B) Secondary waves

(C) Surface waves

(D) None of the above

90. Plasma arc technology is used for the disposal of waste, which of the following statements is/are correct with regard to this technology:

I) It can be used for the disposal of hazardous and radioactive waste.

II) Oxides of Sulphur and Nitrogen are the polluting gases produced in this process.

III) This technology has not been tried anywhere in India.

(A) I, II &

91. (B) I & II only.

(C) I & III only.

(D) III only.

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92. Which region of India receives rainfall due to western disturbance in winter?

(A) Western region

(B) Central region

(C) Eastern region

(D) North-Western region

93. What is the correct sequence of the rivers Godavari, Mahanadi, Narmada and Tapi in the descending order of their lengths?

(A) Godavari-Mahanadi-Narmada-Tapi

(B) Godavari-Narmada-Mahanadi-Tapi

(C) Narmada-Godavari-Tapi-Mahanadi

(D) Narmada-Tapi-Godavari-Mahanadi

94. Among the following which planet takes maximum time for one revolution around the Sun?

(A) Earth

(B) Jupiter

(C) Mars

(D) Venus

95. Match the rivers flowing through the cities below : CITIES RIVERS I. Baghdad 1. Rhine II. Cairo 2. Hudson III. New york 3. Nile IV. Rotterdam 4. Tigris

(A) A B C D IV III II I

(B) A B C D I II III IV

(C) A B C D II I IV III

(D) A B C D III IV I II

96. Which of the following is the highest waterfall in the world?

(A) Angel

(B) Ribbin

(C) Hungela

(D) Quecanag

97. What is the harm from the depletion of Earth's ozone layer

(A) The average temperature of earth's surface will increase gradually

(B) The oxygen content of the atmosphere will decrease

(C) Increased amount of Ultra violet radiation will reach earth's surface

(D) Sea levels will rise as the polar ice caps will gradually melt

98. Acid rain is formed due to contribution from the following pair of gases

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(A) . Methane and ozone

(B) Oxygen and nitrous oxide

(C) methane and sulpher dioxide

(D) Carbon dioxide and sulpher dioxide

99. Which of the following is a prime health risks associated with greater UV radiation through the atmosphere due to depletion of stratospheric ozone?

(A) Damage to digestive system

(B) Increased liver cancer

(C) Neurological disorder

(D) Increased skin cancer

100. The most serious environmental effect posed by hazardous wastes is

(A) air pollution.

(B) contamination of groundwater.

(C) increased use of land for landfills. .

(D) none of the above.

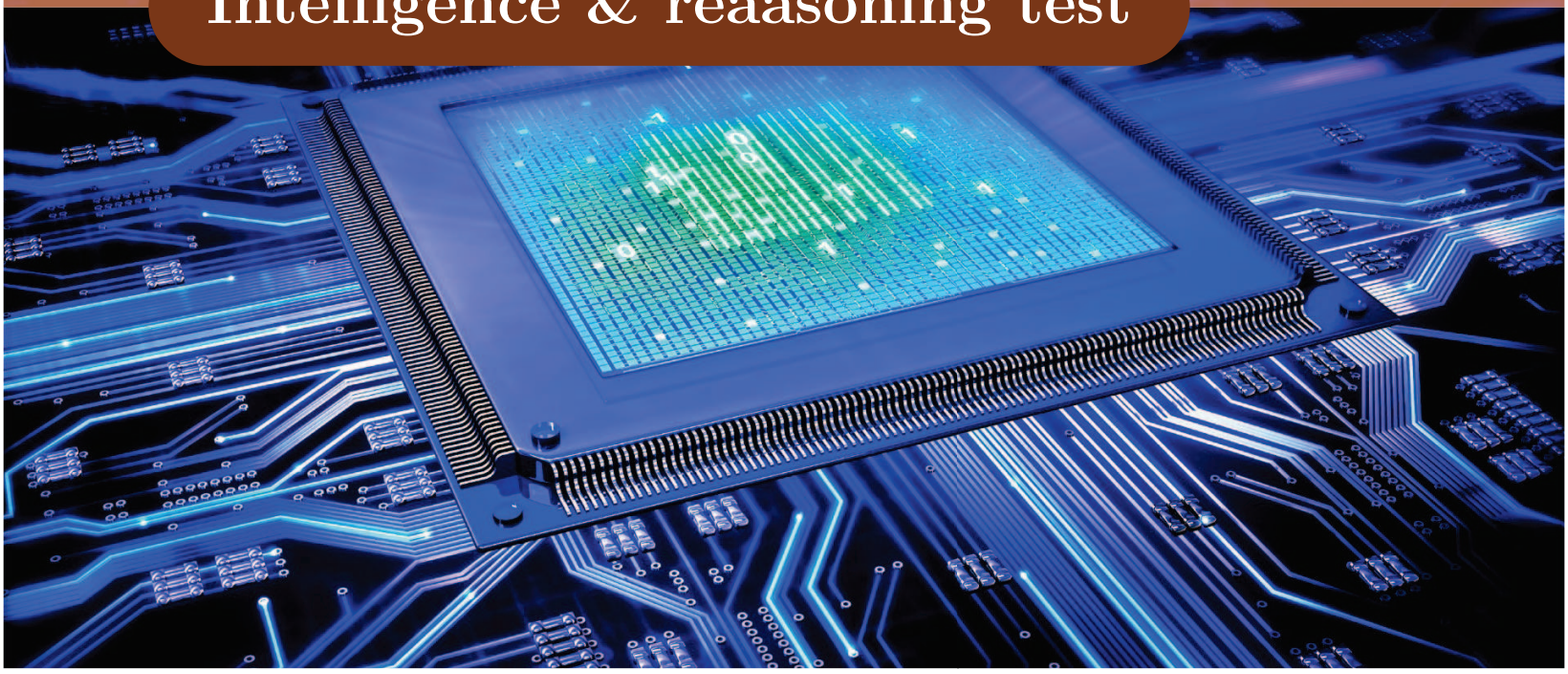
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Answers

2. D 3. A 4. B 5. B 6. B 7. A 8. B 9. C 10. D 11. A 12. D 13. B 14. B 15. C 16. A 17. B
18. B 19. C 20. D 21. A 22. A 23. A 24. A 25. A 25. B 26. B 27. B 28. D 29. B 30. D 31. B
32. D 33. B 34. D 35. A 36. C 37. A 38. A 39. D 40. D 41. A 42. B 43. B 44. C 45. A 46. B
47. B 48. B 49. C 50. C 51. B 52. B 53. C 54. C 55. D 56. D 57. C 58. B 59. C 60. C 61. B
62. B 63. A 64. B 65. B 66. A 67. A 68. D 69. B 70. C 71. B 72. A 73. A 75. A 77. D 78. A
79. C 80. C 81. D 82. A 83. C 84. A 85. C 86. B 87. A 88. D 89. B 91. C 92. D 93. B 94. B
95. A 96. A 97. C 98. B 99. D 100. B

Chapter 7

Intelligence & reaasoning test



7.1 Alphabet series

The reasoning test in every examination contains questions on alphabetical series. In this type of question, if it consists of a single series of alphabets or combination of alphabets, the alphabets or combination of them are arranged in a particular order. The candidate is supposed to do, decoding the logic involved in the sequence and then fill in the space containing the? , with a suitable choice out of the given choices. Now we discuss different techniques to solve alphabetical series problem.

7.1.1 The alphabet

The normal English alphabet contains 26 letters in all, as shown below

$$A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z$$

(Usually, questions on alphabet are accompanied by this normal alphabet). From A to M, the alphabet completes its first half, while the other half starts from N and ends at Z.

$$A - M = 1 - 13 \text{ (First Alphabetical Half)}$$
$$N - Z = 14 - 26 \text{ (Second Alphabetical Half)}$$

7.1.2 Rule of EJOTY

One of the simplest rule to solve alphabetical series problem is EJOTY rule. Most of the times, you need to remember the position of any letter to solve puzzle. EJOTY rules will help you to easily find out the position of different letters in the alphabet.

E	J	O	T	Y
5	10	15	20	25

Table 7.1: Add caption

Now, for instance, we wish to find the position of, say, the 17th letter from the left side. You already know that the 15th letter from the left side is O, therefore, the only thing you have to do is to find a letter which is two positions ahead of O, which is Q (The Answer). Using this simple formula, you can quickly find the position of any letter from the left side without much brain-rattling.

Example 1 *Lets say the name of the person imagined is ZUBINA. Now from EJOTY, we know that Z stands for 26, U stands for 21, B stands for 2, I stands for 9, N stands for 14 and A stands for 1. Now add up all these positions (26+21+2+9+14+1). What you get on addition does not have any significance, but it can be a very good way to try to make out and remember the individual positions of letters in the alphabet.*

Example 2 *What will be the next term in*

$$BKS, DJT, FIU, HHV, ?$$

(A) *IJX* (B) *IGX* (C) *JGW* (D) *IGU*

In each term, the first letter is moved two steps forward, the second letter one step backward and the third letter one step forward to obtain the corresponding letter of the next term. So, the missing term is JGW.

7.1.3 Find the position in reverse

We are very much habituated to find the position of alphabet from the left side, but in a typical question, sometimes we need to find out the position from the right-hand side. This seems to me little bit difficult, but a simple modification of the EJOTY rule plays a vital role to count the number of position from the right-hand side in alphabet series.

Example 3 *Let's say there is a row of 7 boys in which a boy is standing 3rd from left. We want to know his position from the right side.*

	B_1	B_2	B_3	B_4	B_5	B_6	B_7
Position from left	1	2	3	4	5	6	7
Position from left	7	6	5	4	3	2	1

From the above table, you can easily verify that the boy who was in the third position from the left is placed fifth position from the right side. In the case of alphabet series, if we are given the position of any letter from either side, we will add 1 to the total number of letters and then subtract its position from one side to get its position from the other side.

7.1.4 Letter series

This type of question usually consists of a series of small letters which follow a certain pattern. However some letters are missing from the series. These missing letters are then given in a proper sequence as one of the alternatives. The candidate is required to choose this alternative as the answer.

Example 4 *What will be the correct choice*

$$aab - aaa - bba -$$

(A) *baa* (B) *abb* (C) *bbb* (D) *bba*

1. *The first blank space should be filled in by b so that we have two a's followed by two b's.*
2. *The second blank space should be fiiled in either by 'a'. So that we have four as followed by two bs or by 'b' So that we have three a's followed by three b's.*
3. *The last space must be filled in by 'a'.*

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4. *Thus we have two possible answers -baa and bba. But only baa appears in the alternatives. So the answer is baa.*

5. *In case we had both the possible answers in the alternatives, we should choose the one that forms a more prominent pattern, which is aabb/aaabbb/aa. and our answer would have been bba.*

Solved excercises

In each of the following questions, various terms of a letter series are given with one term missing. Choose the missing term out of the given alternatives.

1. $cmw, hrb, ..., rbl, wgq, blv$

   (A) mwg (C) lwg
   (B) lvf (D) mxg

2. $DKY, FJW, HIU, JHS, ...$

   (A) KGR (C) KFR
   (B) LFQ (D) LGQ

3. $OTE, PUF, QVG, RWH, ...$

   (A) SYJ (C) SXJ
   (B) TXI (D) SXI

4. $1725, 15X4, 13V3, ?, 9R1$

   (A) $11T2$ (C) $14T2$
   (B) $11T7$ (D) $11TT$

5. $BXJ, ETL, HPN, KLP, ...$

   (A) NHR (C) MIP
   (B) MHQ (D) None of these

6. $P3C, R5F, T8I, V12L, ...$

   (A) $Y17O$ (C) $X17O$
   (B) $X17M$ (D) None of these

7. $B, E, H, ?$

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(A) I
(B) J
(C) K
(D) L

8. $G, H, J, M, ..., V$

(A) T
(B) S
(C) R
(D) Q

9. $Q, N, K, ?, E$

(A) H
(B) M
(C) Z
(D) I

10. $BDGILNQS, ...$

(A) TV
(B) VW
(C) WX
(D) VX

11. $QPO, SRQ, UTS, WVU, ...$

(A) XVZ
(B) ZYA
(C) YXW
(D) VWX

12. $CG, DI, ?, IP, MU$

(A) FL
(B) MN
(C) FP
(D) FQ

13. $AB, BA, ABD, DBA, PQRS, ?$

(A) $SRQP$
(B) $MNOI$
(C) $PQRM$
(D) None of these

14. $....., siy, oeu, kaq, gwm, csi$

(A) wnb
(B) vne
(C) vme
(D) None of these

15. $D-4, F-6, H-8, J-10, ..., ...$

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(A) $K-12, M-13$

(B) $L-12, M-14$

(C) $L-12, N-14$

(D) $K-12, N-14$

Answer key

Explanations

13 Most important work of teacher is to organize teaching work efficiently. For example the director of any institution is a teacher by profession. So, first priority of a director is teaching and then everything else.

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135

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145

1 All the letters of each term are moved five steps forward to obtain the corresponding letters of the next term

2 The first letters of all the terms are alternate. The second letter of each term is moved one step backward to obtain the second letter of the successive term. The third letter of each term is moved two steps backward to obtain the third letter of the subsequent term

3 The first letters of the terms are in alphabetical order, and so are the second and the third letter.

4 The first number & second letter of every term is moves steps backward & the third number of every term is moved one step backward. So, the missing term would be 11T2.

5 The first, second and third letters of each term are moved three steps forward, four steps backward and two steps forward respectively to obtain the corresponding letters of the successive term

6 The first letters of the terms are alternate. The sequence followed by the numbers is $+2, +3, +4, \ldots$The last letter of each term is three steps ahead of the last letter of the preceding term.

7 In the given series, every letter is moved three steps forward to obtain the corresponding letters of the next term. So, the missing term is K.

8 The first, second, third, fourth and fifth terms are moved one, two, three, four and five steps respectively forward to obtain the successive terms.

9 In the given series, every letter is moved three steps backward to obtain the corresponding letters of the next term. So, the missing term is H.

10 Each term of the series consists of two alternate letters and there is a gap of two letters between the last letter of each term and the first letter of the next term

11 Each term in the series consists of three consecutive letters in reverse order. The first letter of each term and the last letter of the term are the same

12 The first letter of the first, second, their.....terms are moved one, two three, four, five,..... steps forward respectively and the second letters are moved two, three four, five, ...steps forward respectively. So the missing term would be FL.

13 The first term is reversed to get second term. The third term is reversed to get the fourth term. Similarly , to get the sixth tem, we reverse the fifth term. So, the missing term would be $SRQP$.

14 The letters in each term are moved four steps backward to obtain the letters of the next term.

15 The letters in the series are alternate and the numbers indicate their position in the alphabet from beginning.

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7.2 Relationship or analogy test

The relationship test or analogy questions are common in nowadays competitive examination. In this type of questions, relationship between the words or object is more important than the meaning of the words or objects themselves. Students are asked to establish a relationship between the two objects. Whereas, to objects are related in some way, not necessarily real meaning. Your tasks in relationship test questions are to identify the relationship between the given pair of objects or words and then choose the answer choice with the most similar relationship. Analytical type problem is probably the easiest type of problem to solve as soon as you become familiar with the pattern and traps in those types of problems.

strategy to solve analogical problem

To solve analogical problem, dont look at the answer choices at first. Always think a short sentence, which expresses the relationship between the two objects given in the problem. If you can make a short sentence relating that two objects, then it is easier for you to pick up the correct answer choice.

Example 5 *FISH : SCHOOL ::*

In the above example, one can think the relationship between this two objects can be "a group of fish is called a school. Dont worry, you think that the meaning is totally absurd, but there are some relationship between fish and schools in your mind. Thats it! Most students who, at first, struggle with analogies do so because they take a global view of the problem. They read the problem as they would a reading passage, looking for the feel, tone, or general relationship between the given words.

Example 6 *ORCHESTRA : MUSICIAN ::*

(A) *story : comedian*
(B) *band : singer*
(C) *garden : leaf*
(D) *troupe : actor*

"An ORCHESTRA is comprised of MUSICIANS. Now, a STORY is not comprised of COMEDIANS. Eliminate (A). A BAND may have a SINGER, but a BAND is not comprised of SINGERS: there may be a drummer, guitarist, etc. Eliminate (B). Similarly, a GARDEN is comprised of more than just LEAVES. Eliminate (C). But a TROUPE is comprised of ACTORS. The answer, therefore, is (D).

7.2.1 Some techniques to solve analogical questions

Solving analogical questions is easy, if you can grasp that tips and tricks to solve. There are lots of different tricks available and we will discuss it here.

Strategy :I More than one answer choice:
If you think that your thinking is ambiguous and there are two choices that suites thinking, you must make your thinking more specific.

Example 7 *CLUB : GOLF ::*

(A) *type : book* (B) *ball : soccer* (C) *glove : baseball* (D) *racket : tennis*

in this, you can think that, " A CLUB is used to play GOLF. However, in this process, the choices B, C and D remains equally competitive choices and simply you cannot pick any of them. Now, you can think that A CLUB is used to strike a ball in the game of GOLF. Similarly, a RACKET is used to strike a ball in the game of TENNIS.

analogical questions involving verb For analogical questions involving verbs, you try to form a sentence using the Infinitive, or "to , form of the verb. These Analogies Can Often Be Written with the Following Structure: To . Is To ..

Example 8 *CRAWL : PROCEED*
TO CRAWL is TO PROCEED slowly.

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Strategy :II **Try to reverse the order of the given words:**
Do not hesitate to reverse the order of the given words. When you try to form a sentence by using the given words, sometimes it is natural to use the second word first. Similarly, the answer choices are also comes in reverse order.

Example 9 *POTTERY : SHARD ::*
A SHARD is a piece of broken POTTERY.

Strategy :III **You are not recognizing word**
If you are unable to recognize a word, then parts of speech are powerful tool in analogical questions. If the given pair of words is an adjective and a noun, then look for each of the answer choices and there will be an adjective and noun, in that order. These techniques help you to determine the right choice.

Example 10 *PURIFY : DROSS ::*

(A) *defile : litter*
(B) *purge : rival*
(C) *align : objects*
(D) *effectuate : thespian*

you know what PURIFY means, it basically means to clean. Suppose, the meaning of DROSS is not familiar with you. First, you will think that it may means to opposite of PURIFY, that is, Pollute. This would make it a verb, but all the second words in the answer choice pairs are nouns. So DROSS must be a noun as well. Perhaps DROSS is what is removed when something is PURIFIED. Similarly, political RIVALS are removed in a PURGE .

Solved Exercises

For each of the below problems, write a sentence using the two words given and and select the correct answer choices.

1. COACH : TEAM ::
   (A) groupie : band
   (B) foreman : jury
   (C) diplomat : country
   (D) senator : senate

2. ANARCHY : GOVERNMENT ::
   (A) confederation : state
   (B) trepidation : courage
   (C) serenity : equanimity
   (D) computer : harddrive

3. GALVANIZE : CHARISMATIC LEADER ::
   (A) jeer : fan
   (B) correct : charlatan
   (C) retreat : champion
   (D) moderate : arbiter

4. SENTENCE : WORDS ::

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(A) album : guitar
(B) paragraph : punctuation
(C) novel : index
(D) collage : paper strips

5. PARRY : BLOW ::
(A) equivocate : question
(B) cower : start
(C) boomerang : backlash
(D) cast : invective

6. DISQUIETUDE : ANXIOUS ::
(A) isolation : sequestered
(B) cupidity : bellicose
(C) embellishment : overstated
(D) nonplus : perplexed

7. MILK : DRAIN ::
(A) insult : commend
(B) abstract : distend
(C) extend : disregard
(D) exploit : employ

8. . ABSTRUSE : CLEAR ::
(A) nondescript : conspicuous
(B) high-brow : indifferent
(C) affable : agreeable
(D) prominent : manifest

9. OMNISCIENT : KNOWLEDGE ::
(A) saturnine : energy
(B) principled : method
(C) inquisitive : science
(D) boundless : expanse

10. STOKE : SMOTHER ::
(A) incinerate : heat
(B) animate : enervate
(C) contest : decry
(D) acknowledge : apprehend

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Answer key for solved excercises

7.3 Spotting out dissimilar

7.4 Series completion test

Series completion test deals with questions in which series of numbers or alphabetical letters are given, which are generally called as terms of the series. These terms follow a certain pattern throughout the series. The candidate is required to recognize this pattern and either complete the given series with the most suitable alternative or find wrong in the series.

Sequences

A sequence is an ordered list of numbers. The following is a sequence of odd numbers:

$$1, 3, 5, 7, 9, 11, \ldots$$

A term of a sequence is identified by its position in the sequence. In the above sequence, 11 is the sixth term, 9 is the fifth term, etc. The symbol ... indicates that the sequence continues forever.

Example 11 *A number series is given with one term missing. Choose the correct alternative that will same pattern and fill in the blank spaces.*

$$1, 4, 9, 16, 25, x$$

(A) *0* (B) *36* (C) *48* (D) *49*

Solution: *The numbers are* $1^2, 2^2, 3^2, 4^2, 5^2$. *Hence, missing number* $= 6^2 = 36$.

Example 12 *In sequence S, the 3rd term is 4, the 2nd term is three times the 1st, and the 3rd term is four times the 2nd. What is the 1st term in sequence S?*

(A) *0* (B) $\frac{1}{3}$ (C) *1* (D) $\frac{3}{2}$

Solution:

Arithmetic Progressions

An arithmetic progression is a sequence of numbers such that the difference of any two successive members of the sequence is a constant. For example, the sequence $1, 2, 3, 4, \ldots$ is is an arithmetic progression with common difference 1.

Example 13 *The seventh number in a sequence of numbers is 31 and each number after the first number in the sequence is 4 less than the number immediately preceding it. What is the fourth number in the sequence?*

(A) *11* (B) 13 (C) *33* (D) 43

Sequence Formulas

We denote the common difference by d and a_1 is the first term.By a_n we denote the n-th term of an arithmetic progression. By S_n we denote the sum of the first n elements of an arithmetic series.
If the initial term of an arithmetic progression is a_1 and the common difference of successive members is d, then the n-th term of the sequence a_n is given by

$$a_n = a_1 + (n-1)d, n = 1, 2, \ldots$$

The sum S of the first n numbers of an arithmetic progression is given by the formula:

$$S = \frac{1}{2}(a_1 + a_n)n$$

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where a_1 is the first term and a_n is the last one.

$$S = \frac{1}{2}(2a_1 + d(n-1))n$$

Example 14 *What is the sum of the first 10 numbers of this arithmetic series:* $1, 11, 21, 31, \ldots$

(A) *650* (B) *460* (C) *462* (D) *499*

Solution: *we can use this formula* $S = \frac{1}{2}(2a_1 + d(n-1))n$

$$S = \frac{1}{2}(2 * 1 + 10(10-1))10 = 5(2+90) = 460$$

Geometric Progressions

In mathematics, a geometric progression (also inaccurately known as a geometric series) is a sequence of numbers such that the quotient of any two successive members of the sequence is a constant called the common ratio of the sequence.

Sequence Formulas

Since each term of a geometric progression "is generated by multiplying the preceding term by a fixed number," we get the following:

- first term $=a$
- second term $=ar^1$ where r is the common ratio
- third term$= ar^2$
- nth term is $an = ar^{n-1}$

The sum of the first n terms of an geometric sequence is

$$\frac{a(1-r^n)}{1-r}$$

7.4.0.1 Series

A series is simply the sum of the terms of a sequence. The following is a series of even numbers formed from the sequence $2, 4, 6, 8, \ldots$

$$2 + 4 + 6 + 8 + \ldots$$

A term of a series is identified by its position in the series. In the above series, 2 is the first term, 4 is the second term, etc. The ellipsis symbol $(\ldots)$ indicates that the series continues forever

T

he sum of the squares of the first n positive integers $1^2 + 2^2 + 3^2 + \ldots + n^2$ is

$$\frac{n(n+1)(2n+1)}{6}$$

Example 15 *What is the sum of the squares of the first 9 positive integers?*

We are given a formula for the sum of the squares of the first n positive integers. Putting $n = 9$ into this formula we get

$$\frac{n(n+1)(2n+1)}{6} = \frac{9(9+1)(2*9+1)}{6} = 285$$

Solved excercise

Choose the correct alternative that will continue the same pattern and replace the question mark in the given series.

1. $120, 99, 80, 63, 48, ?$

   (A) 35
   (B) 38
   (C) 39
   (D) 40

2. $589654237, 89654237, 8965423, 965423, ?$

   (A) 58965
   (B) 65423
   (C) 89654
   (D) 96542

3. $3, 10, 101, ?$

   (A) 10101
   (B) 10201
   (C) 10202
   (D) 11012

4. In the series $2, 6, 18, 54, \ldots$ what will be the 8th term ?

   (A) 4370
   (B) 4374
   (C) 7443
   (D) 7434

5. $1, 1, 4, 8, 9, 27, 16, ?$

   (A) 32
   (B) 64
   (C) 81
   (D) 256

6. $1, 2, 3, 6, 9, 18, ?, 54$

   (A) 18
   (B) 27
   (C) 36
   (D) 81

7. $6, 13, 25, 51, 101, ?$

   (A) 201
   (B) 202
   (C) 203
   (D) 205

8. $5, 6, 9, 15, ?, 40$

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(A) 21
(B) 25
(C) 27
(D) 33

9. $1, 3, 4, 8, 15, 27, ?$
(A) 37
(B) 44
(C) 50
(D) 55

10. $3, 4, 7, 7, 13, 13, 21, 22, 31, 34, ?$
(A) 42
(B) 43
(C) 51
(D) 52

11. $198, 194, 185, 169, ?$
(A) 92
(B) 112
(C) 136
(D) 144

12. $2, 3, 5, 7, 11, ?, 17$
(A) 12
(B) 13
(C) 14
(D) 15

13. $6, 12, 21, ?, 48$
(A) 33
(B) 38
(C) 40
(D) 45

14. Which term of the series $5, 10, 20, 40, \ldots$ is 1280?
(A) 10th
(B) 9th
(C) 8th
(D) None of these

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15. $2, 5, 9, ?, 20, 27$

(A) 14

(B) 16

(C) 18

(D) 24

16. $2, 3, 3, 5, 10, 13, ?, 43, 172, 177$

(A) 23

(B) 38

(C) 39

(D) 40

17. $9, 27, 31, 155, 161, 1127, ?$

(A) 316

(B) 1135

(C) 1288

(D) 2254

18. $2, 1, 2, 4, 4, 5, 6, 7, 8, 8, 10, 11, ?$

(A) 9

(B) 10

(C) 11

(D) 12

19. Which of the following will not be a number of the series $1, 8, 27, 64, 125, ...?$

(A) 256

(B) 512

(C) 729

(D) 1000

20. $13, 32, 24, 43, 35, ?, 46, 65, 57, 76$

(A) 45

(B) 52

(C) 54

(D) 55

21. $22, 24, 28, ?, 52, 84$

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(A) 36
(B) 38
(C) 42
(D) 46

22. 3, 15, ?, 63, 99, 143
(A) 27
(B) 35
(C) 45
(D) 56

23. 90, 180, 12, 50, 100, 200, ?, 3, 50, 4, 25, 2, 6, 30, 3
(A) 150
(B) 175
(C) 225
(D) 250

24. 48, 24, 96, 48, 192, ?
(A) 76
(B) 90
(C) 96
(D) 98

25. 2, 15, 41, 80, ?
(A) 111
(B) 120
(C) 121
(D) 132

26. 6, 11, 21, 36, 56, ?
(A) 42
(B) 51
(C) 81
(D) 91

27. 563, 647, 479, 815, ?
(A) 672
(B) 386
(C) 279
(D) 143

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28. $13, 35, 57, 79, 911, ?$

(A) 1110

(B) 1112

(C) 1113

(D) 1315

29. $1, 4, 10, 22, 46, ?$

(A) 64

(B) 86

(C) 94

(D) 122

30. $66, 36, 18, ?$

(A) 3

(B) 6

(C) 8

(D) 9

31. In the series$3, 9, 15, ...$ what will be the 21st term?

(A) 117

(B) 121

(C) 123

(D) 129

32. $28, 33, 31, 36, ?, 39$

(A) 32

(B) 34

(C) 38

(D) 40

33. $1, 9, 25, 49, 81, ?$

(A) 100

(B) 112

(C) 121

(D) 144

34. $1, 9, 25, 49, ?, 121$

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(A) 64
(B) 81
(C) 91
(D) 100

35. $2, 2, 5, 13, 28, ?$
(A) 49
(B) 50
(C) 51
(D) 52

36. $0, 2, 8, 14, ?, 34$
(A) 20
(B) 23
(C) 24.
(D) 25

37. $1, 5, 14, 30, 55, 91, ?$
(A) 130
(B) 140
(C) 150
(D) 160

38. In the series $10, 17, 24, 31, 38, ...$which of the following will be a number of the series ?
(A) 48
(B) 346
(C) 574
(D) 1003

39. 240, ?, 120, 40, 10, 2
(A) 180
(B) 240
(C) 420
(D) 480

40. $2, 3, 8, 27, 112, ?$
(A) 226
(B) 339
(C) 452
(D) 565

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41. $6, 17, 39, 72, ?$

(A) 83

(B) 94

(C) 116

(D) 127

42. $20, 20, 19, 16, 17, 13, 14, 11, ?, ?$

(A) 10, 10

(B) 10, 11

(C) 13, 14

(D) 13, 16

43. $24, 60, 120, 210, ?$

(A) 300

(B) 336

(C) 420

(D) 525

44. $625, 5, 125, 25, 25, ?, 5$

(A) 5

(B) 25

(C) 125

(D) 625

45. $10, 100, 200, 310, ?$

(A) 400

(B) 410

(C) 420

(D) 430

46. $11, 10, ?, 100, 1001, 1000, 10001$

(A) 101

(B) 110

(C) 111

(D) None of these

47. $2, 7, 27, 107, 427, ?$

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(A) 1262
(B) 1707
(C) 4027
(D) 4207

48. 1, 1, 2, 6, 24, ?, 720
(A) 100
(B) 104
(C) 108
(D) 120

49. 2, 15, 4, 12, 6, 7, ?, ?
(A) 8, 8
(B) 8, 0
(C) 3, 8
(D) None of these

50. 4832, 5840, 6848, ?
(A) 7815
(B) 7846
(C) 7856
(D) 7887

51. 5824, 5242, ?, 4247, 3823
(A) 4467
(B) 4718
(C) 4856
(D) 5164

52. 2, 8, 16, 128, ?
(A) 2042
(B) 2046
(C) 2048
(D) 2056

53. 1, 2, 6, 7, 21, 22, 66, 67, ?
(A) 70
(B) 134
(C) 201
(D) 301

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54. $0.5, 0.55, 0.65, 0.8, ?$

(A) 0.9

(B) 0.82

(C) 1

(D) 0.95

55. $0, 2, 3, 5, 8, 10, 15, 17, 24, 26, ?$

(A) 28

(B) 30

(C) 32

(D) 35

56. $11, 13, 17, 19, 23, 25, ?$

(A) 26

(B) 27

(C) 29

(D) 37

57. $5, 2, 7, 9, 16, 25, ?$

(A) 41

(B) 45

(C) 48

(D) 52

58. $7, 26, 63, 124, 215, 342, ?$

(A) 391

(B) 421

(C) 481

(D) 511

59. $3, 12, 27, 48, 75, 108, ?$

(A) 147

(B) 162

(C) 183

(D) 192

60. $3, 7, 23, 95, ?$

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(A) 62
(B) 128
(C) 479
(D) 575

61. 6, 18, 3, 21, 7, 56, ?
(A) 8
(B) 9
(C) 63
(D) 64

62. 4, 9, 25, ?, 121, 169, 289, 361
(A) 49
(B) 64
(C) 81
(D) 87

63. 6, 13, 28, 59, ?
(A) 111
(B) 113
(C) 114
(D) 122

64. 4, 12, 36, 108, ?
(A) 144
(B) 216
(C) 304
(D) 324

65. Which term of the series 5, 8, 11, 14, ...is 320?
(A) 104th
(B) 105th
(C) 106th
(D) 64th

66. 8, 9, 8, 7, 10, 9, 6, 11, 10, ?, 12
(A) 5
(B) 7
(C) 8
(D) 11

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67. $4, 10, ?, 82, 244, 730$

(A) 24

(B) 28

(C) 77

(D) 218

68. $1, 5, 13, 25, 41, ?$

(A) 51

(B) 57

(C) 61

(D) 63

69. $325, 259, 204, 160, 127, 105, ?$

(A) 94

(B) 96

(C) 98

(D) 100

70. $4, 7, 12, 19, 28, ?$

(A) 30

(B) 36

(C) 39

(D) 49

71. $5760, 960, ?, 48, 16, 8$

(A) 120

(B) 160

(C) 192

(D) 240

72. $45, 54, 47, ?, 49, 56, 51, 57, 53$

(A) 48

(B) 50

(C) 55

(D) None of these

73. $3, 8, 13, 24, 41, ?$

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(A) 70
(B) 75
(C) 80
(D) 85

74. 10, 14, 26, 42, 70, ?
(A) 100
(B) 102
(C) 106
(D) 114

75. 10, 18, 28, 40, 54, 70, ?
(A) 85
(B) 86
(C) 87
(D) 88

76. 8, 28, 116, 584, ?
(A) 1752
(B) 3502
(C) 3504
(D) 3508

In this type of questions, one term in the number series is wrong. Find out the wrong term

77. 121, 143, 165, 186, 209
(A) 143
(B) 165
(C) 186
(D) 209

78. 6, 15, 35, 77, 165, 221
(A) 35
(B) 77
(C) 165
(D) 15

79. 8, 13, 21, 32, 47, 63, 83
(A) 13
(B) 21
(C) 32

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(D) 47

80. $1, 2, 4, 8, 16, 32, 64, 96$

(A) 4

(B) 32

(C) 64

(D) 96

81. $3, 4, 10, 32, 136, 685, 4116$

(A) 10

(B) 32

(C) 136

(D) 4116

82. $105, 85, 60, 30, 0, -45, -90$

(A) 105

(B) 60

(C) 0

(D) -45

83. $2, 5, 10, 17, 26, 37, 50, 64$

(A) 17

(B) 26

(C) 37

(D) 64

84. $125, 126, 124, 127, 123, 129$

(A) 126

(B) 124

(C) 123

(D) 129

85. $2, 5, 10, 50, 500, 5000$

(A) 5

(B) 10

(C) 50

(D) 5000

86. $1, 3, 12, 25, 48$

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(A) 3
(B) 12
(C) 25
(D) 48

87. 15, 16, 22, 29, 45, 70
(A) 16
(B) 22
(C) 45
(D) 70

88. 8, 14, 26, 48, 98, 194, 386
(A) 14
(B) 48
(C) 98
(D) 194

89. 3, 10, 27, 4, 16, 64, 5, 25, 125
(A) 3
(B) 4
(C) 10
(D) 27

90. 1, 5, 9, 15, 25, 37, 49
(A) 9
(B) 15
(C) 25
(D) 37

91. 4, 10, 22, 46, 96, 190, 382
(A) 4
(B) 10
(C) 96
(D) 382

92. 2, 6, 24, 96, 285, 568, 567
(A) 6
(B) 24
(C) 285
(D) 567

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93. $3, 2, 8, 9, 13, 22, 18, 32, 23, 42$

(A) 8

(B) 9

(C) 13

(D) 22

94. $196, 169, 144, 121, 101$

(A) 101

(B) 121

(C) 169

(D) 196

95. $56, 58, 62, 70, 84, 118, 182$

(A) 58

(B) 62

(C) 84

(D) 118

96. $1, 5, 5, 9, 7, 11, 11, 15, 12, 17$

(A) 11

(B) 12

(C) 17

(D) 15

97. $25, 36, 49, 81, 121, 169, 225$

(A) 36

(B) 49

(C) 169

(D) 225

98. $1,\ 3,\ 10,\ 21,\ 64,\ 129,\ 356,\ 777$

(A) 21

(B) 129

(C) 10

(D) 356

99. $5, 10, 40, 80, 320, 550, 2560$

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(A) 80
(B) 320
(C) 550
(D) 2560

100. $2, 3, 4, 4, 6, 8, 9, 12, 16$
(A) 3
(B) 6
(C) 9
(D) 12

101. $11, 5, 20, 12, 40, 26, 74, 54$
(A) 5
(B) 20
(C) 40
(D) 26

102. $5, 27, 61, 122, 213, 340, 509$
(A) 27
(B) 61
(C) 122
(D) 509

103. $3, 7, 15, 39, 63, 127, 255, 511$
(A) 15
(B) 39
(C) 63
(D) 127

104. $380, 188, 92, 48, 20, 8, 2$
(A) 8
(B) 20
(C) 48
(D) 188

105. $16, 22, 30, 45, 52, 66$
(A) 30
(B) 45
(C) 52
(D) 66

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106. $10, 26, 74, 218, 654, 1946, 5834$

(A) 26

(B) 74

(C) 218

(D) 654

107. $24576, 6144, 1536, 386, 96, 24$

(A) 96

(B) 386

(C) 1536

(D) 6144

108. $10, 14, 28, 32, 64, 68, 132$

(A) 28

(B) 32

(C) 64

(D) 132

109. $46080, 3840, 384, 48, 24, 2, 1$

(A) 384

(B) 48

(C) 24

(D) 2

110. $89, 78, 86, 80, 85, 82, 83$

(A) 83

(B) 82

(C) 86

(D) 78

111. $0, 2, 3, 5, 8, 10, 15, 18, 24, 26, 35$

(A) 18

(B) 24

(C) 26

(D) 10

112. $325, 259, 202, 160, 127, 105, 94$

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(A) 94
(B) 127
(C) 202
(D) 259

113. $1236, 2346, 3456, 4566, 5686$

(A) 1236
(B) 3456
(C) 4566
(D) 5686

114. $93, 309, 434, 498, 521, 533$

(A) 309
(B) 434
(C) 498
(D) 521

115. $20, 19, 17, ?, 10, 5$

(A) 12
(B) 13
(C) 14
(D) 15

116. $2, 3, 5, 7, 11, ?, 17$

(A) 12
(B) 13
(C) 14
(D) 15

117. $6, 11, 21, 36, 56, ?$

(A) 42
(B) 53
(C) 81
(D) 96

118. $1, 6, 13, 22, 33, ?$

(A) 44
(B) 53
(C) 46
(D) 96

119. $3, 9, 27, 81, ?$

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(A) 324
(B) 243
(C) 210
(D) 162

120. $1, 9, 17, 33, 49, 73, ?$

(A) 97 (B) 99 (C) 101 (D) 201

121. $2, 5, 9, ?, 20, 27$

(A) 14
(B) 16
(C) 18
(D) 32

122. $5, 9, 17, 29, 45, ?$

(A) 60
(B) 65
(C) 68
(D) 70

123. $3, 7, 15, 31, 63, ?$

(A) 92
(B) 115
(C) 127
(D) 131

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Answer key

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Explanations

1 The pattern is $-21(99-120), -19(80-99), -17(63-80), -15(48-63), \ldots$. So, missing term is $48-13=35$.

2 The digits are removed one by one from the beginning and the end in order alternately.

3 Each term in the series is obtained by adding 1 to the square of the preceding term. So, missing term is $(101)^2+1=10202$.

4 Clearly, $2\times 3=6, 6\times 3=18, 18\times 3=54, \ldots$ So, the series is a G.P. in which $a=2, r=3$. Therefore 8th term $=ar^{8-1}=ar^7=2\times 3^7=(2\times 2187)=4374$.

5 The series consists of squares and cubes of consecutive natural numbers

$$1^2, 1^3, 2^2, 2^3, 3^2, 3^3, 4^2, \ldots$$

So, missing term is $4^3=64$.

6 The pattern is $x\times 2, x\times 3/2, x\times 2, x\times 3/2, x\times 2, \ldots$ So, missing term is $18\times 3/2=27$

7 The pattern is $x\times 2+1, x\times 2-1, x\times 2+1, x\times 2-1, \ldots$ So, missing term is $101\times 2+1=203$.

8 The pattern is $+1, +3, +6, \ldots$, i.e. $+1, +(1+2), +(1+2+3), \ldots$ So, missing term is $15+(1+2+3+4)=25$.

9 The sum of any three consecutive terms of the series gives the next term. So, missing number is $8+15+27=50$.

10 The given sequence is a combination of two series

I $3, 7, 13, 21, 31, \ldots$

II $4, 7, 13, 22, 34, \ldots$

The pattern in I is

$$+4, +6, +8, +10, \ldots$$

and the pattern in II is

$$+3, +6, +9, +12, \ldots$$

So, missing term $31+12=43$.

11 The pattern is $-4, -9, -16, \ldots$ .i.e.$-2^2, -3^2, -4^2, \ldots$. So, missing pattern $169-5^2=169-25=144$

12 Clearly, the given series consists of prime numbers starting from 2. So, the missing term is the prime number after 11, which is 13.

13 The pattern is $+6, +9, +12, +15, \ldots$. So, missing term is $21+12=33$.

14 Clearly, $5\times 2=10, 10\times 2=20, 20\times 2=40, \ldots$. So, the series is a G.P. in which $a=5$ and $r=2$. Let 1280 be the nth term of the series. Then

$$5\times 2^{n-1}=1280 \Rightarrow 2^{n-1}=256=2^8 \Rightarrow n-1=8 \Rightarrow n=9$$

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15 The pattern is $+3, +4, +5, +6, \ldots$. So, missing term is $9 + 5 = 14$.

16 The pattern is $+1, \times 1, +2, \times 2, +3, \times 3, +4, \times 4, +5$. So, missing term is $13 \times 3 = 39$.

17 The pattern is $\times 3, +4, \times 5, +6, \times 7, \ldots$ So, missing term is $1127 + 8 = 1135$.

18 The given sequence is a combination of three series

I 1st, 4th, 7th, 10th, 13th terms i.e. 2, 4, 6, 8, ?

II 2nd, 5th, 8th, 11th terms i.e. 1, 4, 7, 10

III 3rd, 6th, 9th, 12th terms i.e. 2, 5, 8, 11

Clearly, I consists of consecutive even numbers. So, the missing term is 10.

19 The given series consists of cubes of natural numbers only. 256 is not the cube of any natural number.

20 The given sequence is a combination of two series

I 13, 24, 35, 46, 57

II 32, 43, ?, 65, 76

The pattern in both I and II is + 11. So, missing term is $43 + 11 = 54$.

21 The pattern is + 2, + 4, + 8, + 16,..... So, missing term = 28 + 8 = 36.

22 The terms of the given series are $(22 - 1), (42 - 1), \ldots, (82 - 1), (102 - 1), (122 - 1)$. So, missing term is $(62 - 1) - (36 - 1) = 35$.

23 Clearly, $90 = 30 \times 3, 180 = 6 \times 30, 12 = 2 \times 6, 50 = 25 \times 2, 100 = 4 \times 25, 200 = 50 \times 4$.. So, missing term is $3 \times 50 = 150$.

24 The pattern is $\div, \times, div, \times, \ldots$ i .e $2, 4, 2, 4, \ldots$. So, missing term is $192 \div 2 = 96$.

25 The pattern is $+13, +26, +39, \ldots$. So, missing term is $80 + 52 = 132$.

26 The pattern is $+5, +10, +15, +20, \ldots$ So, missing term is $56 + 25 = 81$.

27 The pattern is $+84, -168, +336, \ldots$..i.e. $+84 \times 2^0, -(84 \times 2), +(84 \times 2^2), \ldots$.. So, missing term is $815 - (84 \ldots 2^3) = 815 - 672 = 143$.

28 The terms of the given series are numbers formed by joining together consecutive odd numbers in order i.e. 1 and 3, 3 and 5, 5 and 7, 7 and 9, 9 and 11, ... So, missing term = number formed by joining 11 and 13 = 1113.

29 The pattern is $+3, +6, +12, +24, \ldots$.. So, missing term is $46 + 48 = 94$.

30 Each term in the series is the product of the digits of the preceding term. So, missing term = $1 \times 8 = 8$.

31 Clearly,$3 + 6 = 9, 9 + 6 = 15, \ldots$.. So, the series is an AP. in which$a = 3$ and $d = 6$. Therefore 21st term $= a + (21 - 1)d = a + 20d = 3 + 20 \times 6 = 123$.

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32 The pattern is $+5, -2, +5, -2, ...$ So, missing term $= 36 - 2 = 34$.

33 The series consists of squares of consecutive odd numbers i.e. $12, 32, 52, 72, 92, ...$ So, missing term $= 112 = 121$.

34 The given series consists of squares of consecutive odd numbers i.e. $1^2, 3^2, 5^2, 7^2, ...$ So, missing term $=9^2 = 81$.

35 The pattern is $+0, +3, +8, +15, ...$i.e. $+(1^2 - 1), +(2^2 - 1), +(3^2 - 1), +(4^2 - 1), ...$ So, missing term $= 28 + (5^2 - 1) = 28 + 24 = 52$.

36 The pattern is $+2, +6, +6, +10, +10, ...$ So, missing term $= 14 + 10 = 24$.

37 The pattern is $+4, +9, +16, +25, +36, ...$ i.e. $+2^2, +3^2, +4^2, +5^2, +6^2, ...$ So, missing term $=91 + 7^2 = 91 + 49 = 140$.

38 The given series consists of numbers each of which, on dividing by 7, leaves a remainder 3. No other number except 346 satisfies the property.

39 The pattern is $\div 1, \div 2, \div 3, \div 4, \div 5$.So, missing term $= 240 \div 1 = 240$.

40 The pattern is $x \times 1 + 1, x \times 2 + 2, x \times 3 + 3, x \times 4 + 4, ...$ So, missing term $= 112 \times 5 + 5 = 565$.

41 The pattern is $+11, +22, +33, ...$ So, missing term $=72 + 44 = 116$.

42 Let the missing terms of the series be x_1 and x_2.Thus, the sequence $20, 20, 19, 16, 17, 13, 14, 11, x_1x_2$ is a combination of two series

I $20, 19, 17, 14, x_1$

II $20, 16, 13, 11, x_2$

The pattern in I is $-1, -2, -3, ...$So, missing term, $x_1 = 14 - 4 = 10$.
The pattern in II is $-4, -3, -2, ...$So, missing term, $x_2 = 11 - 1 = 10$.

43 The pattern is $+36, +60, +90, ...$*i.e.* $+ [6 \times (6 + 0)], +[6 \times (6 + 4)], +[6 \times (6 + 9)], \ldots$ So, missing term $= 210 + [6 \times (6 + 15)] = 210 + 126 = 336$.

44 The given sequence is a combination of two series

I 625, 125, 25, 5

II 5, 25, ?

The pattern in I is $\div 5$, while that in II is $\times 5$. So, missing term $= 25 \times 5 = 125$.

45 The pattern is $+90 + 100, +110, ...$ So, missing term $= 310 + 120 = 430$.

46 The pattern is $-1, \times 10 + 1, -1, \times 10 + 1, -1, \times 10 + 1, ...$ So, missing term $= 10 \times 10 + 1 = 101$.

47 The pattern is $+5, +20, +80, +320, ...$ i.e. $+(5 \times 1^2), +(5 \times 2^2), +(5 \times 4^2), +(5 \times 8^2), ...$ So, missing term $= 427 + (5 \times 16^2) = 427 + 1280 = 1707$.

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48 The pattern is $\times 1, \times 2, \times 3, \times 4, \ldots\ldots$ So, missing term $= 24 \times 5 = 120$.

49 Let the missing terms of the series be x_1 and x_2. Thus, the sequence $2, 15, 4, 12, 6, 7, x_1 x_2$ is a combination of two series :

I $2, 4, 6, x_1$

II $15, 12, 7, x_2$

I consists of consecutive even numbers. So, missing term, $x_1 = 8$.The pattern in II is $-3, -5, \ldots\ldots$So, missing term, $x_2 = 7 - 7 = 0$.

50 The pattern is $+1008$. So, missing term $-6848 + 1008 = 7856$.

51 Each term in the series is obtained by subtracting from the preceding term the number formed by the first three digits of the preceding term. So, missing term $= 5242 - 524 = 4718$.

52 Each term in the series, except the first two terms, is the product of the preceding two terms. So, missing term $=16 \times 128 = 2048$.

53 The pattern is $+1, \times 3, +1, \times 3, +1, \times 3, +1, \ldots\ldots$ So, missing term $= 67 \times 3 = 201$.

54 The pattern is $+0.05, +0.10, +0.15, \ldots\ldots$ So, missing term $=0.8 + 0.20 = 1$.

55 The given sequence is a combination of two series : I. 0, 3, 8, 15, 24, ? and II. 2, 5, 10, 17, 26 The pattern in each one of I and II is + 3, + 5, + 7, + 9, ... So, missing term = 24 + 11 = 35.

56 The pattern is $+2, +4, +2, +4, \ldots\ldots$ So, missing term $= 25 + 4 = 29$.

57 Each term in the series, except the first two terms, is the sum of the preceding two terms. So, missing term = 16 + 25 = 41.

58 The terms of the given series are $(23 - 1), (33 - 1), (43 - 1), (53 - 1), (63 - 1), (73 - 1), \ldots\ldots$ So, missing term $=(83 - 1) = (512 - 1) = 511$.

59 The terms of the given series are $3 \times 1^2, 3 \times 2^2, 3 \times 3^2, 3 \times 4^2, 3 \times 5^2, 3 \times 6^2, \ldots\ldots$ So, missing term $= 3 \times 7^2 = 3 \times 49 = 147$.

60 The pattern is $\times 2 + 1, \times 3 + 2, \times 4 + 3, \ldots\ldots$ So, missing term $= 95 \times 5 + 4 = 479$.

61 Each term at an even place in the series is the product of its two adjacent terms. Thus, if the missing term be x, then we have : $7 \times x = 56$ or $x = 56 \div 7 = 8$.

62 The given series consists of squares of consecutive prime numbers i.e. $2^2, 3^2, 5^2, \ldots\ldots, 11^2, 13^2, 17^2, 19^2$. So, missing term $= 7^2 = 49$.

63 The pattern is $\times 2 + 1, \times 2 + 2, \times 2 + 3, \ldots\ldots$ So, missing term $=59 \times 2 + 4 = 122$.

64 The pattern is $\times 3$. So, missing term $= 108 \times 3 = 324$.

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65 Clearly,$5+3=8, 8+3=11, 11+3=14, \ldots\ldots$So, the series is an A P. in which $a=5$ and $d=3$. Let 320 be the nth term of the series. Then, $320=5+(n-1)\times 3$ or $(n-1)=105$ or $n=106$.

66 The given sequence is a combination of three series

I 1st, 4th, 7th, 10th terms i.e. 8, 7, 6, ?

II 2nd, 5th, 8th, 11th terms i.e. 9, 10, 11, 12

III 3rd, 6th, 9th terms i.e. 8, 9, 10

The pattern in I is - 1. So, missing term $=6-1=5$.

67 Each number in the series is 2 less than thrice the preceding number. So, missing number $=(10\times 3)-2=28$.

68 The pattern is $+4, +8, +12, +16\ldots\ldots$ So, missing term $=41+20=61$.

69 The pattern is $-66, -55, -44, -33, -22, \ldots\ldots$ So, missing term $=105-11=94$.

70 The pattern is $+3, +5, +7, +9, \ldots\ldots$ So, missing term $=28+11=39$.

71 The pattern is $\div 6, \div 5, \div 4, \div 3, \div 2$. So, missing term $=960\div 5=192$.

72 The given sequence is a combination of two series:

I 45, 47, 49, 51, 53

II II. 54, ?, 56, 57

Clearly, II consists of consecutive natural numbers, starting from 54. So, missing term = 55.

73 The pattern followed is nth term $+(n+1)$th term $+\ldots+(n+1)=(n+2)$th term. Thus, 1st term + 2nd term + 2 = 3rd term; 2nd term + 3rd term + 3 = 4th term and so on. So, missing term = 6th term = 4th term + 5th term + 5 = 24 + 41 + 5 = 70.

74 Each term in the series, except the first two terms, is 2 more than the sum of the preceding two terms. So, missing term $=(42+70)+2=114$.

75 The pattern is $+8, +10, +12, +14, \ldots\ldots$ So, missing term $=70+18=88$.

76 The pattern is $\times 3+4, \times 4+4, \times 5+4, \ldots\ldots$ So, missing term $=584\times 6+4=3508$.

77 Each term in the series is obtained by adding 22 to the preceding term. So, 186 is wrong and must be replaced by (165 + 22) i.e. 187.

78 The terms of the series are products of two consecutive prime numbers i.e. $(2\times 3), (3\times 5), (5\times 7), (7\times 11), \ldots\ldots$ So, 165 is wrong and must be replaced by (11×13)i.e. 143.

79 The correct pattern is $+5, +8, +11, +14, \ldots\ldots$ So, 47 is wrong and must be replaced by $(32+14)$i.e. 46.

80 Each term of the series is obtained by multiplying the preceding term by 2. So, 96 is wrong and must be replaced by (64×2) i.e. 128.

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81 The correct pattern is $\times 1+1, \times 2+2, \times 3+3, \times 4+4, \ldots\ldots$ So, 32 is wrong and must be replaced by $(10 \times 3+3)$ i.e. 33.

82 The correct pattern is $-20, -25, -30, \ldots\ldots$ So, 0 is wrong and must be replaced by (30 - 35) i.e. - 5.

83 The terms of the series are $(12+1), (22+1), (32+1), (42+1), (52+1), (62+1), (72+1), \ldots\ldots$ So, 64 is wrong and must be replaced by (82 + 1) i.e. 65.

84 The correct pattern is $+1, -2, +3, -4, +5$. So, 129 is wrong and must be replaced by $(123+5)$ i.e. 128.

85 Each term of the series is the product of the preceding two terms. So, 5000 is wrong and must be replaced by (50×500) i.e. 25000.

86 The terms of the series are $(1^2-0^2), (2^2-1^2), (4^2-2^2), (6^2-3^2)$ and (8^2-4^2). So, 25 is wrong and must be replaced by (6^2-3^2) i.e. 27.

87 The correct pattern is $+1, +4, +9, +16, +25 i.e. +12, +22, +32, +42, +52$. So, 22 is wrong and must be replaced by (16 + 4) i.e. 20.

88 The correct pattern is $\times 2-2$.. So, 48 is wrong and must be replaced by $(26 \times 2-2)$ i.e. 50.

89 The correct sequence is $3, 32, 33, 4, 42, 43, 5, 52, 53$. So, 10 is wrong and must be replaced by 32 i.e. 9.

90 The terms of the given series are $1^2, (2^2+1), 3^2, (4^2.+1), 5^2, (6^2+1), 7^2$. So, 15 is wrong and must be replaced by (4^2+1) i.e. 17.

91 The correct pattern is $+6, +12, +24, +48, +96, +192$. So, 96 is wrong and must be replaced by (46 + 48) i.e. 94.

92 The correct pattern is $\times 6-6, \times 5-5, \times 4-4, \ldots\ldots$ So, 24 is wrong and must be replaced by $(6 \times 5-5)$ i.e. 25.

93 The given sequence is a combination of two series

I 3, 8, 13, 18, 23

II 2, 9, 22, 32, 42

The pattern in I is + 5, and the pattern in II is + 10. So, in II, 9 is wrong and must be replaced by (2 + 10) i.e. 12.

94 The sequence is $(14)^2, (13)^2, (12)^2, (11)^2, (10)^2$..So, 10^1 is wrong and must be replaced by $(10)^2$ i.e. 100.

95 The correct pattern is $+2, +4, +8, +16, +32, +64 i.e. +2, +22, +23, +24, +25, +26$. So, 84 is wrong and must be replaced by (70 + 16) i.e. 86.

96 The given sequence is a combination of two series:

I 1, 5, 7, 11, 12

II 5, 9, 11, 15, 17

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The pattern in both I and II is $+4, +2, +4, +2$. So, 12 is wrong and must be replaced by $(11 + 2)$ i.e. 13.

97 The correct sequence is $52, 72, 92, 112, 132, 152$. So, 36 is wrong.

98 The correct pattern is $\times 2+1, \times 3+1, \times 2+1, \times 3+1, \ldots\ldots$ So, 356 is wrong and must be replaced by $(129 \times 3+1)$ i.e. 388.

99 The correct pattern is $\times 2, \times 4, \times 2, \times 4, \ldots\ldots$ So, 550 is wrong and must be replaced by (320 x 2) i.e. 640.

100 The given sequence is a combination of three series

I 1st, 4th, 7th terms i.e. $2, 4, 9, \ldots\ldots$

II 2nd, 5th, 8th terms i.e. $3, 6, 12, \ldots\ldots$

III 3rd, 6th, 9th terms i.e. $4, 8, 16, \ldots\ldots$

In each one of I, II and III, each term is twice the preceding term. So, 9 is wrong and must be replaced by (4×2) i.e. 8.

101 The given sequence is a combination of two series

I 11, 20, 40, 74

II 5, 12, 26, 54

The correct pattern in I is + 9, + 18, + 36,..... So, 40 is wrong and must be replaced by (20 + 18) i.e. 38.

102 The terms of the series are $(23 - 3), (33 - 3), (43 - 3), (53 - 3), (63 - 3), (73 - 3), (83 - 3)$. So, 27 is wrong and must be replaced (33 - 3) i.e. 24.

103 The correct pattern is $\times 2 + 1$. So, 39 is wrong and must be replaced by $(15 \times 2 + 1)$ i.e. 31.

104 The correct pattern is $-192, -96, -48, -24, -12, -6$. So, 48 is wrong and must be replaced by (92 - 48) i.e. 44.

105 The correct pattern is $+6, +8, +10, +12, +14$. So, 45 is wrong and must be replaced by (30 + 10) i.e. 40.

106 The correct pattern is $\times 3 - 4$. So, 654 is wrong and must be replaced by $(218 \times 3 - 4)$ i.e. 650.

107 Each term of the series is obtained by dividing the preceding term by 4. So, 1536 is wrong and must be replaced by (1536 + 4) i.e. 384.

108 The correct pattern is $+4, \times 2, +4, \times 2, \ldots\ldots$ So, 132 is wrong and must be replaced by (68×2) i.e. 136.

109 The correct pattern is $\div 12, \div 10, \div 8, \div 6, \ldots\ldots$ So, 24 is wrong and must be replaced by (48 + 6) i.e. 8.

110 The correct pattern is $-11, +9, -7, +5, -3, +1$. So, 86 is wrong and must be replaced by (78 + 9) i.e. 87.

111 The given sequence is a combination of two series

I 0, 3, 8, 15, 24, 35

II . 2, 5, 10, 18, 26

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The pattern in both I and II is $+3, +5, +7, +9, ...$ So, in II, 18 is wrong and must be replaced by (10 + 7) i.e. 17.

112 The correct pattern is $-66, -55, -44, -33, -22, -11$. So, 202 is wrong and must be replaced by (259 - 55) i.e. 204.

113 The correct pattern in the series is +1110. So, 5686 is wrong and must be replaced by $(4566 + 1110)$ i.e. 5676.

114 The correct pattern is $+63, +53, +43, +33, ...$ So, 521 is wrong and must be replaced by (498 + 33) i.e. 525.

115 The Pattern is $-1, -2, -3 \ldots$. Hence, missing number $= 17 - 3 = 14$.

116 Clearly, the given series consists of prime numbers starting from 2. The prime number after 11 is 13. So, 13 is the missing number.

117 The pattern is $+5, +10, +15, +20, \ldots$. Missing Number $= 56 + 25 = 81$.

118 The pattern is $+5, +7, +9, +11, \ldots$. Missing number $= 33 + 13 = 46$.

119 Each term of the given series is obtained by multiplying its preceding term by 3. Missing number $= 81 \times 3 = 243$.

120 The pattern is $+8, +8, +16, +16 \ldots$. Missing number $= 73 + 24 = 97$

121 The pattern is $+3, +4, \ldots$. Missing number $= 9 + 5 = 14$.

122 The pattern is $+4, +8, +12, +16, \ldots$. Missing number $= 45 + 20 = 65$.

123 Each number in the series is the preceding number multiplied by 2 and then increased by 1. Thus,

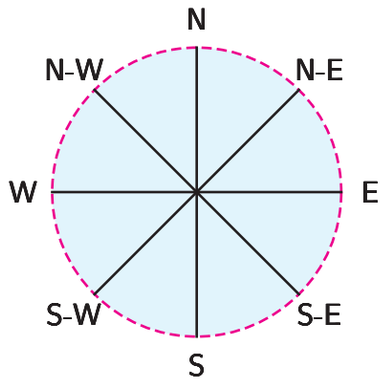
$$(3 * 2) + 1 = 7$$
$$(7 * 2) + 1 = 15$$
$$(15 * 2) + 1 = 31$$

ans so on.Missing number $= (63 * 2) + 1 = 127$.

7.5 Direction sense test

Direction test question are important part of any competitive exam . It is used to check the Imagination power and decision making capability of candidate. These are most easy question and should be solve within 2-3 min after reading the statement of question. Most of the candidate get confused and choose wrong answer in the provided options. We know that the sun rises in the east and sets in the west, so there is four major directions that we prepared based on positioning of the sun, which is South, East, North and West and four sub directions are North-East, South-East, North-West and South-West.Now In this type of direction sense test problems, what we have to do is to make a diagram as quickly as possible on a paper as per the question given. The direction sense test problems involves a person moving in the given directions and the candidate is asked to find out the distance from the initial point or direction in which the person in the question is standing etc.

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Most Important Remember Point

- At the time of sunrise, Shadow of an object will always be towards WEST, i.e. If a man is standing facing NORTH at the Time of SUNRISE, his shadow will be towards his LEFT & facing SOUTH, his shadow will be towards his RIGHT.
- At the time of Sunest, Shadow of an object is always in the EAST. i.e. If a man is standing facing NORTH at the Time of SUNSET, his shadow will be towards his RIGHT & facing SOUTH, his shadow will be towards his LEFT.
- At 12:00 noon, the ray of the SUN are vertically downward, hence there will be no shadow.
- Angle will always be made accordingly to the face direction. Types of Questions:
- All LEFT turn will be taken ANTICLOCK WISE (ACW).
- All RIGHT turn will be taken CLOCKWISE (CW).
-

1. One morning Udai and Vishal were talking to each other face to face at a crossing. If Vishal's shadow was exactly to the left of Udai, which direction was Udai facing?
   - (A) East
   - (B) West
   - (C) North
   - (D) South

2. Y is in the East of X which is in the North of Z. If P is in the South of Z, then in which direction of Y, is P?
   - (A) North
   - (B) South
   - (C) South-East
   - (D) None of these

3. If South-East becomes North, North-East becomes West and so on. What will West become?
   - (A) North-East
   - (B) North-West
   - (C) South-East
   - (D) South-West

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4. A man walks 5 km toward south and then turns to the right. After walking 3 km he turns to the left and walks 5 km. Now in which direction is he from the starting place?

   (A) West

   (B) South

   (C) North-East

   (D) South-West

5. Rahul put his timepiece on the table in such a way that at 6 P.M. hour hand points to North. In which direction the minute hand will point at 9.15 P.M. ?

   (A) South-East

   (B) South

   (C) North

   (D) West

6. Rasik walked 20 m towards north. Then he turned right and walks 30 m. Then he turns right and walks 35 m. Then he turns left and walks 15 m. Finally he turns left and walks 15 m. In which direction and how many metres is he from the starting position?

   (A) 15 m West

   (B) 30 m East

   (C) 30 m West

   (D) 45 m East

7. Two cars start from the opposite places of a main road, 150 km apart. First car runs for 25 km and takes a right turn and then runs 15 km. It then turns left and then runs for another 25 km and then takes the direction back to reach the main road. In the mean time, due to minor break down the other car has run only 35 km along the main road. What would be the distance between two cars at this point?

   (A) 65 km

   (B) 75 km

   (C) 80 km

   (D) 85 km

8. Starting from the point X, Jayant walked 15 m towards west. He turned left and walked 20 m. He then turned left and walked 15 m. After this he turned to his right and walked 12 m. How far and in which directions is now Jayant from X?

   (A) 32 m, South

   (B) 47 m, East

   (C) 42 m, North

   (D) 27 m, South

9. One evening before sunset Rekha and Hema were talking to each other face to face. If Hema's shadow was exactly to the right of Hema, which direction was Rekha facing?

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(A) North

(B) South

(C) East

(D) Data is inadequate

10. A boy rode his bicycle Northward, then turned left and rode 1 km and again turned left and rode 2 km. He found himself 1 km west of his starting point. How far did he ride northward initially?

(A) 1 km

(B) 2 km

(C) 3 km

(D) 5 km

11. K is 40 m South-West of L. If M is 40 m South-East of L, then M is in which direction of K?

(A) East

(B) West

(C) North-East

(D) South

12. A man walks 2 km towards North. Then he turns to East and walks 10 km. After this he turns to North and walks 3 km. Again he turns towards East and walks 2 km. How far is he from the starting point?

(A) 10 km

(B) 13 km

(C) 15 km

(D) None of these

13. The length and breadth of a room are 8 m and 6 m respectively. A cat runs along all the four walls and finally along a diagonal order to catch a rat. How much total distance is covered by the cat?

(A) 10

(B) 14

(C) 38

(D) 48

14. One morning sujata started to walk towards the Sun. After covering some distance she turned to right then again to the right and after covering some distance she again turns to the right. Now in which direction is she facing?

(A) North

(B) South

(C) North-East

(D) South-West

15. Some boys are sitting in three rows all facing North such that A is in the middle row. P is just to the right of A but in the same row. Q is just behind of P while R is in the North of

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(A) In which direction of R is Q?

(B) South

(C) South-West

(D) North-East

(E) South-East

16. One morning after sunrise, Vimal started to walk. During this walking he met Stephen who was coming from opposite direction. Vimal watch that the shadow of Stephen to the right of him (Vimal). To Which direction Vimal was facing?

(A) East

(B) West

(C) South

(D) Data inadequate

17. Golu started from his house towards North. After covering a distance of 8 km. he turned towards left and covered a distance of 6 km. What is the shortest distance now from his house?

(A) 10 km.

(B) 16 km.

(C) 14 km

(D) 2 km.

18. P started from his house towards west. After walking a distance of 25 m. He turned to the right and walked 10 m. He then again turned to the right and walked 15 m. After this he is to turn right at 135o and to cover 30 m. In which direction should he go?

(A) West

(B) South

(C) South-West

(D) South-East

19. X started to walk straight towards south. After walking 5 m he turned to the left and walked 3 m. After this he turned to the right and walked 5 m Now to which direction X is facing?

(A) North-East

(B) South

(C) North

(D) South-West

20. Hemant in order to go to university started from his house in the east and came to a crossing. The road to the left ends in a theatre, straight ahead is the hospital. In which direction is the university?

(A) North

(B) South

(C) East

(D) West

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21. After walking 6 km, I turned to the right and then walked 2 km. After then I turned to the left and walked 10 km. In the end, I was moving towards the North. From which direction did I start my journey?

(A) North

(B) South

(C) East

(D) West

22. Ravi left home and cycled 10 km towards South, then turned right and cycled 5 km and then again turned right and cycled 10 km. After this he turned left and cycled 10 km. How many kilometers will he have to cycle to reach his home straight?

(A) 10 km

(B) 15 km

(C) 20 km

(D) 25 km

23. Reena walked from A to B in the East 10 feet. Then she turned to the right and walked 3 feet. Again she turned to the right and walked 14 feet. How far is she from A?

(A) 4 feet

(B) 5 feet

(C) 24 feet

(D) 27 feet

24. One morning after sunrise Nivedita and Niharika were talking to each other face to face at Dalphin crossing. If Niharika's shadow was exactly to the right of Nivedita, Which direction Niharika was facing?

(A) North

(B) South

(C) East

(D) Data is inadequate

25. If A x B means A is to the south of B; A + B means A is to the north of B; A % B means A is to the east of B; A - B means A is to the west of B; then in P % Q + R - S, S is in which direction with respect to Q?

(A) South-West

(B) South-East

(C) North-East

(D) North-West

26. One morning after sunrise, Suresh was standing facing a pole. The shadow of the pole fell exactly to his right. To which direction was he facing?

(A) East

(B) South

(C) West

(D) Data is inadequate

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27. A child went 90 m in the East to look for his father, then he turned right and went 20 m. After this he turned right and after going 30 m he reached to his uncle's house. His father was not there. From there he went 100 m to his north and met his father. How far did he meet his father from the starting point?

(A) 80 m

(B) 100 m

(C) 140 m

(D) 260 m

28. Four friends A, B, C and D live in a same locality. The house of B is in the east of A's house but in the north of C's house. The house of C is in the west of D's house. D's house is in which direction of A's house?

(A) South-East

(B) North-East

(C) East

(D) Data is inadequate

29. Umesh directly went from P, to Q which is 9 feet distant. Then he turns to the right and walked 4 feet. After this he turned to the right and walked a distance which is equal from P to Q. Finally he turned to the right and walked 3 feet. How far is he now from P?

(A) 6 feet

(B) 5 feet

(C) 1 feet

(D) 0 feet

30. Shyam walks 5 km towards East and then turns left and walks 6 km. Again he turns right and walks 9 km. Finally he turns to his right and walks 6 km. How far is he from the starting point?

(A) 26 km

(B) 21 km

(C) 14 km

(D) 9 km

31. Amit started walking positioning his back towards the sun. After some time, he turned left, then turned right and towards the left again. In which direction is he going now?

(A) North or South

(B) East or West

(C) North or West

(D) South or West

32. Rohit walked 25 m towards south. Then he turned to his left and walked 20 m. He then turned to his left and walked 25 m. He again turned to his right and walked 15 m. At what distance is he from the starting point and in which direction?

(A) 35 m East

(B) 35 m North

(C) 30 m West

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(D) 45 m East

33. Village Q is to the North of the village P. The village R is in the East of Village Q. The village S is to the left of the village P. In which direction is the village S with respect to village R?

(A) West

(B) South-West

(C) South

(D) North-West

34. Radha moves towards South-East a distance of 7 km, then she moves towards West and travels a distance of 14 km. From here she moves towards North-West a distance of 7 km and finally she moves a distance of 4 km towards east. How far is she now from the starting point?

(A) 3 km

(B) 4 km

(C) 10 km

(D) 11 km

35. Sundar runs 20 m towards East and turns to right and runs 10 m. Then he turns to the right and runs 9 m. Again he turns to right and runs 5 m. After this he turns to left and runs 12 m and finally he turns to right and 6 m. Now to which direction is Sundar facing?

(A) East

(B) West

(C) North

(D) South

36. Sachin walks 20 km towards North. He turns left and walks 40 km. He again turns left and walks 20 km. Finally he moves 20 km after turning to the left. How far is he from his starting position?

(A) 20 km.

(B) 30 km.

(C) 50 km.

(D) 60 km.

37. From his house, Lokesh went 15 km to the North. Then he turned west and covered 10 km. Then he turned south and covered 5 km. Finally turning to the east, he covered 10 km. In which direction is he from his house?

(A) East

(B) West

(C) North

(D) South

Dev, Kumar, Nilesh, Ankur and Pintu are standing facing to the North in a playground such as given below: Kumar is at 40 m to the right of Ankur. Dev is are 60 m in the south of Kumar. Nilesh is at a distance of 25 m in the west of Ankur. Pintu is at a distance of 90 m in the North of Dev.

38. Which one is in the North-East of the person who is to the left of Kumar?

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(A) Dev

(B) Nilesh

(C) Ankur

(D) Pintu

39. If a boy starting from Nilesh, met to Ankur and then to Kumar and after this he to Dev and then to Pintu and whole the time he walked in a straight line, then how much total distance did he cover?

(A) 215 m

(B) 155 m

(C) 245 m

(D) 185 m Each of the following questions is based on the following information: Six flats on a floor in two rows facing North and South are allotted to P, Q, R, S, T and U. Q gets a North facing flat and is not next to S. S and U get diagonally opposite flats. R next to U, gets a south facing flat and T gets North facing flat.

40. If the flats of P and T are interchanged then whose flat will be next to that of U?

(A) P

(B) Q

(C) R

(D) T

41. Which of the following combination get south facing flats?

(A) QTS

(B) UPT

(C) URP

(D) Data is inadequate

42. The flats of which of the other pair than SU, is diagonally opposite to each other?

(A) QP

(B) QR

(C) PT

(D) TS

43. Whose flat is between Q and S?

(A) T

(B) U

(C) R

(D) P Each of the following questions is based on the following information: 8-trees mango, guava, papaya, pomegranate, lemon, banana, raspberry and apple are in two rows 4 in each facing North and South. Lemon is between mango and apple but just opposite to guava. Banana is at one end of a line and is just next in the right of guava or either banana tree is just after guava tree. Raspberry tree which at one end of a line, is just diagonally opposite to mango tree.

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44. Which of the following statements is definitely true?

(A) Papaya tree is just near to apple tree.

(B) Apple tree is just next to lemon tree.

(C) Raspberry tree is either left to Pomegranate or after.

(D) Pomegranate tree is diagonally opposite to banana tree.

45. Which tree is just opposite to raspberry tree?

(A) Papaya

(B) Pomegranate

(C) Papaya or Pomegranate

(D) Data is inadequate

46. Which tree is just opposite to banana tree?

(A) Mango

(B) Pomegranate

(C) Papaya

(D) Data is inadequate

Each of the following questions is based on the following information: A # B means B is at 1 metre to the right of

(E) A $ B means B is at 1 metre to the North of

(F) A * B means B is at 1 metre to the left of

(G) A @ B means B is at 1 metre to the south of

(H) In each question first person from the left is facing North.

47. According to X @ B * P, P is in which direction with respect to X?

(A) North

(B) South

(C) North-East

(D) South-West

48. According to M # N $ T, T is in which direction with respect to M?

(A) North-West

(B) North-East

(C) South-West

(D) South-East

49. According to P # R $ A * U, in which direction is U with respect to P?

(A) East

(B) West

(C) North

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(D) South

50. Siva Reddy walked 2 km west of his house and then turned south covering 4 km. Finally, He moved 3 km towards east and then again 1 km west. How far is he from his initial position?

(A) 10 km

(B) 9 km

(C) 2 km

(D) 4 km

51. A man walks 6 km to the east and then turn to the south 2 km. Again he turns to the east and walks 2 km. Next he turns northwards and walks 8 km. How far is he now from his starting point?

(A) 18 km

(B) 10 km

(C) 16 km

(D) 12 km

52. Rajeshs school bus is facing North when reaches his school. After starting from Rajeshs house, it turning twice and then left before reaching the school. What direction the bus facing when it left the bus stop in front of Rajeshs house?

(A) East

(B) North

(C) South

(D) West

53. Anil wants to go the university. He starts from his house which is in the East and comes to a crossing. The road to his left ends in a theatre, straight ahead is the hospital. In which direction is the University?

(A) East

(B) North

(C) South

(D) West

54. If South-East becomes North, North-East becomes West and so on, what will West become?

(A) North

(B) East

(C) South-East

(D) North-West

55. Kumar walks 10 meters in front and 10 meters to the right. Then every time turning to his left he walks 5, 15 and 15 meters respectively. How far is he now from his starting point?

(A) 15m

(B) 10m

(C) 12m

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(D) 5m

56. The time on the watch is quarter to three. If the minute-head points to North-East, If the minute-hand points to North-East, in which direction does the hour hand point?

(A) South-West

(B) South-East

(C) North-West

(D) North-East

57. Starting from a point X, Ravi walked 20 m towards South. He turned left and walked 30m. He then turned left and walked 20 m. He again turned left and walked 40 m and reached at a point Y. How far and in which direction is the point Y from the point X?

(A) 5m East of X

(B) 10m West of X

(C) 15m West of X

(D) 10m East of X

58. Lakshman went 15 kms to the West of his house, then turned left and walked 20 kms. He then turned East and walked 25 kms and finally turning left covered 20 kms. How far was he from his house?

(A) 5 kms

(B) 10 kms

(C) 40 kms

(D) 80 kms

59. Ravi started walking towards North. After walking 30 m, he turned left and walked 40 m. He then turned left and walked 30 m. He again turned left and walked 50 m. How far was he from his original position?

(A) 50m

(B) 30m

(C) 10m

(D) 60m

60. A man walks 30 m towards south. Then, turning to his right, he walks 30 m. Then, turning to his left, he walks 20 m. Again, he turns to his left and walks 30 m. How far is he from his initial position?

(A) 30m

(B) 35m

(C) 50m

(D) 60m

61. Starting from a Point X, Ramu walked 20 m towards South. He turned left and walked 30 m. He then turned left and walked 20 m. He again turned left and walked 40 m and reached a point Y. How far and in which direction is the point Y from the point X

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(A) 20 m West

(B) 10 m East

(C) 10 m North

(D) 10 m West

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62. Going 50m to the south of her house, Latha turns left and goes another 20m. Then,turning to the North, she goes 30m and then starts walking to her house. In which direction isshe walking now?

(A) North-West

(B) North

(C) South-East

(D) East

63. Sahithi who is facing South turns to her left and walks 15 m, then she turns to her leftand Walks 7m, then facing West she walks 15m. How far is she from her original position?

(A) 10m

(B) 7m

(C) 30m

(D) 15m

64. A,B,C and D are playing cards. A and B are partners. D faces towards North. If A facestowards West, then who faces towards south?

(A) C

(B) B

(C) D

(D) E

65. Six persons A,B,C,D,E and F are standing in a circle. B is between D and C. A is between E and C. F is to the right side of D. Who is between A and F?

(A) B

(B) D

(C) C

(D) E

66. B is to the South-West A, C is to the East of B and South-East of A and D is to the northof C in line with BA. In which direction of A is D located?

(A) East

(B) North

(C) South-East

(D) North- east

67. A watch reads 4.30, If the minute hand points East, in what direction will be the hourhand point?

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(A) South-East

(B) North-East

(C) North

(D) North-west

68. Ravi travelled 4km straight towards south. He turned left and travelled 6km straight, thenturned right and raveled 4km straight. How for is he from the starting point?

(A) 8km

(B) 10km

(C) 12km

(D) 18km

69. Ramya walks towards northwest for 5km. Then she walks 3km towards east and is jestabove. Where she started then she moved 7km North. How for is she from her original position?

(A) 12km

(B) 17km

(C) 15km

(D) 11km

70. Ramesh walks 30 m towards south. Then turning to his right he walks 30m. Then turningto his left he walks 20m. Again turning to his left he walks 30m. How for is he from hisstaring position?

(A) 30m

(B) 20m

(C) 50m

(D) None of these

71. A walks 10 m in front and 10m to the right. Then every time turning to his left he walks5, 15 and 15m respectively. How for is he now from his starting point?

(A) 10m

(B) 20m

(C) 5m

(D) 15m

72. A person walks facing north 10m and the he turn left and walks 5m. He again turns leftand walks 10m. How far is he from his original position and towards which direction?

(A) 20m South

(B) 15m West

(C) 10m East

(D) 5m West

73. Anitha started from home and walked some distance towards North-East and then turned90 degrees left. After sometime she again turned 90 degrees left. In what direction is shewalking now?

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(A) North-West
(B) South-West
(C) South
(D) West

74. Amar was facing North. He turns right and walks 20m. Then he turns again and walks10m. Then he turns right again and walks 60m. In which direction is he from the starting point?
(A) North
(B) North-East
(C) North-West
(D) East

75. A man starts walking in the morning facing the sun. After sometime, he turned to his left.Later he again turned to his left. The direction in which the man is moving now is:
(A) South
(B) North
(C) East
(D) West

76. Raghu travelled 3km southwards, then turned right and travelled 5km. Then again turnedright and travelled 7km. In which direction was he travelling last?
(A) South
(B) North
(C) East
(D) West

77. Sunil started walking from a point P towards South. After walking 40m, he took afterturn. He then walked 30m and reached a point Q. What is the straight line distance between Pand Q, and Q is towards which direction of P?
(A) 60 meters, South east
(B) 50 meters, South West
(C) 50 meters, South east
(D) None of these

7.6 Coding and decoding test

7.7 Blood relation test

7.8 Problems based on alphabet

7.9 Mathematical ability test

7.10 Situation reaction test

Situation reaction is the test of candidate's common sense, he/she will be given some situations that occur in daily life and their answer will help the Psychologist to judge candidate's mentality. Situation Reaction Test tend

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to determine behavioral tendencies, assessing how a candidate will behave in a certain situation, and knowledge instruction, which evaluates the effectiveness of possible responses. For example, just think if you are going to appear in a test, and on the way you findan injured person. In this situation, what will you do?So, at anytime we can face such problems. The candidate is, thus, expected to choose the best response whichshall present him/her as a good person or a sincere professional.Such questions consists four probable answers as an alternatives. You have to select most appropriate alternative as the answer

Tips for Situation Reaction Test

- Provide sensible and practical solution, avoid quick jump on conclusion.
- Use proper punctuation and pauses in the sentence. Assessor has to see that you know what you are writing, so avoiding silly mistakes will give a good impression.
- On similar kind of situation its better to answer with same type answers, providing different answers for similar kind of situation will show the assessors that you are not confident on your views.
- Do not skip a situation in between, it projects that you are trying to run away from that situation.
- Bear in mind that you are not being judge on right or wrong answer but you are being judged on your evaluation capability of a situation. Keep a different mind-set, this test is nothing like your regular classroom tests.

Example 16 *In a bus you realize that someone has left his/her wallet. You would*

(A) *give the money to the beggar*
(B) *hand it over to the bus conductor*
(C) *try to find his/her contact number and inform the owner*
(D) *leave the wallet as it is*

Solution— If you are an honest man then, you will try to find his/her contact number and inform the ownerof the wallet. In this way, that wallet will be reached in right hands. So option (c) is our answer.

Example 17 *Do you think that one should change his job often and face new situation?*

(A) *No, unless compelled one should not leave his old job*
(B) *Yes, every new job is challenging and one should accept the challenge*
(C) *No, as it takes time to get adjusted*
(D) *No, as the new situation may not suit you*

Solution— Most appropriate answer will be option (b). Because every new job is challenging and one shouldaccept the challenge. Unless you accept the challenges you can not get different views of life

Example 18 *While travelling in a train, you observe some college students pulling the alarm chain simply to get down attheir desired point. You would*

(A) *with the help of some passengers, check them from doing so*
(B) *let them pull the chain but check them from detraining*
(C) *inform the guard of the train as soon as it stops*
(D) *keep quiet and do nothing*

Solution— Most appropriate option in this situation will be as in option (a). In this case, train will not be late. And others will not have to bear problems. As a good citizen, it is your duty to check such situations

Example 19 *You want to get married to a person of your choice, but your family members give their own reasons, why youshould not marry that person which you do not find very convincing. What would you do?*

(A) *Go by what your family says*
(B) *Become throughly confused and still remain undecided*
(C) *Marry the person of your choice*
(D) *Try to convince your family about your choice*

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Solution— Since, the person concerned does not find the views of the family members convincing, heshould try to convince them and mould their views to match his own. Just following his own choice shall hurt thefamilys sentiments and obeying the family members blindly shall be disloyalty towards the person he loves.In this way the best way to settle a conflict is always to arrive at a consensus through peaceful talks andmutual discussions rather than stick to any one side and ignore the other.

Example 20 *You are a team leader and two of your colleagues are having a strained relationship with each other. As aresult, they are not contributing well in group activities. How will you handle such a situation?*

(A) *How can I be bothered with such petty issues? At least the task is being done by others; so it is fine*
(B) *You will make an explicit effort to help them shake hands*
(C) *You will give them complementary tasks in which both have to work together*
(D) *You will punish them for not contributing by keeping them out of the team*

Solution— As both your colleagues are having a strained relationship with each other, they are notcontributing well in group activities. But you are a team leader. So, it is your responsibility that work should bedone in good manner and in time. It can be possible if both your colleagues do works together. In this case, youshould make an explicit effort to help them shake hands.

Example 21 *You are in a bus. The bus reaches your stop but still you have not purchased the ticket because of heavy rush. What will you do ?*

(A) *Jump out quickly to avoid embarrassment.*
(B) *call the conductor, give him the money and get the ticket.*
(C) *Hand the money to someone sitting nearby to give it to the conductor*
(D) *Give the money to the driver.*

Solution— call the conductor, give him the money and get the ticket

Example 22 *While travelling in a train, you observe some college students pulling the alarm chain simply to get down at their desired point. You would :*

(A) *with the help of some passengers, check them from doing so*
(B) *let them pull the chain but check them from detraining.*
(C) *inform the guard of the train as soon as it stops.*
(D) *keep quiet and do nothing*

Solution— with the help of some passengers, check them from doing so

Example 23 *You are passing by a river and you know swimming. Suddenly, you hear the cry o f a drowning child. You would :*

(A) *dive into the river to save him.*
(B) *wait to see if some other person is there to help*
(C) *look for professional divers*
(D) *console the child's parents.*

Solution— dive into the river to save him.

Example 24 *If you find yourself in a situation where you are required to make a power - point presentation and you are already bogged down by too much work, as the manager what would you do?*

(A) *Take an alternative mode of presentation*
(B) *Cancel the seminar and reschedule according to your convenience*
(C) *Pass the buck to your subordinate, you are the boss, no one can question you*
(D) *Prioritise your work and try to squeeze out time for it*

Solution— A manager is one who has the expertise to manage tasks properly.So, it becomes his prime responsibility to rearrange his work schedule properly and work out the required time for the project rather than postpone it or hand it over to some one else.

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Rules and regulations

- When hero is faced by a single man, use the words- overpowered him.
- Hero alone faced by group of people, use the words- tactfully persuaded them.
- Hero along with a group is faced by another group, use the words- overpowered them.
- In case of serious illness, use the words- called the doctor and in normal case- sent the patient to nearby hospital.
- Never kill the dangerous reptile if it is going towards its natural habitat. Use the words- Let it go. In other case, if it is coming towards you then use- killed it.

7.11 Excercises

1. You are playing football in a park. When you kick the ball, it strikes and breaks the window pane of a nearby house. You would :

   (A) demand your ball back from the house owner.

   (B) say that it was no fault of yours.

   (C) stealthily get your ball back.

   (D) apologise to the house owner and contribute to replace the glass.

2. If in the examination hall, you find that the question paper is too tough to be answered satisfactorily by you, the best thing to do for you is to :

   (A) tell the examiner that the questions are out of course.

   (B) provoke the candidates to walk out of the examination hall.

   (C) try to know something from your neighbour.

   (D) try to solve the questions as much as you know with a cool head.

3. You are returning home from school. On the way, you find a sealed envelope in a street, fully addressed with unused stamps on it You would :

   (A) leave it there as it was and walk away

   (B) remove the stamps and destroy the envelope.

   (C) open the envelope, find out who has dropped it by mistake, and send it to him if possible.

   (D) post it at the nearest letter box.

4. You are interviewed for a new job. Which of the following is most important to you ?

   (A) Opportunites for promotion

   (B) Renumeration you will be paid

   (C) Scope to develop your ideas and use them to improve the working of the organisation

   (D) All the above are equally important

5. You find that the person whom you call your friend has been cheating you. what would you do ?

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(A) Break relations with him.

(B) Give him tit for tat

(C) Make him realise his mistake

(D) Tell other friends about him.

6. An Angry customer wants to meet the senior manager for grievance reporting. What will you do?

(A) Talk to him yourself

(B) Be patient and try to cool him down

(C) Try to remove his inconveniences by consulting seniors

(D) Tell him it is not easy to meet the senior manager

7. You are a sincere and dedicated manager in a reputed five-star hotel. You have been appointed as the Chief Manager of the Guwahati branch which needs to be developed.Your Salary has been hiked.

(A) You give it a shot for 2 months and see how it goes

(B) You accept the challenge and go ahead with the project

(C) You accept another offer and leave the job

(D) You crib for limited resources and try to convince the superior to send somebody else instead of

8. You are walking down the street and suddenly you see two hundred rupee notes on the pavement. What action will you take?

(A) Pocket it yourself.

(B) Leave it where it is.

(C) Give the money to a beggar.

(D) Deposite it in the nearest police station

9. You have made some silly mistakes which have been pointed out to you. You will :

(A) laugh it away.

(B) get angry.

(C) feel miserable.

(D) feel thankful.

10. You are moving across the road on a scooter when you observe that two boys on a bike snatch a lady's gold chain and ride away. You would :

(A) console the woman.

(B) chase the

(C) inform the police about the matter. boys to catch hold of them.

(D) stand and see what happens next.

11. On reaching the railway station, you find that the train you wanted to catch is just to start and there is hardly any time for purchasing the ticket. The best thing for you is to :

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(A) rush to the train rather than miss it and inform the T.T.I. at the next stoppage about your inability to purchase the ticket.

(B) rush to the train and perform your journey quietly.

(C) first purchase the ticket and then catch the train if it is there.

(D) miss the train rather than take the risk of boarding the moving train.

12. You are returning home from school. On the way, you find a sealed envelope in a street, fully addressed with unused stamps on it. You would :

(A) leave it there as it was and walk away.

(B) remove the stamps and destroy the envelope.

(C) open the envelope, find out who has dropped it by mistake, and send it to him if possible.

(D) post it at the nearest letter box.

13. If in the examination hall, you find that the question paper is too tought to be answered satisfactorily by you, the best thing to do for you is to :

(A) tell the examiner that the questions are out of course.

(B) provoke the candidates to walk out of the examination hall.

(C) try to know something from your neighbour.

(D) try to solve the questions as much as you know with a cool head.

14. Your bathroom tap is leaking and is a constant source of irritating noise. You would :

(A) sleep with pillows upon your ears.

(B) put a bucket underneath

(C) try to put up a cork upon the mouth of the tap.

(D) call a plumber to repair the tap.

15. You find a lady's purse dropped on the road and on pocking it up, find a thousand rupees inside. You would :

(A) take the purse away.

(B) take out the money and leave the purse there.

(C) deposite it at thenearest police station.

(D) stand there and wait for the owner.

16. While sitting in a park, you obeserve that a smart young man comes to the place on a scooter, leaves it there and goes away with someone else on a motorbike.You would :

(A) chase the person.

(B) inform the police at the nearby booth.

(C) call back the person.

(D) remain engaged in your enjoyment.

17. You are playing football in a park. When you kick the ball. it strikes and breaks the window pane of a nearby house. You would :

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(A) demand your ball back from the house owner.

(B) say that it was no fault of yours.

(C) stealthily get your ball back.

(D) apologise to the house owner and contribute to replace the glass.

18. You are in a bus. The bus reaches your stop but still you have not purchased the ticket because of heavy rush.What will you do?

(A) Jump out quickly to avoid embarrassment.

(B) Call the conductor,give him the money and get the ticket.

(C) Hand the money to someone sitting nearby to give it to the conductor.

(D) Give the money to the driver.

19. While you board a train at the station, you find a suitcase beneath your seat. You would :

(A) report the matter to the police.

(B) open up the suitcase to look through its contents.

(C) try to find out the address of the owner from the paper etc. in the suitcase.

(D) finding no one to claim it, take it into the own possession.

20. While firing crackers, a child gets severs burns on the hand. What would you do?

(A) Dip the child's hands in cold water till there is no more burning sensation.

(B) Wash the hands with dettol.

(C) Send someone to call the doctor.

(D) Apply some ointment on the affected area.

21. You find that the person whom you call your friend has been cheating you. What would you do ?

(A) Break relations with him.

(B) Give him tit for tat.

(C) Make him realise his mistake.

(D) Tell other friends about him.

22. While attending your friend's party, you see your friend's muffler catching fire from the candle on the table behind him. You would :

(A) ask your friend to see behind him.

(B) rush to call friend's mother.

(C) rush and taking out the muffler from his neck, drop it and pour water on it.

(D) take out the muffler and throw it away.

23. Your friend is not invite you to his marrige party. You will :

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(A) hold it against him.

(B) attend the ceremony.

(C) send him your best wishes.

(D) ignore the whole affair.

24. While travelling in a train, you observe some college students pulling the alarm chain simply to get down at their desired point. You would :

(A) with the help of some passengers , check them from doing so.

(B) let them pul the chain but check them from detraining.

(C) inform the guard of the train as soon as it stops.

(D) keep quite and do nothing.

25. You are driving your car on the road when you hit against a fruit vendor's cart. You would :

(A) escape from the site by driving away.

(B) abuse the fruit vendor for putting his cart on the way.

(C) pay the fruit vendor for the damage done to him.

(D) insist that it was not your fault.

26. You are the guest at a dinner. The host asks you to take one more chapati after your stomach is full. You would :

(A) make a blunt refuse.

(B) take the chapati.

(C) politely say that the food was too good and you have already eaten much.

(D) make a bad face at him.

27. You are passing by a river and you know a swimming. suddenly, you hear the cry of the drowning child. You would :

(A) dive into the river to save him.

(B) wait to see if some other person is there to help.

(C) look for professional drivers.

(D) console the chile's parents.

28. You are playing in your friend's house,when he gets stuck with a nacked electric wire. You would :

(A) hold him by the arms and try to set him free.

(B) hold the wire and pull it away.

(C) pull off the wire with a wooden stick.

(D) send for the doctor.

29. You are interviewed for a new job. Which of the following questions is most important to you ?

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(A) Opportunities for promotion

(B) Remuneration you will be paid

(C) Scope to develop your ideas and use them to improve the working of the organisation

(D) All the above are equally important

30. You are alone in the house and there is quite a danger of thieves around. Just then, you hear a knock at the door. You would:

(A) open the door to see who is there.

(B) first peep out from the window to confirm whether you know the person.

(C) not open the door.

(D) ask the servant to see who is there.

31. You are living in the college hostel. The dal served to you in the mess has a lot of stones. What would you do ?

(A) Leave eating the dal altogether.

(B) Bring the matter to the notice of mess incharge.

(C) Speak to the cook about changing the dal.

(D) Buy your own dal and cook it in your room.

32. While travelling in a train, you notice a man from the coach behind yours fall off the train . You would :

(A) pull the alarm chain so that the train may stop and the man may be helped.

(B) shout at the falling man asking him to get up quickly and entrain.

(C) jump off the train to assist the falling man.

(D) wait till the train stops at the next station and inform the railway authorities there.

33. "No risk no gain", you

(A) feel that risk means no gain

(B) believe that this slogan is correct

(C) feel it is foolish to accept unnecessary risk

(D) feel that risk may be taken only after judging the situation throughly.

34. Your friends like smoking and influence you to do the same. You will

(A) smoke only because your friends are smoking

(B) refuse to smoke

(C) smoke but only in their presence

(D) refuse and lie to them that you have asthma

35. You have a new boss. You

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(A) will be in different

(B) welcome him warmly

(C) go and flatter him as will help out in future

(D) have problems adjusting as you are still loyal to your old boss

36. You are getting late for your college and bus is not available. In such a situation

(A) you start walking

(B) you drop the idea of going to college that day and return home

(C) you think about other possible conveyance

(D) you wait patiently for the bus though you are late for the class

37. If you are HR Manager of XYZ company and there is only one vacancy. There are three candidates to the post, one out of them is your nephew. You would

(A) select your nephew though he is not eligible for the post

(B) select the candidate who is eligible for the post

(C) consult with senior what needs to be done

(D) tell the candidate that vacancy is already fulfilled

38. After having committed to your family that you would be taking them out on a vacation, you suddenly find yourself wanted in a boardmeeting which unfortunately clashes with the vacation. What would you do?

(A) Assuming it to be urgent, start making necessary arrangement to ensure that the reason for the meeting is fulfilled, thus cancelling the vacation

(B) Find out what the urgent meeting is all about and make necessary arrangements and postpone your vacation

(C) Proceed with your vacation plans without making any arrangement

(D) Try and get out of that situation by asking your colleague to cover up for you.

39. Your college has organized a blood donation camp. You

(A) persuade your friends to donate

(B) donate your blood at the camp

(C) do not believe in donating blood and decide not to attend

(D) yourself do not believe in donating blood but ask other to do so

40. Your maid has invited you to her daughters wedding. You would

(A) completely ignore her

(B) attend the wedding

(C) buy a gift for her daughter

(D) congratulate her and make up some for not being able to attend.

41. When you see a blind man trying to cross the road. You

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(A) ask someone to help him.

(B) go and help him

(C) wait till he crosses the road

(D) ignore and move in

42. If you are a manager and one of your employees is not working properly, as a manager you would

(A) fine him

(B) give the man two weeks to improve

(C) try to develop the mans abilities and interest in another job

(D) talk to him and try to find out his problem

43. You are suffering from diabetes, when you see a whole lot of chocolates, you are tented to eat them. But you also realize that they are not good for you in the long run. What do you do?

(A) You would not eat them because you know the harmful effects

(B) You decide not to eat them but keep thinking about them

(C) You would eat thembut feel guilty about what you have done

(D) You would give into the temptation and eat the chocolates without being bothered about the consequences

44. You have four options of job. You would

(A) choose the higher salary

(B) choose the job where you can utilize your skills

(C) choose the one which gives you chance to go abroad

(D) choose the one which has surety that it cannot be snatched from you

45. Your boss has given you some urgent assignment at the end hour. What would you do?

(A) Try to finish the job as per its requirement

(B) Tell him that you would do it next day

(C) Request one of your colleagues to help you

(D) None of the above

46. You are a social worker. On visiting an orphanage, there is one child who is not ready to let you go away,

(A) you ignore the child because you have other kids to attend

(B) you leave with no concern

(C) you decide to visit him every Sunday

(D) you talk to the authorities and arrange for parents who can adopt him ,

47. After your graduation, you are offered a well paid government job. However, your friend says that you have to bribe to get the appointment order. You

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(A) go to some influential politician who can help

(B) accept the job by paying the bribe, consoling yourself that this is the present social setup

(C) accept the job by paying the bribe, but firmly resolve that this is the last time you will pay bribe

(D) flatly refuse the offer

48. You

(A) get setup when others do not behave properly

(B) are at least interested about what others are thinking about you

(C) can keep your face smiling even when you are terribly disgusted

(D) feel that you should not conceal your attitude from others

49. If you find yourself in a situation where you are required to make a power-point presentation and you are already bogged down by too work, as the manager what would you do?

(A) Take an alternative mode of presentation

(B) Cancel the seminar and reschedule according to your convenience

(C) Pass the buck to your subordinate, you are the boss, no one can question you

(D) Prioritise your work and try to squeeze out time for it

50. You are alone in the house and your sister-in-law is suddenly experiencing labour pains, you

(A) would definitely get upset and do not know what is the right step

(B) go out of the house to call your family doctor

(C) walk her to the nearest hospital

(D) call an ambulance for emergency

51. When you get angry, you usually

(A) throw things

(B) withdraw yourself and start crying

(C) leave the situation and engage yourself in a different activity

(D) None of the above

52. While traveling in your car, certain persons stop you on the way asking you to take an injured child to the hospital. You would

(A) ask them to leave your way and then drive away

(B) ask them to first call the police

(C) immediate take the child to hospital

(D) get out of the car and ask some other person to help them

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7.12 Truth verification

Logic is a language for reasoning it is a collection of rules we use when doing *logical reasoning*. *Human reasoning* has been observed over centuries from at least the times of Greeks, and patterns appearing in reasoning have been extracted, abstracted, and streamlined. The foundation of the logic we are going to learn here was laid down by a British mathematician *George Boole* in the middle of the 19th century, and it was further developed and used in an attempt to derive all of mathematics by *Gottlob Frege*a German mathematician, towards the end of the 19th century. A British philosopher/mathematician, *Bertrand Russell*, found a flaw in basic assumptions in Freges attempt but he, together with *Alfred Whitehead*, developed Frege's work further and repaired the damage. The logic we study today is more or less along this line.

There are various types of logic such as logic of sentences (*propositional logic*), logic of objects (*predicate logic*), logic involving *uncertainties*, logic dealing with fuzziness, temporal logic etc. Here we are going to be concerned with propositional logic and predicate logic, which are fundamental to all types of logic.

7.12.1 What is an Argument?

Logic is concerned with the *validity of arguments*. So, what is an *argument*?. An argument is a connected series of statement, called *premises*, intended to establish a proposition, called *conclusion*. Logic can be thought of as the *science of arguments*, and in particular is concerned With a key property that some arguments possess: *validity*. Some arguments are valid and some are invalid. why is this? This is the topic of logic. We write arguments in the following way. It never matters what order the premises are in.

$$\frac{\text{If it is snowing, then it is cold outside.} \qquad \text{It is snowing}}{\text{Therefore, it is cold outside}}$$

7.12.1.1 Valid argument

A valid argument is an argument that has no counterexamples. An invalid argument is an argument that's not valid. Note that it does not make sense to say a statement is valid. Validity is an attribute of arguments only. Individual statements can be true or false, but they cannot be valid or invalid. For example the below argument is valid one.

Premise 1	If it is raining, then Grass are wet.
Premise 2	It is Raining
Conclusion	Therefore, grass are wet

Above argument is a valid one. We will later see that this is famous modes ponens rule in natural deduction. Any argument of the form as below one is a valid argument.

$$\frac{\alpha \text{ and } \beta.}{\text{Thus, } \alpha}$$

$$\frac{\text{Because } \delta, \text{ it isn't so that } \Gamma}{\text{Thus, } \Gamma}$$

$$\frac{\text{It is crazy to believe that } \beta. \qquad \text{It is possible that } \alpha.}{\text{Thus, it is likely that } \alpha, \text{ but } \beta.}$$

$$\frac{\alpha \text{ but } \beta.}{\text{Thus, } \beta}$$

$$\frac{\alpha. \qquad \beta.}{\text{Thus, } \alpha \text{ and } \beta}$$

$$\frac{\alpha \text{ or } \beta. \qquad \text{It is not the case that } \alpha.}{\text{Thus, } \beta}$$

$$\frac{\text{If } \alpha, \text{ then } \beta. \qquad \alpha.}{\text{Thus, } \beta}$$

$$\frac{\alpha \text{ unless } \beta. \qquad \text{It is not the case that } \beta}{\text{Thus, } \alpha}$$

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Wrong definition of Validity:

The below interpretation of counter example is wrong. By valid we mean that the collusion of the argument must follow from the truth of the premises of the argument. An argument is valid if and only if it is impossible for all the premises to be true and the conclusion to be false.

- A valid argument is a case where the premises are true and the conclusion is true as well.
- A valid argument is a case where the premises are true and therefore the conclusion has to be true.
- A valid argument is an argument where if the premises are true, then the conclusion is true.
- A valid argument is an argument where the premises are true and the conclusion can't be false.
- An argument is valid only when it has no counterexamples.
- An argument is valid if and only if it is not invalid.

An argument is sound when it is valid and all its all premises are true. Sound arguments always have true conclusions

A rough test for validity

Here is the mechanical way to test the validity of any argument. You try it your self

1. First imagines that the premises are true–whether or not they actually are.
2. Ask yourself, without appealing to any other knowledge you have, could you still imagine the conclusion being false?
3. If you can, the argument is invalid. If you can't, then the argument is valid

A deductive argument is one in which our intention is the evidence to be so strong that it is impossible for the premises to be true and the conclusion false, or the conclusion follows necessarily from the premises.

An inductive argument is one in which the our intention is the evidence only to be so strong that it is impossible that the premises could be true and the conclusion false, or the conclusion is likely true if the premises are true. Below are the possible relation between premises and conclusion.

Premises	Conclusion	Valid	Invalid
TRUE	TRUE	Possible	Possible
TRUE	FALSE	Impossible	Possible
FALSE	TRUE	Possible	Possible
FALSE	FALSE	Possible	Possible

7.12.1.2 Introduction to Syllogism

A syllogism is a kind of logical argument in which one proposition (the conclusion) is inferred from two or more others (the premises).There are two main types of Syllogism question.

1. Two Statement Syllogism
2. Three Statement Syllogism

Example 25 *Here is an example of two statement Syllogism*

Premise 1	All cats are dogs
Premise 2	All dogs are birds
Conclusion	I) Grass are wet
	II) Some birds are cats

Example 26 *Here is an example of three statement Syllogism*

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Premise 1	All cats are dogs
Premise 2	some pigs are cats
Premise 3	no dogs are birds
Conclusion	I) some cats are dogs II) no birds are cats III) some pigs are birds IV) some pigs are not birds

Subject vs Predicate

Consider this question statement

1. All cats are dogs
2. Some dogs are birds
3. No bird is a pig
4. Some pigs are not birds.

In all such statements, first-term is called subject and second is called predicate.

	Subject	Predicate
1. All cats are dogs	Cats	Dogs
2. Some dogs are birds	Dogs	Birds
3. No bird is a pig	Bird	Pig
4. Some pigs are not birds.	Pigs	Birds

Classification of statement

In syllogism, each statement usually has following format

abc subject is/are (not) predicate

.

abc	Subject	Is/are (+/-not)	Predicate
All	Cats	Are	Dogs
Some	Pigs	Are not	birds

Based on *abc* and "not", we classify the statements as following

Statement	Type	Codename
1. All cats are dogs	Universal Positive	UP
2. Some dogs are birds	Particular Positive	PP
3. No bird is a pig	Universal Negative	UN
4. Some pigs are not birds.	Particular Negative	PN

Please remember following words. Whenever they come, you classify the statement accordingly.

All, every, any, none, not a single, only etc.	Universal (positive or negative)
Some, many, a few, quite a few, not many, very little, most of, almost, generally, often, freqently, etc.	Particular (positive or negative)

7.12.2 Standard format conversion

Basically, a syllogism(we consider 2 premise syllogism here) should have the following basic form:

1. (*abc*) "A" is/are (+/- not) "B"
2. (*abc*) "B" is/are (+/- not) "C"

So basically it is

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1. $A \to B$
2. $B \to C$

Read as "A to B then B to C". If it is not, then it needs to be converted to the above format. Question statements must have ONLY three terms. (A, B and C). In the exam, if they give you two question statements with four terms then your time is saved! Just tick the answer "no conclusion can be drawn"

Example 27 *Consider the following*

1. *All cats are Dogs*
2. *Some birds are pigs*

(A) *All Dogs are cat*
(B) *All Birds are dog*
(C) *All Pigs are bird*
(D) *No clusion can be drawn*

Solution— No conclusion can be drawn. Because it has four terms (cats, dogs, birds, pigs)
The standard format for question statements is

1. $A \to B$
2. $B \to C$

But if the given question statements are not given in this format, then we must convert them into above format. Otherwise we cannot proceed with answer. Suppose Given question statements are

1. $A \to B$
2. $C \to B$

This must be converted into

1. $A \to B$
2. $B \to C$

If Given question statements are

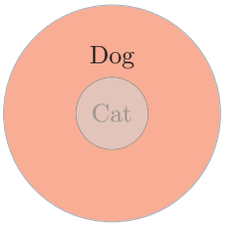
1. $B \to A$
2. $B \to C$

This must be converted into

1. $A \to B$
2. $B \to C$

Ok, so how to convert the statements?

Universal positive (UP) conversion		
Given Statement	Valid conversions	Type
All Cats are Dogs	Some Cats are dogs	Particular Positive (PP)
	Some dogs are cats	Particular Positive (PP)

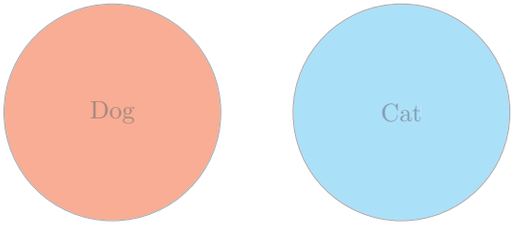


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It means UP can be converted into PP. Suppose the given statement is " Only pigs are goat" then it is better to convert is " All goat are pigs".

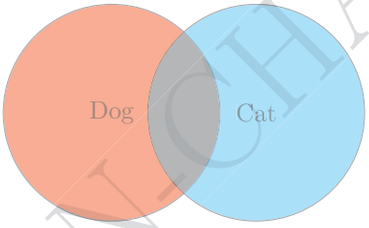
Only x is y means all y are x

Universal Negative (UN) conversion		
Given Statement	Valid conversions	Type
No Cats are Dogs	Some dogs are not cats	Particular Negative (PN)
	No dogs are cats	Universal Negative (UN)



It means UN can be converted into PN or UN.

Particular Positive (PP) conversion		
Given Statement	Valid conversions	Type
Some Cats are Dogs	Some dogs are cats	Particular Positive (PP)



It means PP can be converted into PP only.
Some Cats are not Dogs. In Particular negative statements (PN), no conversion can be made.

Conversion rules	
Type	Valid Conversion
Universal Positive (UP)	Only PP
Universal Negative (UN)	PN or UN
Particular Positive (PP)	Only PP
Particular Negative (PN)	Not possible.

Example 28 *What can be concluded from the given statement: "Some Politicians are honest men."*

(A) *Some Honest men are not Politicians.*
(B) *All Honest men are not politician*
(C) *Some Honest men are politicians.*
(D) *None of Above.*

Solution—According to our table, it can be converted into PP only.Particular Positive (PP) statement can be converted into Particular Positive (PP) statement only. SO C is correct choice.

The standard question format is

1. $A \to B$
2. $B \to C$

If the given question doesn't have statements in above standard format, then we must convert them into standard format. Only then we can proceed further.

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Example 29 *Consider below statements*

1. *All Cats are dogs*
2. *All pigs are dogs*

We have to convert it, because it is not in standard format

1. *All Cats(A) are dogs (B)* $A \to B$
2. *Some dogs(B) are pigs(C).* $B \to C$ *(Rule UP* $\to$ *only PP)*

Here are the non-conclusion combos when two question statements are in following format

No conclusion Combos		
First statement ($A \to B$)	Second statement ($B \to C$)	Answer
Universal Positive (UP)	Particular Positive (PP)	No conclusion
	Particular Negative (PN)	No conclusion
Universal Negative (UN)	Universal Negative (UN)	No conclusion
	Particular Negative (PN)	No conclusion
Particular Positive (PP)	Particular Positive (PP)	No conclusion
	Particular Negative (PN)	No conclusion
Particular Negative (PN)	Any other (UP, UN, PP, PN)	No conclusion

Some rules to remember it

1. Ramesh from UP hate giving particular statements (both positive and negative).
2. United Nations hates negativity. (both Universal and particular)
3. Parminder Nandy hates everybody.
4. Two-negatives=no conclusion.
5. Two particulars=no conclusion.

When you face a "two-statement syllogism question". you should follow these steps:

1. First, make sure it contains only three terms (ABC) (else no conclusion.)
2. Make sure question statements are in standard format (A to B then B to C). If not in standard format, then re-arrange.
3. Classify the question statements. (UP, UN, PP, PN)
4. Check if the question statements have no conclusion combos

If above things donot yield an answer, then we have to think about what will be the "conclusion(s)"?. In below table answer statement is usually in the format of $A \to C$

Other Combos	
UP+UP=UP	If Uttar Pradesh meets Uttar Pradesh, then its size remains same.
UP+UN=UN	If Uttar Pradesh meets United Nations then its size increases and it becomes United Nations.
UN+ (UP/PP)=PN	United Nations Secretary Ban Ki Moon from South Korea is in very positive mood. But he meets another positive person, and his attitude is totally reversed. i.e he becomes particularly negative! (reversed $C \to A$)
PP+ (UP/UN)=PP/PN	When Ms.Parminder Pratap observes the universe via NASA telescope, her mood becomes positive or negative depending on the mood of universe.

Example 30 *Consider below statement*

a) All men are women.

b) All women are crazy.

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Conclusion

1. *All Men are crazy*
2. *All the crazy are men*
3. *Some of the crazy are men*
4. *Some of the crazy are women*

(A) *None of the conclusion follows*
(B) *All conclusions follow*
(C) *Only 1, 3 and 4 follow*
(D) *Only 2 and 3 follow*

Solution— First step is to make sure four terms are not given .Only three terms (men, women, crazy) is given . Second step, make sure all terms are in standard format (A to B and then B to C): Here conversion is not required.

All men(A) are women. (B))	$A \to B$
All women(B) are crazy.(C)	$B \to C$

Third step, classify the statements.

All men are women.	Universal Positive (UP)
All women are crazy.	Universal Positive (UP)

Fourth step: check the combo for question statements. Well, since it is UP+UP= its size doesn't increase. Hence conclusion should be UP. $(A \to C)$ meaning All men(A) are crazy.(C). Check the answer statements one by one.

All Men are crazy	Correct.
All the crazy are men	Recall that "conversion table".Universal Positive (UP) can be converted only into Particular Positive (PP). Since All men are crazy → Some Crazy are men. But we cannot say All crazy are men. So this option is false.
Some of the crazy are men	Correct if we appply "conversion table"
Some of the crazy are women	All women are crazy. (Universal positive). If we apply conversion table $(UP \to PP)$ then Some Crazy are women. Hence this statement is also correct.

7.12.3 Forceful argument

In this type of questions, a Statement (usually an interrogative sentence) in the form of a suggested course of action is followed by two arguments. One argument generally Supports the given Statement (or suggested course of action) by pointing out some positive features or positive results of that action while the second argument denies the Statement or argues against it by pointing out the negative features or deleterious effect/result ofthat action. In order to determine the forcefulness of the arguments we have to decide whether the argument is perfect or not. If an argument is hundred per cent perfect, it would be forceful.

Points to remember

1. The argument should not be just an opinion. It must answer one of the questions—Why, How, When, What—of the Statement. Otherwise it is not an argument.
2. An argument also depends on the language used because by changing a few words we can make a weak argument forceful.
3. The argument must be judged as an argument and not with what somebody or newspapers say (s).
4. If some one is quoted in support of the Statement it cannot be a forceful argument.
5. If an argument is an assumption. (That is. if it assumes something to be true whereas in reality it may or may not be true, the argument cannot be forceful.

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6. An ambiguous argument cannot be forceful. The argument must be clear in meaning otherwise it may not be forceful or strong. An ambiguous argument leaves a doubtful and confused impression.
7. If the argument is in form of a simple sentence lacking any facts or established notions which is not ambiguous can not be forceful. Such argument shows proper relation with the Statement but due to its simplicity, it cannot be considered a forceful or strong argument.
8. If the argument is superfluous and only glances at the theme without making an indepth analysis of the facts or information, the argument cannot be forceful

1. Should we follow non-alignment as foreign policy ?

   (A) Yes (B) No

2. Is child the father of man ?

   (A) Yes (B) No

3. Should school teachers be banned to take any private tuitions ?

   (A) Yes (B) No

4. Should education be made compulsory for all children upto the age of 14 ?

   (A) Yes, This would improve the Standard of living. (B) No

5. Should terminal examination in India's present present education system be abolished altogether.

   (A) Yes, it has outlived altogether (B) No

6. Should open book examinations be introduced for professional courses in India

   (A) Yes, All candidates can pass easily and can start their professional life (B) No

7.12.3.1 Weak arguments

Weak argument are those which are of minor importance and also may not be directly related to the Statement or may be related to a trivial aspect of the question/statement. You can declare an argument as weak on the basis of the following ground

Points to remember for weak argument

1. If it is an established fact that such a result as mentioned in the argument would not follow an action suggested in the Statement.
2. If experiences predict that the result. will not follow
3. If logically the result is not probable. That means. if we analyse the result and it does not appear to

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be logicaly sound.

4. An argument should not be factually incorrect. The argument must not violate the prevailing notion of truth or ideas. An argument can be rejected if it violates the previous notion of truth.
5. Sometimes an argument Supports an action on the basis ofconsequences which are not universaly accepted and which are not logically sound. Such an argument can only be described as the assumption or individual perception of the Speaker . In no case such an argument be forceful.

Strong arguments have logical and clear reasons that directly support the claim.

7.13 Solved excercises

1. **Statement**— Should India encourage exports, when most things are insufficient for internal use itself?
Arguments—

I) Yes. We have to earn foreign exchange to pay for our imports.
II) No. Even selective encouragement would lead to shortages.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong

2. **Statement**— Should all the drugs patented and manufactured in Western countries be first tried out on sample basis before giving licence for sale to general public in India?
Arguments—

I) Yes. Many such drugs require different doses and duration for Indian population and hence it is necessary.
II) No. This is just not feasible and hence cannot be implemented.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Both I and II are strong

3. **Statement**— Should India make efforts to harness solar energy to fulfil its energy requirements?
Arguments—

I) Yes, Most of the energy sources used at present is exhaustible.
II) No. Harnessing solar energy requires a lot of capital, which India lacks in.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong

4. **Statement**— Should there be students union in college/university?
Arguments—

I) No. This will create a political atmosphere in the campus.

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II) Yes, it is very necessary Students are future political leaders.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

5. **Statement**— Should India give away Kashmir to Pakistan?
Arguments—

I) No. Kashmir is a beautiful state. It earns a lot of foreign exchange for India.

II) Yes. This would help settle conflicts.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Both I and II are strong

6. **Statement**— Should cottage industries be encouraged in rural areas?
Arguments—

I) Yes. Rural people are creative.

II) Yes. This would help to solve the problem of unemployment to some extent.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

7. **Statement**— Should young entrepreneurs be encouraged?
Arguments—

I) Yes. They will help in industrial development of the country.

II) Yes. They will reduce the burden on employment market.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Both I and II are strong

8. **Statement**— Should all the annual examinations up to Std. V be abolished?
Arguments—

I) Yes. The young students should not be burdened with such examinations which hampers their natural growth.

II) No. The students will not study seriously as they will get automatic promotion to the next class and this will affect them in future.

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(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Both I and II are strong

9. **Statement**— Should Indian scientists working abroad be called back to India?
Arguments—

I) Yes. They must serve the motherland first and forget about discoveries, honours, facilities and all.

II) No. We have enough talent; let them stay where they want.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

10. **Statement**— Should we scrap the system of formal education beyond graduation?
Arguments—

I) Yes. It will mean taking employment at an early date.

II) No. It will mean lack of depth of knowledge.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

11. **Statement**— Should there be an upper age limit of 65 years for contesting Parliamentary/ Legislative Assembly elections?
Arguments—

I) Yes. Generally, people above the age of 65 lose their dynamism and will power.

II) No. The life span is so increased that people remain physically and mentally active even up to the age of 80.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

12. **Statement**— Should new big industries be started in Mumbai?
Arguments—

I) Yes. It will create job opportunities.

II) No. It will further add to the pollution of the city.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

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13. **Statement**— Should high chimneys be installed in industries?
Arguments—

I) Yes. It reduces pollution at ground level.

II) No. It increases pollution in upper atmosphere.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Both I and II are strong

14. **Statement**— Does India need so many plans for development?
Arguments—

I) Yes. Nothing can be achieved without proper planning.

II) No. Too much time, money and energy is wasted on planning.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

15. **Statement**— Should articles of only deserving authors be allowed to be published?
Arguments—

I) Yes. It will save a lot of paper which is in short supply.

II) No. It is not possible to draw a line between the deserving and the undeserving.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Both I and II are strong

16. **Statement**— Should colleges be given the status of a university in India?
Arguments—

I) Yes. Colleges are in a better position to assess the student's performance and therefore the degrees will be more valid.

II) No. It is Utopian to think that there will not be nepotism and corruption in awarding degrees by colleges.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

17. **Statement**— Should the prestigious people who have committed crime unknowingly, be met with special treatment?
Arguments—

I) Yes. The prestigious people do not commit crime intentionally.

II) No. It is our policy that everybody is equal before the law.

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(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Both I and II are strong

18. **Statement**— Can pollution be controlled?
Arguments—

I) Yes. If everyone realizes the hazards it may create and cooperates to get rid of it, pollution may be controlled.

II) No. The crowded highways, factories and industries and an ever-growing population eager to acquire more and more land for constructing houses are beyond control.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

19. **Statement**— Should the railways in India be privatized in a phased manner like other public sector enterprises?
Arguments—

I) Yes. This is the only way to bring in competitiveness and provide better services to the public.

II) No. This will pose a threat to the national security of our country as multinationals will enter into the fray.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

20. **Statement**— Should internal assessment in colleges be abolished?
Arguments—

I) Yes. This will help in reducing the possibility of favouritism.

II) No, teaching faculty will lose control over students.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

21. **Statement**— Should all the unauthorized structures in the city be demolished?
Arguments—

I) No. Where will the people residing in such houses live?

II) Yes. This will give a clear message to general public and they will refrain from constructing unauthorized buildings.

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(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

22. **Statement**— Should there be a maximum limit for the number of ministers in the Central Government?
Arguments—

I) No. The political party in power should have the freedom to decide the number of ministers to be appointed.

II) Yes. The number of ministers should be restricted to a certain percentage of the total number of seats in the parliament to avoid unnecessary expenditure.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Both I and II are strong

23. **Statement**— Should foreign films be banned in India?
Arguments—

I) Yes. They depict an alien culture which adversely affects our values.

II) No. Foreign films are of a high artistic standard.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

24. **Statement**— Is buying things on instalments profitable to the customer?
Arguments—

I) Yes. He has to pay less.No, paying instalments upsets the family budget.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

25. **Statement**— Should Doordarshan be given autonomous status?
Arguments—

I) Yes. It will help Doordarshan to have fair and impartial coverage of all important events.

II) No. The coverage of events will be decided by a few who may not have healthy outlook.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

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26. **Statement**— Should adult education programme be given priority over compulsory education programme?
Arguments—

I) No. It will also help in success of compulsory education programme.
II) Yes. It will help to eliminate the adult illiteracy.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Both I and II are strong

27. **Statement**— Should new universities be established in India?
Arguments—

I)
II) No. We have still not achieved the target for literacy.
III)
IV) No. We will have to face the problem of unemployed but highly qualified people.

(A) Only argument II is strong
(B) Either I or II is strong
(C) Neither I nor II is strong
(D) Both I and II are strong

28. **Statement**— Should non-vegetarian food be totally banned in our country?
Arguments—

I) Yes. It is expensive and therefore it is beyond the means of most people in our country.
II) No. Nothing should be banned in a democratic country like ours.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Both I and II are strong

29. **Statement**— Should a total ban be put on trapping wild animals?
Arguments—

I) Yes. Trappers are making a lot of money;
II) No. Bans on hunting and trapping are not effective.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong

30. **Statement**— Should Government close down loss-making public sector enterprises?
Arguments—

I) No. All employees will lose their jobs, security and earning, what would they do?

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II) Yes. In a competitive world the rule is 'survival of the fittest'.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

31. **Statement**— Should government jobs in rural areas have more incentives?
Arguments—

I) Yes. Incentives are essential for attracting government servants there.

II) No. Rural areas are already cheaper, healthier and less complex than big cities. So ? Why offer extra incentives!

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Both I and II are strong

32. **Statement**— Should there be a cap on maximum number of contestants for parliamentary elections in any constituency?
Arguments—

I) Yes. This will make the parliamentary elections more meaningful as the voters can make a considered judgement for casting their vote.

II) No. In a democracy any person fulfilling the eligibility criteria can contest parliamentary elections and there should be no restrictions.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

33. **Statement**— Should so much money be spent on advertisements?
Arguments—

I) Yes. It is an essential concomitant in a capitalist economy.

II) No. It leads to wastage of resources.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

34. **Statement**— Should all the legislators be forced to resign from their profession?
Arguments—

I) Yes. They will be able to devote more time for the country.

II) No, nobody will contest election.

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(A) Only argument I is strong

(B) Only argument II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

35. **Statement**— Should 'computer knowledge' be made a compulsory subject for all the students at secondary school level?
Arguments—

I) No, our need is 'bread' for everyone, we cannot follow western models.

II) Yes. We cannot compete in the international market without equipping our children with computers.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

36. **Statement**— Should there be uniforms for students in the colleges in India as in the schools?
Arguments—

I) Yes, this will improve the ambience of the colleges as all the students will be decently dressed.

II) No. The college students should not be regimented and they should be left to choose their clothes for coming to the college.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Both I and II are strong

37. **Statement**— Should India engage into a dialogue with neighbouring countries to stop cross border tension?
Arguments—

I) Yes. This is the only way to reduce the cross border terrorism and stop loss of innocent lives.

II) No. Neighbouring countries cannot be relied upon in such matters, they may still engage in subversive activities.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

38. **Statement**— Should there be a world government?
Arguments—

I) Yes. It will help in eliminating tensions among the nations.

II) No. Then, only the developed countries will dominate in the government.

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(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

39. **Statement**— Should the practice of transfers of clerical cadre employees from government offices of one city to those of another be stopped?
Arguments—

I) No. Transfer of employees is a routine administrative matter and we must continue it.

II) Yes. It involves lot of governmental expenditure and inconvenience too many compared to the benefits it yields.

(A) Only argument I is strong

(B) Either I or II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

40. **Statement**— Is paying ransom or agreeing to the conditions of kidnappers of political figures, a proper course of action?
Arguments—

I) Yes. The victims must be saved at all cost.

II) No. It encourages the kidnappers to continue their sinister activities.

(A) Only argument II is strong

(B) Either I or II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

41. **Statement**— Should religion be banned?
Arguments—

I) Yes. It develops fanaticism in people.No, Religion binds people together.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

42. **Statement**— Should India become a permanent member of UN's Security Council?
Arguments—

I) Yes. India has emerged as a country which loves peace and amity.

II) No. Let us first solve problems of our own people like poverty, malnutrition.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Both I and II are strong

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43. **Statement**— Should fashionable dresses be banned?
Arguments—

I) Yes. Fashions keep changing and hence consumption of cloth increases.

II) No. Fashionable clothes are a person's self expression and therefore his/her fundamental right.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Both I and II are strong

44. **Statement**— Should an organization like UNO be dissolved?
Arguments—

I) Yes. With cold war coming to an end, such organizations have no role to playNo, In the absence of such organizations there may be a world war.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

45. **Statement**— Should there be no place of interview in selection?
Arguments—

I) Yes, it is very subjective in assessment.

II) No. It is the only instrument to judge candidates' motives and personality.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

46. **Statement**— Should family planning be made compulsory in India?
Arguments—

I) Yes. Looking to the miserable conditions in India, there is no other go.

II) No. In India there are people of various religions and family planning is against the tenets of some of the religions.

(A) Only argument I is strong

(B) Either I or II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

47. **Statement**— Should income tax be abolished in India?
Arguments—

I) Yes. It is an unnecessary burden on the wage earners.

II) No. It is a good source of revenue.

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(A) Only argument I is strong

(B) Only argument II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

48. **Statement**— Should there be a ceiling on the salary of top executives of multinationals in our country?
Arguments—

I) Yes. Otherwise it would lead to unhealthy competition and our own industry would not be able to withstand that.

II) No. With the accent on liberalization of economy, any such move would be counter-productive. Once the economy picks up, this disparity will be reduced.

(A) Only argument I is strong

(B) Either I or II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

49. **Statement**— Should school education be made free in India?
Arguments—

I) Yes. This is the only way to improve the level of literacy.

II) No. It would add to the already heavy burden on the exchequer.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

50. **Statement**— Should import duty on all the electronic goods be dispensed with?
Arguments—

I) No. This will considerably reduce the income of the government and will adversely affect the developmental activities.

II) No. The local manufacturers will not be able to compete with the foreign manufacturers who are technologically far superior.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

51. **Statement**— Should children be legally made responsible to take care of their parents during their old age?
Arguments—

I) Yes. Such matter can only be solved by legal means.

II) Yes. Only this will bring some relief to poor parents.

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(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

52. **Statement**— Should there be reservation in Government jobs for candidates from single child family?
Arguments—

I) No. This is not advisable as the jobs should be offered to only deserving candidates without any reservation for a particular group.

II) Yes. This will help reduce the growing population in India as the parents will be encouraged to adopt single child norm.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

53. **Statement**— Should higher education be completely stopped for some time?
Arguments—

I) No. It will hamper the country's future progress.

II) Yes. It will reduce the educated unemployment.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Neither I nor II is strong

(D) Both I and II are strong

54. **Statement**— Should we scrap the 'Public Distribution System' in India?
Arguments—

I) Yes, Protectionism is over, everyone must get the bread on his/her own.

II) Yes. The poor do not get any benefit because of corruption.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

55. **Statement**— Should India have no military force at all?
Arguments—

I) No. Other countries in the world do not believe in non-violence.

II) Yes. Many Indians believe in non-violence.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

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1. **Statement**— Are nuclear families better than joint families?
Arguments—

I) No. Joint families ensure security and also reduce the burden of work.
II) Yes. Nuclear families ensure greater freedom.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong
(E) Both I and II are strong

2. **Statement**— Should government stop spending huge amounts of money on international sports?
Arguments—

I) Yes. This money can be utilized for upliftment of the poor.
II) No. Sports persons will be frustrated and will not get international exposure.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong
(E) Both I and II are strong

3. **Statement**— Should the railways immediately stop issuing free passes to all its employees?
Arguments—

I) No. The employees have the right to travel free.
II) Yes. This will help railways to provide better facility.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong
(E) Both I and II are strong

4. **Statement**— Should there be compulsory medical examination of both the man and the woman before they marry each other?
Arguments—

I) No. This is an intrusion to the privacy of an individual and hence cannot be tolerated.
II) Yes. This will substantially reduce the risk of giving birth to children with serious ailments.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong
(E) Both I and II are strong

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5. **Statement**— Should there be a ban on product advertising?
Arguments—

I) No. It is an age of advertising. Unless your advertisement is better than your other competitors, the product will not be sold.

II) Yes. The money spent on advertising is very huge and it inflates the cost of the product.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

6. **Statement**— Should luxury hotels be banned in India?
Arguments—

I) Yes. They are places from where international criminals operate.

II) No. Affluent foreign tourists will have no place to stay.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

7. **Statement**— Should shifting agriculture be practised?
Arguments—

I) No. It is a wasteful practice.

II) Yes. Modern methods of farming are too expensive.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

8. **Statement**— Should our country extend generous behaviour and goodwill to our erring and nagging neighbours?
Arguments—

I) Yes. Goodwill always pays dividend.

II) No. Our generous behaviour and goodwill will be considered as our weakness.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

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9. **Statement**— Is pen mightier than a sword?
Arguments—

I) Yes. Writers influence the thinking of the people.
II) No. With the help of physical force one can conquer all.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong
(E) Both I and II are strong .

10. **Statement**— Should the sex determination test during pregnancy be completely banned?
Arguments—

I) Yes. This leads to indiscriminate female foeticide and eventually will lead to social imbalance.
II) No. People have a right to know about their unborn child.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong
(E) Both I and II are strong

11. **Statement**— Should persons convicted of criminal offences in the past be allowed to contest elections in India?
Arguments—

I) No. Such persons cannot serve the cause of the people and country.
II) Yes. It is democracy - let people decide whom to vote.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong
(E) Both I and II are strong

12. **Statement**— Should officers accepting bribe be punished?
Arguments—

I) No. Certain circumstances may have compelled them to take bribe.
II) Yes. They should do the job they are entrusted with, honestly.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong
(E) Both I and II are strong

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13. **Statement**— Should there be a complete ban on use of all types of chemical pesticides in India?
Arguments—

I) No. The pests will destroy all the crops and the farmers will have nothing to harvest.

II) Yes. The chemical pesticides used in agriculture pollute the water underground and this has become a serious health hazard.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

14. **Statement**— Should cutting of trees be banned altogether?
Arguments—

I) Yes. It is very much necessary to do so to restore ecological balance.

II) No. A total ban would harm timber based industries.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

15. **Statement**— Should there be a restriction on the migration of people from one state to another state in India?
Arguments—

I) No. Any Indian citizen has a basic right to stay at any place of his/her choice and hence they cannot be stopped.

II) Yes. This is the way to effect an equitable distribution of resources across the states in India.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

16. **Statement**— Should all refugees, who make unauthorized entry into a country, be forced to go back to their homeland?
Arguments—

I) Yes. They make their colonies and occupy a lot of land.

II) No. They leave their homes because of hunger or some terror and on human grounds, should not be forced to go back.

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(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

17. **Statement**— Should India create a huge oil reserve like some Western countries to face difficult situations in future?
Arguments—

I) No. There is no need to block huge amount of foreign exchange and keep the money idle.

II) Yes. This will help India withstand shocks of sudden rise in oil prices due to unforeseen circumstances.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

18. **Statement**— Should there be more than one High Court in each state in India?
Arguments—

I) No. This will be a sheer wastage of taxpayers' money.

II) Yes. This will help reduce the backlog of cases pending for a very long time.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

19. **Statement**— Should judiciary be independent of the executive?
Arguments—

I) Yes. This would help curb the unlawful activities of the executive.

II) No. The executive would not be able to take bold measures.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

20. **Statement**— Should all the practising doctors be brought under Government control so that they get salary from the Government and treat patients free of cost?
Arguments—

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I) No. How can any country do such an undemocratic thing?

II) Yes. Despite many problems, it will certainly help minimize, if not eradicate, unethical medical practices.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

21. **Statement**— Should students take part in politics?
Arguments—

I) Yes. It inculcates in them qualities of leadership.

II) No. They should study and build up their career.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

22. **Statement**— Should the opinion polls predicting outcome of elections before the elections be banned in India?
Arguments—

I) Yes. This may affect the voters mind and may affect the outcome.

II) No. Such polls are conducted all over the world.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

23. **Statement**— Should the political parties be banned?
Arguments—

I) Yes. It is necessary to teach a lesson to the politicians.

II) No. It will lead to an end of democracy.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

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24. **Statement**— Should system of offering jobs only to the wards of government employees be introduced in all government offices in India?
Arguments—

I) No. It denies opportunity to many deserving individuals and government may stand to lose in the long run.

II) No. It is against the principle of equality, does not government owe its responsibility to all its citizens?

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

25. **Statement**— Should the vehicles older than 15 years be rejected in metros in India?
Arguments—

I) Yes. This is a significant step to lower down the pollution level in metros.

II) No. It will be very difficult for vehicle owners to shift to other parts in country because they will not get suitable job for their very existence.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

26. **Statement**— Should the tuition fees in all post-graduate courses be hiked considerably?
Arguments—

I) Yes. This will bring in some sense of seriousness among the students and will improve the quality.

II) No. This will force the meritorious poor students to stay away from post-graduate courses.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

27. **Statement**— Should the persons below the age of 18 years be allowed to join armed forces?
Arguments—

I) No. Persons below the age of 18 do not attain both physical and mental maturity to shoulder such burden.

II) Yes. This will help the country develop its armed forces which will serve the country for a longer time.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

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(E) Both I and II are strong

28. **Statement**— Should all the infrastructural development projects in India be handed over to the private sector?
Arguments—

I) No. The private sector entities are hot equipped to handle such projects.

II) Yes. Such projects are handled by private sector in the developed countries.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

29. **Statement**— Should all the colleges in India be allowed to devise their own curriculum and syllabus for the vocational courses promoting self-employment?
Arguments—

I) Yes. This is an important step to generate employment opportunities.

II) No. This will affect the quality of education due to lack of uniformity in syllabus.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

30. **Statement**— Should agriculture in rural India be mechanized?
Arguments—

I) Yes. It would lead to higher production.

II) No. Many villagers would be left unemployed.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

31. **Statement**— Should there be concentration of foreign investment in only few states?
Arguments—

I) No. It is against the policy of overall development of the country.

II) Yes. A large number of states lack infrastructure to attract foreign investment.

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(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

32. **Statement**— Should the oil companies be allowed to fix the price of petroleum products depending on market conditions?
Arguments—

I) Yes. This is the only way to make the oil companies commercially viable.

II) No. This will put additional burden on the retail prices of essential commodities and will cause a lot of hardships to the masses.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

33. **Statement**— Should the education at all levels be offered only in vernacular medium?
Arguments—

I) Yes. This is the only way to enhance performance of the students.

II) No. This will severely affect acquiring knowledge for want of good text books in vernacular medium.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

34. **Statement**— Should there be only one rate of interest for term deposits of varying durations in banks?
Arguments—

I) No. People will refrain from keeping money for longer duration resulting into reduction of liquidity level of banks.

II) Yes. This will be much simple for the common people and they may be encouraged to keep more money in banks.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

35. **Statement**— Should all news be controlled by Government in a democracy?
Arguments—

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I) Yes. Variety of news only confuses people.

II) No. Controlled news loses credibility.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

36. **Statement**— Should taxes on colour television be further increased?
Arguments—

I) Yes, Colour television is a luxury

II) and only rich people buy them.No, Televisions are bought by the poor too.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

37. **Statement**— Should the educated unemployed youth be paid "unemployment allowance" by the Government?
Arguments—

I) Yes. It will provide them some monetary help to either seek employment or to kick-start some 'self-employment' venture.

II) No. It will dampen their urge to do something to earn their livelihood and thus promote idleness among the unemployed youth.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

38. **Statement**— Should higher education be restricted to only those who can bear the expenditure?
Arguments—

I) Yes. Higher education is very costly; hence it should not be given free.

II) No. There are a large number of brilliant students who cannot afford to pay and they should be given higher education.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

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39. **Statement**— Should those who receive dowry, despite the law prohibiting it, be punished?
Arguments—

I) Yes. Those who violate the law must be punished.

II) No. Dowry system is firmly rooted in the society since time immemorial.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

40. **Statement**— Is the Government justified in spending so much on defence?
Arguments—

I) Yes. Safety of the country is of prime importance.

II) No. During peace, this money could be used for the development of the country.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

41. **Statement**— Should girls learn arts like judo and karate?
Arguments—

I) Yes. It will enable them to defend themselves from rogues and ruffians.

II) No. They will lose their feminine grace.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

42. **Statement**— Should India develop a national water grid by connecting all the rivers in the country?
Arguments—

I) No. This is not just possible as we do not have the technical knowhow.Yes, this will greatly help the entire country by effectively channelizing the excess water to the areas having shortage.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

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43. **Statement**— Should individuals/institutes having treasures of national significance like Nobel Prizes, hand them over to the Central Government for their safe custody?
Arguments—

I) Yes. The individuals or institutions do not have enough resources to protect them.
II) No. These are the property of the individuals/institutions who win them and should be in their custody.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong
(E) Both I and II are strong

44. **Statement**— Should there be reservation of seats and posts on communal basis?
Arguments—

I) Yes. It will check most of the inter-communal biases.No, ours is a secular state.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong
(E) Both I and II are strong

45. **Statement**— Should octroi be abolished?
Arguments—

I) Yes. It will eliminate an important source of corruption.
II) No. It will adversely affect government revenues.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong
(E) Both I and II are strong

46. **Statement**— Should public holidays be declared on demise of important national leaders?
Arguments—

I) No. Such unscheduled holidays hamper national progress.
II) Yes. People would like to pay their homage to the departed soul.

(A) Only argument I is strong
(B) Only argument II is strong
(C) Either I or II is strong
(D) Neither I nor II is strong
(E) Both I and II are strong

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47. **Statement**— Should India support all the international policies of United States of America?
Arguments—

I) No. Many other powerful countries do not support the same.

II) Yes. This is the only way to gain access to USA developmental funds.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

48. **Statement**— Should words like 'Smoking is injurious to health essentially appear on cigarette packs?
Arguments—

I) Yes. It is a sort of brainwash to make the smokers realize that they are inhaling poisonous stuff.

II) No. It hampers the enjoyment of smoking.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

49. **Statement**— Should the council of ministers once appointed be kept the same for the entire period intervening two elections?
Arguments—

I) No. Shuffling of ministers and portfolios is a healthy democratic process.

II) Yes. The ministers do not get a hold on their portfolio unless they are kept for a longer duration.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

50. **Statement**— Should people with educational qualification higher than the optimum requirements be debarred from seeking jobs?
Arguments—

I) No. It will further aggravate the problem of educated unemployment.

II) Yes. It creates complexes among employees and affects the work adversely.

III) No. This goes against the basic rights of the individuals.

IV) Yes. This will increase productivity.

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(A) Only I and III are strong
(B) All are strong
(C) Only II and IV are strong
(D) Only III is strong
(E) None of these

51. **Statement**— Should India go in for computerization in all possible sectors?
Arguments—

I) Yes. It will bring efficiency and accuracy in the work.
II) No. It will be an injustice to the monumental human resources which are at present underutilized.
III) No. Computerization demands a lot of money. We should not waste money on it.
IV) Yes. When advanced countries are introducing computers in every field, how can India afford to lag behind?

(A) Only I is strong
(B) Only I and II are strong
(C) Only I and III are strong
(D) Only II and III are strong
(E) All are strong

52. **Statement**— Should all the school teachers be debarred from giving private tuitions?
Arguments—

I) No. The needy students will be deprived of the expertise of these teachers.
II) Yes. This is an injustice to the unemployed educated people who can earn their living by giving tuitions.
III) Yes. Only then the quality of teaching in schools will improve.
IV) Yes. Now salary of these teachers is reasonable.

(A) Only I and III are strong
(B) Only I, II and III are strong
(C) Only III and IV are strong
(D) Only II, III and IV are strong
(E) None of these

53. **Statement**— Should education be made compulsory for all children up to the age of 14?
Arguments—

I) Yes. This will help to eradicate the system of forced employment of these children.
II) Yes. This is an effective way to make the entire population educated.
III) No. We do not have adequate infrastructure to educate the entire population.
IV) Yes. This would increase the standard of living.

(A) All are strong
(B) Only I, II and III are strong
(C) Only I, II and IV are strong
(D) Only II is strong
(E) Only II and III are strong

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54. **Statement**— Should trade unions be banned completely?
Arguments—

I) Yes. Workers can concentrate on production.
II) No. This is the only way through which employees can put their demands before the management.
III) Yes. Employees get their illegal demands fulfilled through these unions.
IV) No. Trade unions are not banned in other economically advanced countries.

(A) Only I is strong
(B) Only II is strong
(C) Only I and II are strong
(D) Only I, II and III are strong
(E) None of these

55. **Statement**— Should the public sector undertakings be kilo wed to adopt hire and fire policy?
Arguments—

I) Yes. This will help the public sector undertakings to get rid of non-performing employees and reward the performing employees.
II) No. This will give an unjust handle to the management and they may use it indiscriminately.
III) Yes. This will help increase the level of efficiency of these organizations and these will become profitable establishments.

(A) None is strong
(B) Only I and II are strong
(C) Only II and III are strong
(D) Only I and III are strong
(E) All are strong

56. **Statement**— Is caste-based reservation policy in professional colleges justified?
Arguments—

I) Yes. The step is a must to bring the underprivileged at par with the privileged ones.
II) No. It obstructs the establishment of a classless society.
III) Yes. This will help the backward castes and classes of people to come out of the oppression of upper caste people.

(A) Only I and II are strong
(B) Only II is strong
(C) Only II and III are strong
(D) Only I and III are strong
(E) All are strong

57. **Statement**— Should there be a complete ban on genetically modified imported seeds?
Arguments—

I) Yes. This will boost the demand of domestically developed seeds.
II) No. This is the only way to increase production substantially.
III) Yes. Genetically modified products will adversely affect the health of those who consume these products.

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(A) Only I and II are strong
(B) Only II is strong
(C) Only II and III are strong
(D) Only I and III are strong
(E) All are strong

58. **Statement**— Should the income generated out of agricultural activities be taxed?
Arguments—

I) No. Farmers are otherwise suffering from natural calamities and low yield coupled with low procurement price and their income should not be taxed.
II) Yes. Majority of the population is dependent on agriculture and hence their income should be taxed to augment the resources.
III) Yes. Many big farmers earn much more than the majority of the service earners and they should be taxed to remove the disparity.

(A) Only I is strong
(B) Only I and II are strong
(C) Only II and III are strong
(D) All are strong
(E) None of these

59. **Statement**— Should all the management institutes in the country be brought under government control?
Arguments—

I) No. The government does not have adequate resources to run such institutes effectively.
II) No. Each institute should be given freedom to function on its own.
III) Yes. This will enable to have standardized education for all the students.
IV) Yes. Only then the quality of education would be improved.

(A) None is strong
(B) Only I, II and III are strong
(C) Only I and III are strong
(D) All are strong
(E) Only III is strongView Answer Workspac

60. **Statement**— Should the system of Lok Adalats and mobile courts be encouraged in India?
Arguments—

I) Yes. It helps to grant speedy justice to the masses.
II) Yes. The dispensing of minor cases at this level would reduce the burden on the higher courts.
III) No. These courts are usually partial in justice.

(A) Only I and II are strong
(B) Only II and III are strong
(C) Only I and III are strong
(D) All are strong
(E) Only I is strong

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61. **Statement**— Should India acquire/manufacture the latest nuclear weapons?
Arguments—

I) Yes. The enemies of India are improving their weapons continuously and it becomes imperative to protect the sovereignty and integrity of the country.
II) No. Instead the money should be diverted to development activities.
III) No. The international community will isolate Indians and this will bring a setback to Indian economy.
IV) No. It will be against our policy of maintaining world peace.

(A) Only I is strong
(B) Only I and IV are strong
(C) Only I, II and IV are strong
(D) All are strong
(E) None of these

62. **Statement**— Should there be a complete ban on manufacture and use of firecrackers?
Arguments—

I) No. This will render thousands of workers jobless.
II) Yes. The firecracker manufacturers use child labour to a large extent.
III) Yes. This will be a concrete step to reduce noise and air pollution.
IV) No. Use of firecrackers makes certain special occasions more lively and joyful.

(A) Only I and II are strong
(B) Only I and III are strong
(C) Only III and IV are strong
(D) Only I, II and III are strong
(E) Only I, III and IV are strong

63. **Statement**— Should "literacy" be the minimum criterion for becoming a voter in India?
Arguments—

I) No. Mere literacy is no guarantee of political maturity of an individual.
II) Yes. Illiterate people are less likely to make politically wiser decisions of voting for a right candidate or party.
III) No. Voting is the constitutional right of every citizen.

(A) None is strong
(B) Only I and II are strong
(C) Only III is strong
(D) Only II and III are strong
(E) All are strong

64. **Statement**— Should there be only few banks in place of numerous smaller banks in India?
Arguments—

I) Yes. This will help secure the investor's money as these big banks will be able to withstand intermittent market related shocks.
II) No. A large number of people will lose their jobs as after the merger many employees will be redundant.

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III) Yes. This will help consolidate the entire banking industry and will lead to healthy competition.

(A) None is strong
(B) Only I and II are strong
(C) Only II and III are strong
(D) Only I and III are strong
(E) All are strong

65. **Statement**— Should religion be taught in our schools?
Arguments—

I) No. Ours is a secular state.
II) Yes. Teaching religion helps inculcate moral values among children.
III) No. How can one dream of such a step when we want the young generation to fulfil its role in the 21st century.

(A) All are strong
(B) None is strong
(C) Only I is strong
(D) Only II is strong
(E) Only I and III are strong

66. **Statement**— Should the parliamentary elections in India be held every three years as against five years at present?
Arguments—

I) No. This will enhance wastage of money and resources.
II) Yes. This will help the voters to change non-performing representatives without much delay.
III) No. The elected representatives will not have enough time to settle and concentrate on developmental activities.

(A) None is strong
(B) Only I and II are strong
(C) Only II and III are strong
(D) Only I and III are strong
(E) All are strong

67. **Statement**— Should the number of holidays of government employees be reduced?
Arguments—

I) Yes. Our government employees are having the maximum number of holidays among the countries of the world.
II) Yes. It is a sign of British legacy, why should we carry it further?
III) Yes. It will speed up work and all the pending jobs can be completed well in time.
IV) No. Employees must be given ample spare time to spend with their family.

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(A) Only I and III are strong

(B) Only III is strong

(C) Only I, III and IV are strong

(D) None is strong

(E) None of these

68. **Statement**— Should class IV children have Board examination?
Arguments—

I) Yes. This will motivate the children to study and get higher marks, and thus more knowledge can be imbibed at a younger age.

II) No. The children will be forced to study and won't enjoy the process.

III) Yes. In today's competitive world the children need to be prepared right from the beginning to face such difficult examinations.

IV) No. This will add pressure on tender aged children and leave very little time for them to play.

(A) All are strong

(B) Only I, II and IV are strong

(C) Only II, III and IV are strong

(D) Only I and III are strong

(E) Only I and IV are strong

69. **Statement**— Should the rule of wearing helmet for both driver and pillion rider while driving a motor bike be enforced strictly?
Arguments—

I) Yes. It is a rule and rules should be followed strictly by all.

II) No. Each individual knows how to protect his own life and it should be left to his discretion.

III) No. It does not ensure safety as only the head is protected and rest of the body is not.

IV) Yes. It is a necessity as head, being the most sensitive organ, is protected by the helmet.

(A) None is strong

(B) Only I and III are strong

(C) Only I and IV are strong

(D) Only II and IV are strong

(E) All are strong

70. **Statement**— Should all the students graduating in any discipline desirous of pursuing post-graduation of the subjects of their choice be allowed to enrol in the post-graduate courses?
Arguments—

I) Yes. The students are the best judge of their capabilities and there should not be restrictions for joining post-graduate courses.

II) No. The students need to study relevant subjects in graduate courses to enrol in post-graduate courses and the students must fulfil such conditions.

III) No. There are not enough institutes offering post-graduate courses which can accommodate all the graduates desirous of seeking post-graduate education of their own choice.

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(A) None is strong

(B) Only I and II are strong

(C) All are strong

(D) Only I and III are strong

(E) None of these

71. **Statement**— Should we impart sex education in schools?
Arguments—

I) Yes. All the progressive nations do so.

II) No. We cannot impart it in co-educational schools.

III) Yes. It would certainly help in eradicating the existing misunderstanding and make the younger generation physically and mentally healthier.It will destroy the moral fibre and the highly esteemed value system which we have inherited from our forefathers.

(A) None is strong

(B) Only I, III and IV are strong

(C) Only II, III and IV are strong

(D) Only II and IV are strong

(E) None of these

72. **Statement**— Should coal engines be replaced by electric engines in trains?
Arguments—

I) Yes. Coal engines cause a lot of pollution.

II) Yes. Electric engines are good on performance, easy to operate and low on maintenance.

III) No. India does not produce enough electricity to fulfil its domestic needs also.

(A) All are strong

(B) Only I and II are strong

(C) Only II and III are strong

(D) Only I and III are strong

(E) Only I is strong

73. **Statement**— Should all those who are convicted for heinous crimes like murder or rape, beyond all reasonable doubts be given capital punishment or death penalty?
Arguments—

I) No. The death penalty should be given only in very rare and exceptional cases.

II) Yes. This is the only way to punish such people who take others' lives or indulge in inhuman activities.

III) Yes. Such severe punishments only will make people refrain from such heinous acts and the society will be safer.

IV) No. Those who are repentant for the crime they committed should be given a chance to improve and lead a normal life.

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(A) Only II and IV are strong
(B) All are strong
(C) Only III is strong
(D) Only II and III are strong
(E) Only I, II and III are strong

74. **Statement**— Should all the profit making public sector units be sold to private companies?
Arguments—

I) Yes. This will help the government to augment its resources for implementing the development programmes.
II) No. The private companies will not be able to run these units effectively.
III) Yes. There will be a significant improvement in the quality of services.
IV) No. There would not be job security for the employees at all the levels.

(A) Only II and III are strong
(B) All are strong
(C) Only III and IV are strong
(D) Only I, II and III are strong
(E) Only II, III and IV are strong

75. **Statement**— Should all the youngsters below 21 years of age be disallowed from going to a beer bar?
Arguments—

I) No. It is not correct to prevent matured youngsters above 18 years of age who can vote, from having fun.
II) Yes. The entry fee to such pubs should also be hiked.
III) No. There is no such curb in western countries.
IV) Yes. This will help in preventing youngsters from getting into bad company and imbibing bad habits.

(A) Only I is strong
(B) Only I and III are strong
(C) Only III and IV are strong
(D) Only I and IV are strong
(E) None is strong

76. **Statement**— Should the government ban all forms of protests including strikes and processions?
Arguments—

I) Yes. This is the only way to teach discipline to the employees.
II) No. Government cannot deprive its citizens of their basic rights.
III) Yes. This is the only way to ensure maximum productivity without disruption of work.

(A) None is strong
(B) Only I and II are strong
(C) Only II and III are strong
(D) Only I and III are strong
(E) All are strong

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77. **Statement**— Should children be prevented completely from watching television?
Arguments—

I) No. We get vital information regarding education through television.
II) Yes. It hampers the study of children.
III) Yes. Young children are misguided by certain programmes featuring sex and violence.
IV) No. This is the only way to educate the masses.

(A) Only I, II and III are strong
(B) Only I is strong
(C) Only I, II and IV are strong
(D) Only I and II are strong
(E) Only I, III and IV are strong

78. **Statement**— Should mercy death be legalized, i.e., all those who are suffering from terminal diseases be allowed to end their lives if they so desire?
Arguments—

I) No. Nobody should be allowed to end his/her life at his/her will as this goes against the basic tenets of humanity.
II) Yes. Patients undergoing terrible suffering and having absolutely no chance of recovery should be liberated from suffering through mercy death.
III) No. Even mercy death is a sort of killing and killing can never be legalized.

(A) None is strong
(B) Only I and II are strong
(C) Only II and III are strong
(D) Only I and III are strong
(E) All are strong

79. **Statement**— Should seniority be the only criterion for the promotion?
Arguments—

I) No. It would be an injustice to those juniors who are more deserving and suitable for higher positions than their senior counterparts.
II) Yes. Otherwise senior employees do feel humiliated.
III) Yes. Senior employees are more experienced and must be rewarded for the same.

(A) None is strong
(B) Only I is strong
(C) Only I and III are strong
(D) Only I and II are strong
(E) All are strong

80. **Statement**— Should admission to all professional courses be made on the basis of past academic performance rather than through entrance tests?
Arguments—

I) Yes. It will be beneficial for those candidates who are unable to bear the expenses of entrance tests.

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II) Yes. Many deserving candidates securing high marks in their qualifying academic examinations do not perform well on such entrance tests.

III) No. The standard of examinations and assessment conducted by different Boards and universities are not comparable and hence there is a need to conduct entrance tests to calibrate them on a common yardstick.

(A) Only I and II are strong

(B) Only II and III are strong

(C) Only I and III are strong

(D) Only III is strong

(E) All are strong

81. **Statement**— Should there be reservation of jobs in the organizations in the private sector also as in the public sector undertakings in India?
Arguments—

I) Yes. This would give more opportunities of development to the weaker sections of the society and thus help reduce the gap between the affluent and the downtrodden in India.

II) No. The private sector does not get any government assistance and therefore they should not be saddled with such policies.

III) No. Nowhere else in the world such a practice is being followed.

IV) No. The management of the private sector undertaking would not agree to such compulsions.

(A) Only I is strong

(B) Only I and II are strong

(C) Only I, II and IV are strong

(D) Only I and IV are strong

(E) All are strong

82. **Statement**— Should workers/employees be allowed to participate in the management of factories in India?
Arguments—

I) Yes. It is the present management theory.

II) No. Many workers are illiterate and so their contributions will not be of any value.

III) Yes. Employees-owned companies generally have higher productivity.

IV) No. Employee-union ownership drives up salaries and wages.

(A) Only I and II are strong

(B) None is strong

(C) Only II and III are strong

(D) All are strong

(E) None of these

83. **Statement**— Should women be given equal opportunity in the matter of employment in every field?
Arguments—

I) Yes. They are equally capable.

II) No. They have to shoulder household responsibilities.

III) Yes. They should also go into the outside world.

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(A) Only I is strong

(B) Only I and II are strong

(C) Only II and III are strong

(D) Only I and III are strong

(E) All are strong

84. **Statement**— Should government established higher level Institutes of Technology (IIT's) be privatized?
Arguments—

I) Yes. Privatization will make these institutes financially healthy, competitive and quality conscious.

II) Yes. Privatization is the key of the new era - can we survive without it?

III) No. Standard of education of these institutes will fall.

(A) None is strong

(B) All are strong

(C) Only I is strong

(D) Only I and III are strong

(E) Only II and III are strong

85. **Statement**— Should there be only one university throughout India?
Arguments—

I) Yes. This is the only way to bring about uniformity in the educational standards.

II) No. This is administratively impossible.

III) Yes. This will make the degrees procured by students, comparable for offering jobs.

(A) None is strong

(B) Only I and II are strong

(C) Only II and III are strong

(D) Only I and III are strong

(E) All are strong

86. **Statement**— Should India immediately stop digging coal from its mines?
Arguments—

I) Yes. The present stock of coal will not last long if we continue mining at the present rate.

II) No. We do not have alternate energy source of sufficient quantity.

III) No. This will put millions of people at a disadvantage and their lives will get adversely affected and also the industry.

(A) Only I and II are strong

(B) Only II and III are strong

(C) Only I and III are strong

(D) All are strong

(E) None is strong

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87. **Statement**— Should all the indirect taxes in India be combined into a single tax on all commodities?
Arguments—

I) Yes. This will considerably simplify the tax collection mechanism and the cost of collecting tax will also reduce.

II) Yes. The manufacturers and traders will be benefited by this which in turn will boost tax collection.

III) No. No other country has adopted such system.

(A) None is strong

(B) Only I and III are strong

(C) Only II is strong

(D) Only II and III are strong

(E) None of these

88. **Statement**— Should there be complete ban on Indian professionals seeking jobs elsewhere after getting their education in India?
Arguments—

I) Yes. This is the only way to sustain present rate of technological development in India.

II) No. The Indians settled abroad send huge amount of foreign exchange and this constitutes a significant part of foreign exchange reserve.

III) No. The practical knowledge gained by Indians by working in other countries help India develop its economy.

(A) None is strong

(B) All are strong

(C) Only I and II are strong

(D) Only III is strong

(E) Only II and III are strong

89. **Statement**— Should there be a total ban on tobacco products and smoking in India?
Arguments—

I) Yes. It is wrong to smoke away millions of money.

II) No. It will throw thousands of workers in the tobacco industry out of employment.

III) No. The government will lose huge amount of money as it will not earn by way of taxes on these products.

(A) None is strong

(B) Only I and II are strong

(C) Only II is strong

(D) Only II and III are strong

(E) All are strong

90. **Statement**— Should administrative officers be transferred after one or two years?
Arguments—

I) Yes. They get friendly with local people and are manipulated by them.

II) No. By the time their policies and schemes start taking shape, they have to leave.

III) No. This will create a lot of administrative hassles and cause a lot of inconvenience to the officers.

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(A) Only II is strong

(B) Only I and II are strong

(C) Only II and III are strong

(D) Only I and III are strong

(E) All are strong

91. **Statement**— Should the consumption of aerated drinks be banned in India?
Arguments—

I) Yes. This is the only way to reduce the risk of exposing people to some diseases.
II) No. Each individual should have right to choose what he wants.
III) No. There is no confirmed evidence that such products have adverse effects on human body.
IV) Yes. It is banned in many other countries also.

(A) Only I is strong

(B) Only I and II are strong

(C) Only III is strong

(D) Only I and IV are strong

(E) All are strong

7.14 Excercise Syllogism

1. Consider below statements

a) No Cloud is Bird.
b) Some Goats are Birds.
c) All Cars are Goats.

Conclusions—

I) No Car is Cloud.
II) Some Cars are Birds.
III) No Bird is Car.
IV) Some Clouds are Goats.

(A) Only III follows

(B) Only either II or III follows

(C) Only I follows

(D) Only I and either II or III follow

2. Consider below statements

a) All Grapes are Bananas.
b) All Potatoes are Bananas.
c) Some Bananas are Mangoes.

Conclusions—

I) No Grape is Mango.

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II) Some Potatoes are not Mangoes.
III) Some Grapes are Potatoes.
IV) All Mangoes are Grapes.

(A) Either I or III follows
(B) Only II & III follow
(C) Only I, II & III follow
(D) None of these

3. Consider the following statements

a) All medicines are tablets
b) Some tablets are tonics
c) Some tonics are bitter

Conclusions—

I) Some tablets are bitter
II) No medicine is a tonic

(A) Only I follow
(B) Either I or II follow
(C) Only II follows
(D) None follows

4. Consider below statements

a) Some Cats are Rats.
b) Some Rats are Ants.
c) Some Ants are Flies.

Conclusions—

I) Some Flies are Cats.
II) Some Flies are not Ants.
III) No Rat is Fly.
IV) No Cat is Fly.

(A) Only II follows
(B) Only I & III follow
(C) Only I or IV follows
(D) None of these

5. Consider below statements

a) All Chalks are Dusters
b) Some Chalks are Boards.
c) Some Dusters are Pens.

Conclusions—

I) Some Pens are Chalks.

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II) Some Dusters are Boards.
III) Some Pens are Boards.
IV) All Chalks are Pens.

(A) Either I or IV follows
(B) Either I or IV & II follow
(C) Only II follows
(D) None of these

6. Consider the following statements

a) All incomes are salaries
b) Some salaries are perks
c) Some perks are tangible

Conclusions—

I) Some incomes are tangible
II) At least some perks are salaries

(A) Only I follow
(B) Either I or II follow
(C) Only II follows
(D) None follows

7. Consider below statements

a) Some Bags are Books.
b) All Books are Boxes.
c) No Box is Board.

Conclusions—

I) Some Bags are not Boards.
II) Some Bags are not Boxes.
III) All Bags are Boxes.
IV) No Bag is Board.

(A) Only I follows

(A) I & either II or III follows
(B) Only IV follows
(C) Only II follows
(D) None of these

8. Consider below statements

a) Some streets are roads.
b) Some roads are lanes.
c) Some lanes are highways.

Conclusions—

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I) Some roads are not streets.
II) No highway is street.
III) Some streets are not roads.
IV) Some lanes are not roads.

(A) Only III follows
(B) Only IV and III follow
(C) Both I and III follow
(D) None of these

9. Consider the following statements

a) All roses are red
b) Some red are colour
c) All colour are paints

Conclusions—

I) Some red are paints
II) All red are roses

(A) Only I follow
(B) Either I or II follow
(C) Only II follows
(D) None follows

10. Consider below statements

a) Some pencils are pens.
b) All pens are erasers.
c) All staplers are erasers.

Conclusions—

I) Some pens are not pencils.
II) All erasers are pencils.
III) Some staplers are pens.
IV) Some staplers are pencils.

(A) Only I follows
(B) Only III follows
(C) Only IV follows
(D) None of these

11. Consider below statements

a) Some tables are chairs.
b) No cupboard is table.
c) Some chairs are cupboards.

Conclusions—

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I) Some chairs are not tables.
II) All chairs are either tables or cupboard
III) Some chairs are both tables andcupboards.
IV) All chairs are tables.

(A) Only I and IV follow
(B) Only IV follows
(C) Either II or III & I follow
(D) None of these

12. Consider the following statements

a) Some casual are formal
b) All formal are expensive
c) All expensive are elegant

Conclusions—

I) All formal are elegant
II) Some causal are expensive

(A) Only I follow
(B) Either I or II follow
(C) Only II follows
(D) Both I and II follows

13. Consider below statements

a) All birds are animals.
b) Some animals are humans.
c) All humans are mammals.

Conclusions—

I) Some humans are not birds.
II) Some birds are humans.
III) Some animals are not mammals.
IV) All animals are mammals.

(A) Only I and II follow
(B) Either I or II follows
(C) Either I or II and either III or IV follow
(D) None of these

14. Consider below statements

a) Some leaves are fruits.
b) All branches are fruits.
c) Some roots are branches

Conclusions—

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I) Some roots are fruits.
II) Some branches are leaves.
III) No leaf is branch.
IV) Some leaves are roots.

(A) Either II or III and I follow
(B) Only I follows
(C) Only I and III follow
(D) None of these

15. Consider below statements

a) All books are notes.
b) Some notes are pencils.
c) No pencil is paper.

Conclusions—

I) Some notes are books.
II) Some pencils are books.
III) Some books are papers.
IV) No book is a paper.

(A) Only I follows

(A) Only I and either III or IV follow
(B) Either III or IV follows
(C) None of these

16. Consider the following statements

a) All towns are cities
b) All cities are urban
c) Some urban are rural

Conclusions—

I) Some towns are rural
II) All rural are towns

(A) Only I follow
(B) Either I or II follow
(C) Only II follows
(D) Neither I nor II follow

17. Consider below statements

a) Some cups are utensils.
b) No utensil is a bucket.
c) All buckets are plates.

Conclusions—

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I) Some cups are buckets.
II) Some utensils are plates.
III) No utensil is a plate.
IV) Some cups are plates.

(A) Only I follows
(B) Only III follows
(C) Either II or III follows
(D) None of these

18. Consider below statements

a) Some keys are locks.
b) All locks are doors.
c) Some doors are windows.

Conclusions—

I) Some locks are windows.
II) Some windows are keys.
III) Some windows are doors.
IV) No window is a lock.

(A) Either I or IV follows
(B) Only II follows
(C) Only III and IV follow
(D) None of these

19. Consider the following statements

a) Some trains are cars
b) All cars are branches
c) All branches are nets
d) Some nets are dresses

Conclusions—

I) Some dresses are cars
II) Some nets are trains
III) Some branches are trains
IV) Some dresses are trains

(A) Only I follow
(B) Either I or II follow
(C) Only II and III follow
(D) Both I and II follows

20. Consider below statements

a) All pins are staplers.
b) Some staplers are sharpeners.

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c) Some sharpeners are stands.

Conclusions—

I) Some staplers are stands.
II) Some sharpeners are pins.
III) Some pins are stands.
IV) Some stands are sharpeners.

(A) Only I and II follow
(B) Only II and IV follow
(C) Only IV follows
(D) None of these

21. Consider the following statements

a) All papers are clips
b) Some clips are boards
c) Some boards are lanes
d) All lanes are roads

Conclusions—

I) Some roads are boards
II) Some lanes are clips
III) Some boards are papers
IV) Some roads are clips

(A) Only I follow
(B) Either I or II follow
(C) Only II and III follow
(D) Both I and II follows

22. Consider below statements

a) Some oranges are apples.
b) All apples are guavas.
c) No guava is a banana

Conclusions—

I) Some guavas are oranges.
II) No apple is a banana
III) Some oranges are bananas.
IV) Some apples are bananas.

(A) Only I and II follow
(B) Only I and either II or IV follow
(C) Only I, II and IV follow
(D) Only III and either II or IV follow

23. Consider below statements

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a) Some spectacles are boxes.
b) No bat is a ball.
c) Some boxes are balls.

Conclusions—

I) Some boxes are not bats.
II) Some bats are spectacles.
III) No bat is a box.
IV) No ball is a spectacle.

(A) Only I follows
(B) Only 1 & III follow
(C) Only II and III follow
(D) None of these

24. Consider the following statements

a) All pens are clocks
b) Some clocks are tyres
c) Some tyres are wheels
d) Some wheels are buses

Conclusions—

I) Some buses are tyres
II) Some wheels are clocks
III) Some wheels are pens
IV) Some buses are clocks

(A) Only I follow
(B) Either I or IV follow
(C) Only II and III follow
(D) None follows

25. Consider below statements

a) All fans are tubelights.
b) No pen is a bul
c) Some bulbs are fans.

Conclusions—

I) Some pens are tubelights.
II) No pens are tubelights.
III) Some tubelights are fans.
IV) All tubelights are fans.

(A) Only I and II follow
(B) Either I or II and III follow
(C) Only III and IV follow
(D) None of these

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26. Consider the following statements

a) All stones are hammers No hammer is ring
b) Some rings are doors
c) All doors are windows

Conclusions—

I) Some windows are stones
II) Some windows are rings No window is stone
III) Some rings are stones

(A) Only I follow
(B) Either I or II follow
(C) Only II and III follow
(D) II and either I or III follow

27. Consider below statements

a) Some fruits are vegetables.
b) All liquids are drinks.
c) All drinks are fruits.

Conclusions—

I) Some drinks are vegetables.
II) Some fruits are liquids.
III) All liquids are fruits.
IV) No liquids are vegetables.

(A) Only I and II follow
(B) Only II and III follow
(C) Only I, II & III follow
(D) None of these

28. Consider the following statements

a) Some desks are chairs
b) All chairs are tables
c) Some tables are mats

Conclusions—

I) Some mats are desks
II) Some tables are desks
III) Some mats are chairs

(A) Only II follow
(B) Either I or II follow
(C) Only II and III follow
(D) II and either I or III follow

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29. Consider below statements

a) All shirts are trousers.
b) Some socks are shoes.
c) All shoes are shirts.

Conclusions—

I) Some socks are shirts.
II) Some socks are trousers.
III) All shoes are trousers.
IV) All shoes are socks.

(A) Only I and II follow
(B) Only II and IV follow
(C) Only III and IV follow
(D) None of these

30. Consider below statements

a) Some books are papers.
b) All plates are records.
c) Some records are books.

Conclusions—

I) Some plates are books.
II) Some records are papers.
III) Some papers are plates.
IV) Some books are records.

(A) Only II and III follow
(B) Only I and III follow
(C) Only IV follows
(D) None of these

31. Consider the following statements

a) All sweets are fruits
b) No fruit is pencil
c) Some pencils are glasses

Conclusions—

I) Some glasses are sweets
II) Some pencils are sweets No glass is sweet

(A) Only I follow
(B) Either I or II follow
(C) Only II and III follow
(D) II and either I or III follow

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32. Consider below statements

a) Some ice are ring.
b) No ring is paint.
c) Some rings are gold.

Conclusions—

I) No gold is paint.
II) No ice is gold.
III) Some rings are paints.
IV) All golds are rings.

(A) Only I and II follow
(B) Only III and IV follow
(C) Only II and III follow
(D) None of these

33. Consider below statements

a) All gates are flowers.
b) Some gates are fruits.
c) Some flowers are clips.

Conclusions—

I) Some flowers are fruits.
II) Some clips are fruits.
III) Some clips are gates.
IV) No flower is fruit.

(A) Only I follows
(B) Only I and IV follow
(C) Only II and IV follow
(D) Only I and III follow

34. Consider the following statements

a) Some books are flowers
b) Some flowers are chains
c) Some chains are hammers

Conclusions—

I) Some hammers are flowers
II) Some chains are books
III) Some hammers are books

(A) Only I follow
(B) Either I or II follow
(C) Only II and I follow
(D) None follows

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35. Consider below statements

a) No candle is bell.
b) Some shoes are bells.
c) All tables are shoes.

Conclusions—

I) Some tables are bells.
II) No table is bell.
III) Some shoes are candles.
IV) No shoe is a candle.

(A) Only I and IV follow
(B) Only III and IV follow
(C) Only II and IV follow
(D) None of these

36. Consider below statements

a) Some films are clouds.
b) All rats are clouds.
c) Some clouds are chairs.

Conclusions—

I) No film is chair.
II) Some rats are films.
III) Some clouds are rats.
IV) Some chairs are rats.

(A) Only I and III follow
(B) No conclusion follows
(C) Only IV follows
(D) None of these

37. Consider the following statements

a) All roofs are cameras
b) Some cameras are photographs
c) Some photographs are stores

Conclusions—

I) Some stores are cameras
II) Some stores are roofs
III) Some cameras are roofs

(A) Only III follow
(B) Either I or II follow
(C) Only II and III follow
(D) II and either I or III follow

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38. Consider below statements

a) Some cups are slates.
b) All slates are apples.
c) No apple is a car.

Conclusions—

I) Some cars are slates.
II) Some cups are cars.
III) Some apples are cups.
IV) No car is a cup.

(A) Only III follows
(B) Only IV follows
(C) Either II or IV & IIIfollow
(D) None of these

39. Consider below statements

a) All buds are bells.
b) Some buds are cakes.
c) Some bells are sponges.

Conclusions—

I) Some cakes are sponges.
II) Some bells are buds.
III) Some sponges are not cakes.
IV) Some bells are not sponges.

(A) Only either 1 or III and II follow
(B) Only II and III follow
(C) Only either I or IV and II follow
(D) None of these

40. Consider the following statements

a) Some nails are horses
b) All horses are tablets
c) All tablets are crows

Conclusions—

I) Some crows are nails
II) Some tablets are nails
III) Some crows are horses

(A) Only I follow
(B) Either I or II follow
(C) Only II and III follow
(D) All I, II and III follow

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41. Consider below statements

a) No machine is a fly.
b) Some flies are colours.
c) All colours are sweets.

Conclusions—

I) Some machines are colours.
II) All sweets are colours.
III) Some sweets are flies.
IV) No sweet is a machine.

(A) Only I and II follow
(B) Only IV follows
(C) Only III follows
(D) None of these

42. Consider below statements

a) Some kings are cars.
b) Some cars are bottles.
c) No bottle is a lemon.

Conclusions—

I) Some cars are lemons.
II) No king is a lemon.
III) Some kings are bottles.
IV) All cars are either kings or bottles.

(A) Only either 1 or II and III follow
(B) Only III or IV follows
(C) Only IV follows
(D) None of these

43. Consider below statements

a) Some goats are hammers.
b) All hammers are diamonds.
c) No diamond is green.

Conclusions—

I) No goat is green.
II) Some diamonds are hammers.
III) Some goats are diamonds.
IV) Some greens are hammers.

(A) Only I and IV follow
(B) Only II and IV follow
(C) Only II and III follow
(D) Only either II or III and I follow

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44. Consider the following statements

a) All buildings are towers
b) All towers are roads
c) All roads are huts

Conclusions—

I) Some roads are buildings
II) All towers are huts
III) All huts are roads

(A) Only I and II follow
(B) Either I or II follow
(C) Only II and III follow
(D) II and either I or III follow

45. Consider below statements

a) Some cars are mopeds.
b) Some mopeds are hills.
c) All pencils are mopeds.

Conclusions—

I) All pencils are hills.
II) Some pencils are cars.
III) Some cars are hills.
IV) Some pencils are not cars.

(A) Only I follows
(B) Only either II or IV follows
(C) Only I or III follows
(D) Only I and IV follow

46. Consider below statements

a) Some pages are papers.
b) Some papers are magazines.
c) All magazines are books.

Conclusions—

I) Some books are magazines.
II) Some books are papers.
III) Some magazines are pages.
IV) Some pages are magazines.

(A) All follow
(B) Only I and III follow
(C) Only II and IV follow
(D) None of these

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47. Consider below statements

a) All windows are doors.
b) No door is a lock.
c) Some locks are keys.

Conclusions—

I) Some locks are doors.
II) Some locks are not doors.
III) Some keys are not doors.
IV) All doors are windows.

(A) All follow
(B) Only either I or II follows
(C) None follows
(D) None of these

48. Consider below statements

a) Some shirts are coats.
b) All coats are jackets.
c) Some jackets are trousers.

Conclusions—

I) Some shirts are jackets.
II) Some jackets are shirts.
III) All trousers are jackets.
IV) Some trousers are jackets.

(A) Only I, II and III follow
(B) Only I, II and IV follow
(C) Only II, III and IV follow
(D) None of these

49. Consider the following statements

a) All cups are benches
b) Some benches are drums
c) All drums are kites

Conclusions—

I) Some kites are cups
II) Some kites are benches
III) Some drums are cups

(A) Only I follow
(B) Either I or II follow
(C) Only II and III follow
(D) II and either I or III follow

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50. Consider the following statements

a) Some bikes are cars
b) Some cars are trains
c) Some trains are buses

Conclusions—

I) Some buses are cars
II) Some trains are bikes
III) Some buses are bikes

(A) Only I follow
(B) Either I or II follow
(C) Only II and III follow
(D) None follows

51. Consider the following statements

a) All dogs are cats
b) Some cats are rats
c) All rats are mats

Conclusions—

I) Some mats are cats
II) Some mats are dogs
III) Some rats are cats

(A) Only I and III follow
(B) Either I or II follow
(C) Only II and III follow
(D) II and either I or III follow

52. Consider below statements

a) All bikes are scooters.
b) All scooters are scooties.
c) All scooties are mopeds.

Conclusions—

I) All mopeds are scooties.
II) All scooties are scooters.
III) All scooters are bikes.
IV) All bikes are mopeds.

(A) None follows
(B) Only III and IV follow
(C) Only IV follows
(D) None of these

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53. Consider below statements

a) Some pots are buckets.
b) Some buckets are bags.
c) Some bags are purses.

Conclusions—

I) Some purses are buckets.
II) Some bags are pots.
III) Some purses are pots.
IV) Some pots are bags.

(A) All follow
(B) None follows
(C) Only II and IV follow
(D) None of these

54. Consider the following statements

a) All pens are sticks
b) All sticks are rings
c) All rings are rods

Conclusions—

I) Some rings are pens
II) Some rods are sticks
III) Some rods are pens

(A) Only I follow
(B) Either I or II follow
(C) Only II and III follow
(D) All I, II and III follow

55. Consider the following statements

a) Some tables are chairs
b) All chairs are houses
c) All houses are tents

Conclusions—

I) All houses are chairs
II) Some tents are chairs
III) Some houses are tables

(A) Only I follow
(B) Either I or II follow
(C) Only II and III follow
(D) II and either I or III follow

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56. Consider the following statements

a) Some pencils are kites
b) Some kites are desks
c) All desks are jungles
d) All jungles are mountains

Conclusions—

I) Some mountains are pencils
II) Some jungles are pencils
III) Some mountains are desks
IV) Some jungles are kites

(A) Only III and IV follow
(B) Either I or II follow
(C) Only II and III follow
(D) Both I and II follows

57. Consider the following statements

a) All cups are bottles
b) Some bottles are jugs No jug is plate
c) Some plates are tables

Conclusions—

I) Some tables are bottles
II) Some plates are cups
III) No table is bottle
IV) Some jugs are cups

(A) Only I follow
(B) Either I or II follow
(C) Only II and III follow
(D) Either I or III follows

58. Consider the following statements

a) Some chairs are handles
b) All handles are pots
c) All pots are mats
d) Some mats are buses

Conclusions—

I) Some buses are handles
II) Some mats are chairs No bus is handle
III) Some mats are handles

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(A) Only I follow

(B) Either I or II follow

(C) Only II and III follow

(D) II and IV and I or III follow

59. Consider below statements

a) All flowers are buses

b) Some buses are cats

c) All cats are tigers

Conclusions—

I) Some tigers are buses

II) Some tigers are flowers

III) Some cats are flowers

IV) Some buses are tigers

(A) Only I and IV follow

(B) Either I or II follow

(C) Only II and III follow

(D) Only I and III followAnswer:

60. Consider below statements

a) All fans are rooms

b) No room is green

c) Some windows are green

Conclusions—

I) Some windows are fans

II) Some windows are rooms

III) Some fans are green

IV) No green is fan

(A) IV follow

(B) Either I or II follow

(C) Only II and III follow

(D) Only I and III followAnswer: Only IV follows

61. Consider below statements

a) Some tablets are rains

b) All dogs are rains

c) All rains are chairs

Conclusions—

I) Some chairs are tablets

II) All dogs are chairs

III) Some tablets are dogs

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IV) Some tablets are chairs

(A) Only I and IV follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only I, II and IV follow

62. Consider below statements

a) No man is sky
b) No sky is road
c) Some men are roads

Conclusions—

I) No road is man
II) No road is sky
III) Some skies are men
IV) All roads are men

(A) Only II follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only I and III follow

63. Consider below statements

a) All players are spectators
b) Some spectators are theatres
c) Some theatres are dramas

Conclusions—

I) Some dramas are spectators
II) Some players are dramas
III) Some theatres are players
IV) All spectators are players

(A) Only I and IV follow
(B) Either I or II follow
(C) Only II and III follow
(D) None follows

64. Consider below statements

a) Some buckets are waters
b) All waters are papers
c) Some papers are woods

Conclusions—

I) Some woods are waters

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II) Some buckets are woods
III) Some papers are buckets
IV) Some woods are buckets

(A) Only I and IV follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only III follows

65. Consider below statements

a) Some rings are phones
b) Some phones are computers
c) Some computers are stations

Conclusions—

I) Some stations are rings
II) Some phones are stations
III) Some computers are rings
IV) All rings are stations

(A) Only I and IV follow
(B) Either I or II follow
(C) Only II and III follow
(D) None follows

66. Consider below statements

a) All leaves are inks
b) No ink is brush
c) All cakes are brushes

Conclusions—

I) Some cakes are leaves
II) Some inks are cakes
III) Some inks are leaves
IV) Some cakes are brushes

(A) Only I and IV follow
(B) Either I or II follow
(C) Only II and III follow
(D) III and IV follow

67. Consider below statements

a) All needles are threads
b) All threads are boxes
c) All trees are boxes

Conclusions—

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I) No needle is tree
II) Some trees are threads
III) Some boxes are needles
IV) Some trees are needles

(A) Only I and III follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only either I or IV and III follow

68. Consider below statements

a) Some tents are buildings
b) Some buildings are chairs
c) Some chairs are windows

Conclusions—

I) Some windows are buildings
II) Some windows are tents
III) Some chairs are tents

(A) Only I and III follow
(B) Either I or II follow
(C) Only II and III follow
(D) None follows

69. Consider below statements

a) All tables are boards
b) All pens are boards
c) All boards are papers

Conclusions—

I) Some pens are tables
II) Some papers are pens
III) No pen is table

(A) Only I and III follow
(B) Either I or II follow
(C) Only III and III follow
(D) Only either I or III and II follow

70. Consider below statements

a) All chains are cycles
b) Some cycles are wheels
c) All wheels are mirrors

Conclusions—

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I) Some cycles are mirrors
II) Some wheels are chains
III) Some mirrors are cycles

(A) All follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only I and III follow

71. Consider below statements

a) Some boxes are hammers
b) Some hammers are beads
c) All beads are rings

Conclusions—

I) Some rings are hammers
II) Some hammers are boxes
III) Some rings are boxes

(A) Only I and III follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only I and II follow

72. Consider below statements

a) All jackets are trousers
b) No trouser is shirt
c) Some shirts are caps

Conclusions—

I) Some caps are jackets
II) Some shirts are jackets
III) Some trousers are jackets

(A) Only I and III follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only III follows

73. Consider below statements

a) Some cameras are binoculars
b) All binoculars are spoons
c) Some spoons are cups

Conclusions—

I) Some cups are binoculars

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II) Some spoons are cameras
III) Some cups are cameras

(A) Only I and III follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only II follows

74. Consider below statements

a) All hotels are airports
b) All airports are belts
c) Some belts are hooks

Conclusions—

I) Some belts are hotels
II) Some airports are hotels
III) Some hooks are belts

(A) All follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only I and III follow

75. Consider below statements

a) All pins are rods
b) Some rods are chains
c) All chains are hammers

Conclusions—

I) Some pins are hammers
II) Some hammers are rods
III) No pin is hammer

(A) Only I and II follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only either I or III and II follow

76. Consider below statements

a) Some books are papers
b) Some papers are desks
c) Some desks are chairs

Conclusions—

I) Some books are desks
II) Some papers are chairs

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III) Some books are chairs

(A) Only I and III follow
(B) Either I or II follow
(C) Only II and III follow
(D) None follows

77. Consider below statements

a) Some pots are buckets
b) All buckets are tubs
c) All tubs are drums

Conclusions—

I) Some drums are pots
II) All tubs are buckets
III) Some drums are buckets

(A) none follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only I and III follow

78. Consider below statements

a) All pins are bags
b) All chalks are bags
c) All needles are bags

Conclusions—

I) Some needles are pins
II) Some chalks are needles
III) No needle is pin

(A) Only I and III follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only either I or III follows

79. Consider below statements

a) Some buses are trucks
b) Some trucks are boats
c) No boat is jeep

Conclusions—

I) Some jeeps are buses
II) Some boats are buses
III) Some jeeps are trucks

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(A) Only I and III follow

(B) Either I or II follow

(C) Only II and III follow

(D) None follows

80. Consider below statements

a) All flowers are trees

b) All trees are jungles

c) No jungle is hill

Conclusions—

I) No flower is hill

II) No tree is hill

III) Some jungles are flowers

(A) Only I and III follow

(B) Either I or II follow

(C) Only II and III follow

(D) All follow

81. Consider below statements

a) All tables are sofas

b) All sofas are beds

c) All beds are mats

Conclusions—

I) Some mats are sofas

II) Some beds are tables

III) Some mats are tables

(A) Only I and III follow

(B) Either I or II follow

(C) Only II and III follow

(D) All follow

82. Consider below statements

a) Some plates are spoons

b) All spoons are forks

c) All forks are bowlsSome bowls are utensils

Conclusions—

I) Some plates are bowls

II) All spoons are bowls

III) Some forks are utensils

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(A) Only I and III follow

(B) Either I or II follow

(C) Only II and III follow

(D) Only I and II follow

83. Consider below statements

a) Some books are files

b) All files are discs

c) Some discs are boards

d) All boards are keys

Conclusions—

I) Some books are keys

II) No book is key

III) Some discs are keys

(A) Only I and III follow

(B) Either I or II follow

(C) Only II and III follow

(D) Either I or II and III follow

84. Consider below statements

a) All buses are trains

b) Some trains are cars

c) No car is scooter

d) All scooter are jeeps

Conclusions—

I) Some cars are buses

II) All jeeps are scooters

III) No jeep is train

(A) Only I and III follow

(B) Either I or II follow

(C) Only II and III follow

(D) None follows

85. Consider below statements

a) All curtains are pillows

b) No pillow is mattress

c) Some mattresses are beds

d) All beds are sofas

Conclusions—

I) No bed is pillow

II) Some mattresses are sofas

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III) Some beds are pillows

(A) Only I and III follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only II and either I or III follow

86. Consider below statements

a) Some pulses are grains
b) Some grains are sprouts
c) All sprouts are nuts
d) No fruit is nut

Conclusions—

I) Some nuts are pulses
II) Some nuts are grains
III) No fruit is sprout

(A) Only I and III follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only II and III follow

87. Consider below statements

a) Some tables are jugs
b) Some jugs are pots
c) All pots are plates

Conclusions—

I) Some plates are jugs
II) Some pots are tablets
III) Some plates are tablets

(A) Only I follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only I and III follow

88. Consider below statements

a) All chairs are rings
b) Some rings are sticks
c) All sticks are branches

Conclusions—

I) Some branches are chairs
II) Some branches are rings

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III) Some sticks are chairs

(A) Only II follow
(B) Either I or II follow
(C) Only II and III follow
(D) Only I and III follow

89. Consider below statements

a) All bulbs are chairs
b) All chairs are tablets
c) All tables are mirrors

Conclusions—

I) Some mirrors are bulbs
II) Some tables are bulbs
III) All chairs are mirrors

(A) Only I and III follow
(B) Either I or II follow
(C) Only IV and III follow
(D) All follow

90. Consider below statements

a) All knives are hammers
b) No hammer is sword
c) Some swords are nails

Conclusions—

I) Some nails are hammers
II) Some swords are knives
III) No nail is hammer

(A) Only I and III follow
(B) Either I or II follow
(C) Only IV and III follow
(D) Only either I or III follows

91. Consider below statements

a) Some fruits are trees
b) All trees are jungles
c) All jungles are roads

Conclusions—

I) All fruits are jungles
II) Some roads are fruits
III) Some jungles are fruits

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(A) Only I and III follow

(B) Either I or II follow

(C) Only I and III follow

(D) Only II and III follow

92. Consider below statements

a) Some books are pens

b) Some pens are desks

c) Some desk are racks

Conclusions—

I) Some racks are pens

II) Some desks are books

III) Some racks are books

(A) Only I and III follow

(B) Either I or II follow

(C) Only I and III follow

(D) None follow

93. Consider below statements

a) No room is house

b) No house is building

c) Some buildings are huts

Conclusions—

I) Some huts are rooms

II) Some huts are houses

III) Some huts are buildings

(A) Only I and III follow

(B) Either I or II follow

(C) Only II and III follow

(D) Only III follows

94. Consider below statements

a) All houses are window

b) All roads are windows

c) All toys are windows

Conclusions—

I) Some toys are houses

II) Some roads are houses

III) Some roads are toys

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(A) Only I and III follow

(B) Either I or II follow

(C) Only II and III follow

(D) None follows

95. Consider below statements

a) All chairs are fruits

b) No fruit is nail

c) Some nails are hammers

Conclusions—

I) Some hammers are fruits

II) Some nails are fruits

III) Some fruits are chairs

(A) Only I and III follow

(B) Either I or II follow

(C) Only II and III follow

(D) Only III follows

96. Consider below statements

a) All benches are rivers

b) All rivers are ponds

c) Some ponds are hills

Conclusions—

I) Some ponds are benches

II) Some hills are benches

III) Some rivers are benches

(A) Only I and III follow

(B) Either I or II follow

(C) Only II and III follow

(D) All follow

97. Consider below statements

a) Some rings are bangles

b) Some bangles are beads

c) Some beads are flowers

Conclusions—

I) Some flowers are rings

II) Some flowers are bangles

III) No ring is flower

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(A) Only I and II follow

(B) Either I or II follow

(C) Only II follows

(D) Only Either I or III follows

98. Consider below statements

a) Some bats are dogs

b) All dogs are tigers

c) Some tigers are rats

Conclusions—

I) Some rats are bats

II) Some tigers are bats

III) Some rats are dogs

(A) Only III follow

(B) Either I or II follow

(C) Only II follows

(D) None follows

99. Consider below statements

a) Some chairs are pens

b) All pens are books

c) Some books are walls

Conclusions—

I) Some walls are pens

II) Some books are chairs

III) Some walls are chairs

(A) Only III follow

(B) Either I or II follow

(C) Only II follows

(D) None follows

100. Consider below statements

a) Some robots are machines

b) Some computers are both robots and machines

c) Some animals are machines

d) Some toys are animals

Conclusions—

I) Some toys are robots

II) Some toys are machines

III) Some animals are computers

IV) Some robots are not toys

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(A) Only III follow
(B) Either I or II follow
(C) Only II follows
(D) Only Either I or IV follows

101. Consider below statements

a) All suns are stars
b) All moons are stars
c) Some planets are suns
d) Some stars are gases

Conclusions—

I) Some stars are planets
II) Some suns are gases
III) No moon is a planet
IV) Some gases are moons

(A) Only I follow
(B) Either I or II follow
(C) Only III and IV follows
(D) None follows

102. Consider below statements

a) All books are diaries
b) Some diaries are pens
c) Some pens are drawers
d) All drawers are chairs

Conclusions—

I) Some drawers are diaries
II) Some chairs are pens
III) Some pens are books
IV) Some diaries are books

(A) Only III follow
(B) Either I or II follow
(C) Only II follows
(D) Only II and IV follows

103. Consider below statements

a) Some buildings are rivers
b) Some mountains are both buildings and rivers
c) Some roads are buildings
d) All roads are trucks

Conclusions—

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I) Some mountains are roads
II) Some buildings are trucks
III) Some rivers are roads
IV) Some trucks are rivers

(A) Only IV follow
(B) Either I or II follow
(C) Only II follows
(D) None follows

104. Consider below statements

a) All tables are round
b) Some hills are round
c) Some rivers are hills
d) All rivers are conical

Conclusions—

I) Some rivers are round
II) Some hills are conical
III) Some rivers are both hills and round
IV) Some tables are conical

(A) Only IV follow
(B) Either I or III follow
(C) Only II follows
(D) None follows

105. Consider below statements

a) All pens are books
b) All books are chairs
c) Some chairs are desks
d) Some desks are tables

Conclusions—

I) Some tables are chairs
II) Some desks are pens
III) Some chairs are pens
IV) All pens are chairs

(A) Only IV follow
(B) Either I or II follow
(C) Only II follows
(D) Only III and IV follow

106. Consider below statements

a) Some trains are buses

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b) Some buses are trucks

c) Some trucks are boats

d) Some boats are cars

Conclusions—

I) Some trucks are trains

II) Some cars are trucks

III) Some boats are buses

IV) Some boats are trains

(A) Only IV follow

(B) Either I or III follow

(C) Only II follows

(D) None follows

107. Consider below statements

a) Some chains are bangles

b) Some bangles are rings

c) All rings are tyres.

d) All tyres are tables

Conclusions—

I) Some tables are bangles

II) Some tyres are bangles

III) Some tables are chains

IV) Some tyres are chains

(A) Only IV follow

(B) Either I or III follow

(C) Only I and II follows

(D) None follows

108. Consider below statements

a) All hills are roads

b) All roads are stones

c) All stones are jungles

d) All jungles are rivers

Conclusions—

I) Some rivers are stones

II) Some jungles are hills

III) Some stones are hills

IV) All rivers are jungles

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(A) Only IV follow

(B) Either I or II follow

(C) Only II and IVfollows

(D) Only I, II and III follow

109. Consider below statements

a) All needles are threads

b) Some threads are clothes

c) No cloth is room

d) All rooms are houses

Conclusions—

I) Some houses are needles

II) Some rooms are threads

III) No house is needle

IV) Some clothes are needles

(A) Only IV follow

(B) Either I or II follow

(C) Only II follows

(D) Only either I or III follows

110. Consider below statements

a) Some bags are toys

b) All toys are curtains

c) Some curtains are walls

d) All walls are roofs

Conclusions—

I) Some roofs are curtains

II) Some walls are toys

III) Some walls are bags

IV) Some curtains are bags

(A) Only III follow

(B) Either I or II follow

(C) Only II and IV follows

(D) Only I and IV follow

111. Consider below statements

a) Some roses are flowers

b) Some flowers are buds

c) All buds are leaves

d) All leaves are plants

Conclusions—

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I) Some plants are flowers
II) Some roses are buds
III) No leaves are roses
IV) No roses are buds

(A) Only IV follow
(B) Either I or II follow
(C) Only III follows
(D) Only I and either II or IV follow

112. Consider below statements

a) Some books are journals
b) All journals are papers
c) Some papers are cards
d) All cards are boards

Conclusions—

I) Some papers are books
II) Some papers are boards
III) Some boards are journals
IV) Some boards are books

(A) Only I and II follow
(B) Either I or IV follow
(C) Only I and II follows
(D) None follows

113. Consider below statements

a) Some grapes are apples
b) Some apples are bananas
c) All bananas are guavas
d) No guava is pomegranate

Conclusions—

I) No grapes are pomegranates
II) Some guavas are grapes
III) Some guavas are apples
IV) No bananas are pomegranates

(A) Only I follow
(B) Either I or II follow
(C) Only IV follows
(D) Only III and IV follow

114. Consider below statements

a) Some doors are walls

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b) All walls are floors

c) All floors are rooms

d) Some rooms are windows

Conclusions—

I) All walls are rooms

II) Some rooms are doors

III) Some rooms are walls

IV) Some floors are doors

(A) Only I and III follow

(B) Either I or II follow

(C) Only VI follows

(D) All follow

115. Consider below statements

a) Some spoons are forks

b) Some forks are bowls

c) All bowls are plates

d) Some plates are utensils

Conclusions—

I) Some utensils are forks

II) Some plates are forks

III) Some plates are spoons

IV) Some utensils are spoons

(A) Only I and III follow

(B) Either IV or II follow

(C) Only II follows

(D) None follows

116. Consider below statements

a) All chairs are tables

b) All tables are desks

c) Some desks are benches

d) Some desks are sofas

Conclusions—

I) Some benches are sofas

II) Some sofas are tables

III) Some benches are tables

IV) No chair is bench

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(A) Only I and IIIfollow
(B) Either I or II follow
(C) Only IV follows
(D) None follows

117. Consider below statements

a) Some sweets are chocolates
b) Some chocolates are mints
c) Some mints are food
d) Some food is diet

Conclusions—

I) No sweets are diet
II) No food is chocolates
III) Some sweets are diet
IV) Some sweets are food

(A) Only I and III follow
(B) Either I or II follow
(C) Only IV follows
(D) Either I or III follows

118. Consider below statements

a) All windows are doors
b) All buildings are doors
c) All doors are boats

Conclusions—

I) All windows are boats
II) All buildings are boats
III) Some boats are doors

(A) Only I follow
(B) Either I or II follow
(C) Only III follows
(D) All follow

119. Consider below statements

a) Some desks are chairs
b) Some chairs are pens
c) Some pens are drawers

Conclusions—

I) Some drawers are desks
II) Some drawers are chairs
III) No drawer is chair

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(A) Only I follow

(B) Either I or II follow

(C) Only III follows

(D) Only Either II or III follows

120. Consider below statements

a) All flowers are trees

b) Some trees are houses

c) All houses are wheels

Conclusions—

I) Some wheels are trees

II) Some trees are flowers

III) Some wheels are flowers

(A) Only I follow

(B) Either I or III follow

(C) Only II follows

(D) Only I and II follow

121. Consider below statements

a) Some radios are telephones

b) All telephones are mirrors

c) All mirrors are desks

Conclusions—

I) Some radios are desks

II) Some radios are mirrors

III) Some desks are telephones

(A) Only I follow

(B) Either I or II follow

(C) Only II and III follows

(D) All follow

122. Consider below statements

a) All furniture are jungles

b) No jungle is road

c) Some roads are hills

Conclusions—

I) Some roads are furniture

II) Some jungles are furniture

III) Some hills are jungles

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(A) Only III follow

(B) Either I or II follow

(C) Only II follows

(D) None follows

123. Consider the following statements

a) Some boxes are walls

b) No wall is roads

c) All roads are rivers

Conclusions—

I) Some rivers are walls

II) Some roads are boxes

III) No wall is river

(A) Only I follow

(B) Either I or II follow

(C) Only II and III follow

(D) Only either I or III follows

124. Consider below statements

a) All biscuits are chocolates.

b) Some chocolates are breads.

c) All breads are pastries.

Conclusions—

I) Some biscuits are pastries.

II) Some pastries are chocolates.

III) Some biscuits are not pastries.

IV) All pastries are breads.

(A) Only I, II and III follow

(B) Only either I or III and II follow

(C) Only either I or III and IV follow

(D) None of these

125. Consider below statements

a) All glasses are roads.

b) No road is a stick.

c) Some sticks are pens.

Conclusions—

I) Some glasses are sticks.

II) Some pens are sticks.

III) Some roads are sticks.

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IV) No glass is a stick.

(A) None follows

(A) Only either I or II and IV follows

(B) Only either I or II and IV follow

(C) None of these

126. Consider below statements

a) Some lions are goats.

b) Some goats are horses.

c) Some horses are flowers.

Conclusions—

I) Some lions are horses.

II) Some goats are flowers.

III) Some lions are flowers.

IV) Some horses are lions.

(A) None follows

(B) Only I and IV follow

(C) Only II and III follow

(D) None of these

127. Consider below statements

a) All trees are books.

b) Some books are tables.

c) All tables are pencils.

Conclusions—

I) Some pencils are tables.

II) Some books are trees.

III) Some tables are trees.

IV) Some pencils are trees.

(A) None follows

(B) All follow

(C) Only either I or II follows

(D) None of these

128. Consider below statements

a) Some doors are windows.

b) All windows are dogs.

c) Some dogs are cats.

Conclusions—

I) Some dogs are doors.

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II) All dogs are doors.
III) Some cats are windows.
IV) Some dogs are windows.

(A) Only I and II follow
(B) Only II and III follow
(C) Only I and IV follow
(D) All follow
(E) None of these

129. Consider below statements

a) All buses are trains.
b) All trains are rickshaws.
c) All rickshaws are cycles.

Conclusions—

I) All cycles are buses.
II) All rickshaws are buses.
III) All buses are rickshaws.
IV) All trains are cycles.

(A) All follow
(B) None follows
(C) Only II and III follow
(D) None of these

130. Consider below statements

a) Some bricks are trees.
b) All trees are pens.
c) All pens are boats.

Conclusions—

I) Some boats are bricks
II) Some pens are bricks
III) Some trees are bricks
IV) Some bricks are boats

(A) All follow
(B) Only I and II follow
(C) Only III and IV follow
(D) None of these

131. Consider below statements

a) All cups are tables.
b) No table is water.
c) Some waters are clothes.

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Conclusions—

I) No cloth is cup.
II) No cloth is table.
III) Some clothes are waters.
IV) Some waters are cups.

(A) All follow
(B) Only III follows
(C) Only I and II follow
(D) None of these

132. Consider below statements

a) Some flowers are rods.
b) Some rods are doors.
c) Some doors are houses.

Conclusions—

I) Some houses are flowers.
II) Some doors are flowers.
III) Some flowers are doors.
IV) No house is flower.

(A) Only II and III follow
(B) Only either I or II follows
(C) Only either I or IV follows
(D) None of these

133. Consider below statements

a) All trucks are vans.
b) All vans are cars.
c) All cars are trains.

Conclusions—

I) All trains are trucks.
II) All cars are trucks.
III) All trucks are trains.
IV) All vans are trains.

(A) All follow
(B) Only I and II follow
(C) Only II and IVfollow
(D) None of these

134. Consider below statements

a) No table is fruit.
b) No fruit is window.

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c) All windows are chairs.

Conclusions—

I) No window is table.
II) No chair is fruit.
III) No chair is table.
IV) All chairs are windows.

(A) None follows
(B) Only I and II follow
(C) Only III & IV follow
(D) None of these

135. Consider below statements

a) All birds are fruits.
b) Some fruits are towers.
c) All towers are windows.

Conclusions—

I) Some birds are towers.
II) Some windows are birds.
III) Some windows are fruits.
IV) Some towers are birds.

(A) None follows
(B) Only I and II follow
(C) Only III follows
(D) All follow

136. Consider below statements

a) Some buses are trains.
b) No train is a dog.
c) All dogs are parrots.

Conclusions—

I) No bus is a parrot.
II) Some parrots are trains.
III) Some parrots are buses.
IV) No dog is a bus.

(A) Only either I or III follows
(B) Only IV follows
(C) Only I and III follow
(D) None of these

137. Consider below statements

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a) Some cups are flowers.
b) Some flowers are boxes.
c) All boxes are tigers.

Conclusions—

I) Some tigers are cups.
II) Some tigers are flowers.
III) Some boxes are cups.
IV) No tiger is a flower.

(A) None follows
(B) Only III follows
(C) Only either I or III follows
(D) None of these

138. Consider below statements

a) Some cats are lions.
b) All lions are hares.
c) All hares are horses.

Conclusions—

I) Some cats are horses.
II) Some horses are lions.
III) Some hares are cats.
IV) Some cats are hares.

(A) Only I and II follow
(B) Only I and III follow
(C) All follow
(D) None of these

139. Consider below statements

a) All boats are rivers.
b) All rivers are mangoes.
c) All mangoes are apples.

Conclusions—

I) All apples are boats.
II) All mangoes are boats.
III) All rivers are apples.
IV) All boats are apples.

(A) All follow
(B) Only I, III and IV follow
(C) Only II, III and IV follow
(D) None of these

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140. Consider below statements

a) Some boxes are trees.
b) Some trees are horses,
c) All horses are fruits.

Conclusions—

I) Some fruits are boxes.
II) Some fruits are trees.
III) Some horses are boxes.
IV) No fruits are boxes.

(A) Only either II or IV follows
(B) Only either I or IV and II follow
(C) Only either I or III and IV follow
(D) None of these

141. Consider below statements

a) All flowers are buses.
b) Some buses are cats.
c) All cats are tigers.

Conclusions—

I) Some tigers are buses.
II) Some tigers are flowers.
III) Some cats are flowers.
IV) Some buses are tigers.

(A) None follows
(B) Only III and IV follow
(C) Only I and IV follow
(D) Only II and III follow

142. Consider below statements

a) All fans are rooms.
b) No room is green.
c) Some windows are green.

Conclusions—

I) Some windows are fans.
II) Some windows are rooms.
III) Some fans are green.
IV) No green is fan.

(A) Only III follows
(B) Only IV follows
(C) Only II & IV follow
(D) All follow

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143. Consider below statements

a) Some tablets are rains.
b) All dogs are rains.
c) All rains are chairs.

Conclusions—

I) Some chairs are tablets.
II) All dogs are chairs.
III) Some tablets are dogs.
IV) Some tablets are chairs.

(A) Only I, II& III follow
(B) Only II, III and IV follow
(C) Only III & IV follow
(D) None of these

144. Consider below statements

a) No man is sky.
b) No sky is road.
c) Some men are roads.

Conclusions—

I) No road is man.
II) No road is sky.
III) Some skies are men.
IV) All roads are rnen.

(A) Only I follows
(B) Only 1 and III follow
(C) Only II & III follow
(D) None of these

145. Consider below statements

a) Some candles are houses.
b) Some houses are trains.
c) Some trains are roads.

Conclusions—

I) Some roads are candles.
II) Some trains are candles.
III) Some roads are houses.
IV) Some candles are roads.

(A) None follows
(B) Only I and II follow
(C) Only II & III follow
(D) Only III and IV follow

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146. Consider below statements

a) No tree is fruit.
b) All fruits are stones,
c) All stones are rains.

Conclusions—

I) No stone is tree.
II) No rain is tree.
III) Some rains are fruits.
IV) Some rains are trees.

(A) None follows

(A) Only either II or IV and III follow
(B) Only either II or III and I follow
(C) None of these

147. Consider below statements

a) All books are stars.
b) Some stars are windows,
c) All windows are hills.

Conclusions—

I) Some windows are books.
II) Some hills are stars.
III) Some hills are books.
IV) Some stars are books.

(A) None follows
(B) Only I & III follow
(C) Only II & IV follow
(D) None of these

148. Consider below statements

a) Some cats are rats,
b) All rats are bats,
c) Some bats are jungles.

Conclusions—

I) Some jungles are cats.
II) Some bats are cats.
III) Some jungles are rats.
IV) No jungles is cat.

(A) None follows
(B) Only either I or IV and III follow
(C) Only either I or IV and II follow
(D) None of these

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149. Consider below statements

a) All flowers are clouds.
b) No clouds is sky
c) All skies are tigers.

Conclusions—

I) Some clouds are flowers.
II) All clouds are flowers.
III) Some tigers are skies.
IV) All tigers are skies.

(A) Only II and IV follow
(B) Only either III or IV follows
(C) All follow
(D) None of these

150. Consider below statements

a) Some dogs are rats.
b) All rats are trees.
c) Some trees are not dogs.

Conclusions—

I) Some trees are dogs.
II) All dogs are trees.
III) All rats are dogs.
IV) All trees are dogs.

(A) Only I follows
(B) Only II & III follow
(C) All follow

151. Consider below statements

a) Some boys are rains.
b) All rains are clouds.
c) Some clouds are cars.

Conclusions—

I) Some clouds are boys.
II) Some cars are boys.
III) Some cars are rains.
IV) Some rains are boys.

(A) None follows
(B) Only I follows
(C) Both I & IV follow
(D) All follow

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152. Consider below statements

a) All bricks are flowers.
b) Some houses are flowers.
c) All pens are houses.

Conclusions—

I) Some houses are bricks.
II) Some pens are flowers.
III) Some flowers are bricks.
IV) No pen is flower.

(A) Only either II or IV and III follow
(B) Only either II or IV and I follow
(C) Only either I or II and IV follow
(D) All follow

153. Consider below statements

a) All lions are ducks.
b) No duck is a horse.
c) All horses are fruits.

Conclusions—

I) No lion is a horse.
II) Some fruits are horses.
III) Some ducks are lions.
IV) Some lions are horses.

(A) All follows
(B) Only either I or IV and both II and III follow
(C) Only either I or IV and II follow
(D) None of these

154. Consider below statements

a) Some mountains are rivers.
b) Some rivers are roads.
c) Some roads are windows.

Conclusions—

I) Some windows are roads.
II) Some rivers are mountains.
III) Some roads are mountains.
IV) Some windows are rivers.

(A) Only I and II follow
(B) Only III and IV follow
(C) Only I & IV follow
(D) None follows

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155. Consider below statements

a) All benches are trees.
b) All trees are flowers.
c) All flowers are fruits.

Conclusions—

I) All fruits are benches.
II) All trees are fruits.
III) Some fruits are flowers.
IV) Some flowers are benches.

(A) Only II,III& IV follow
(B) Only III and IV follow
(C) Only II & III follow
(D) None of these

156. Consider below statements

a) Some trains are radios.
b) Some radios are waters.
c) All tigers are waters.

Conclusions—

I) Some trains are tigers.
II) Some trains are waters.
III) No water is train.
IV) All waters are tigers.

(A) Both II & III follow
(B) Only either II or III follows
(C) Only either I or III follows
(D) Only either I or IV follows

157. Consider below statements

a) Some buses are rivers.
b) All rivers are mountains.
c) Some roads are mountains.

Conclusions—

I) Some mountains are buses.
II) Some roads are buses.
III) Some roads are rivers.
IV) Some mountains are roads.

l) None follows

(A) Only III and IV follow
(B) Only I & IV follow
(C) All follow

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158. Consider below statements

a) All lions are jungles.
b) Some jungles are rabbits.
c) All rabbits are elephants.

Conclusions—

I) Some rabbits are lions.
II) Some elephants are jungles.
III) Some elephants are lions.
IV) Some elephants are rabbits.

(A) Only I and II follow
(B) Only II and III follow
(C) Only III & IV follow
(D) None of these

159. Consider below statements

a) All books are pens.
b) No pens are houses.
c) All houses are doors.

Conclusions—

I) No books are houses.
II) No books are doors.
III) Some doors are pens.
IV) Some houses are books.

(A) Only I follows
(B) Only II and III follow
(C) Only III & IV follow
(D) None of these

7.15 Paper cutting test

7.16 Venn diagram

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Explanation 2018 JULY

General Paper-I

UGC

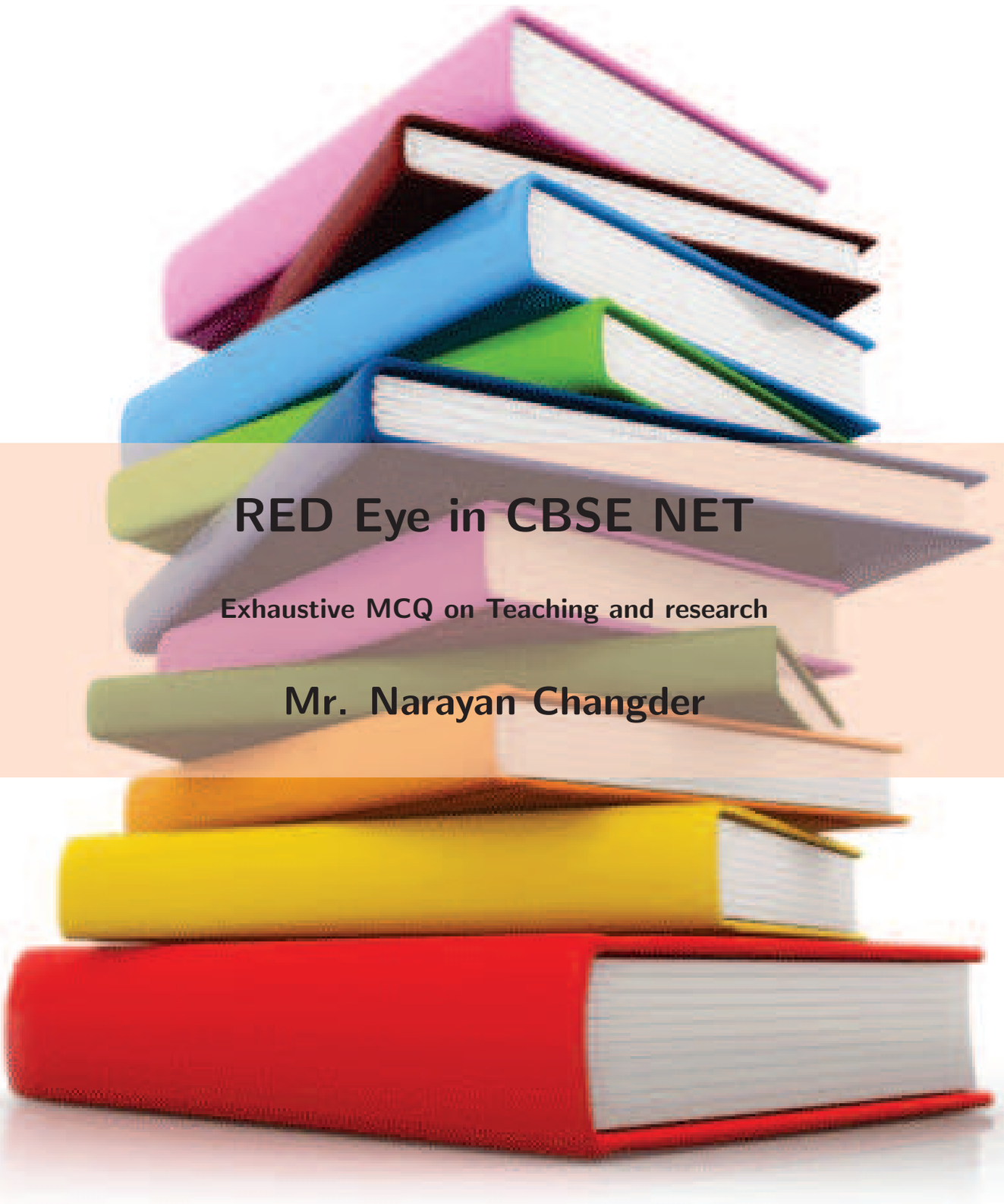
NET/JRF/SLET

ANSWER KEY

Teaching and Research Aptitude

Teaching aptitude, Research aptitude,Communication, Environment, Higher education

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RED Eye in CBSE NET

Exhaustive MCQ on Teaching and research

Mr. Narayan Changder

RED EYE IN CBSE NET

Dedicated to Sarvepalli Radhakrishnan (1888-1975)

Preface

In order to determine eligibility for lectureship and to award Junior Research Fellowship (JRF) and to ensure minimum standards for the entrants in the teaching profession and research, National Eligibility Test (NET) is conducted in Humanities (including languages), Social Sciences, Forensic Science, Environmental Sciences, Computer Science and Electronic Science. This time Central Board of Secondary Education (CBSE) on behalf of UGC is holding the National Eligibility Test (NET). This is conducted twice in a year in the months of June and December. Junior Research Fellowship (JRF) is for candidates who desire to pursue research. The JRFs are awarded to the meritorious candidates from among the candidates qualifying for eligibility for lectureship in the NET. JRFs are restricted to only those candidates who opt for it in their application.



This notes presents teaching and research-based related topic with multiple choice questions . These strategies are based on the theory of multiple topic and brain-storming MCQ for each chapter, which can be usefull in examination like UGC/CBSE NET, SET, B.ED and other competitive examinations. No matter what the subject or grade level. Finally, its my request to reader for valuable suggestion to improve this notes, you can contact me below address

My facebook profile https://www.facebook.com/narayan.changder. Also i maintain dedicated facebook group for NET paper I (https://www.facebook.com/groups/ugccbse/). You can acess more MCQ from below website too. http://www.gatecseit.in/ugcnet/.

Paper I: consists of General paper on Teaching and Research aptitude. This paper aims to assess your capabilities in these prime areas which are foundation for Higher education teacher. Some cognitive abilities are expected from teachers and they are tested through this paper which consists of 100 marks. It contains Objective type questions from Teaching aptitude, Research aptitude, Reading Comprehension, Communication, Mathematical and logical Reasoning, Data Interpretation, ICT, People and environment, Higher Education System-Governance, Polity and Administration. Sixty (60) multiple choice questions of two marks are set in this paper, out of which you would be required to answer any fifty (50). If you attempt more than fifty questions, the first fifty questions attempted would be evaluated. For passing NET examination, you must require 40% marks in Paper I that is at least 20 questions in this paper should be correct. If you belong to OBC (Non creamy layer)/ PWD/SC/ST class than you need 35% to pass this paper I.

Note: If you get any wrong answer , please message me for further improvement of this notes. If you think any topic, which is not included in this notes , message me about it.

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Contents

1 2016 JULY answer 1

Chapter 1

2016 JULY answer



1. Select the alternative which consist of positive factors contributing to effectiveness of teaching list of factors

   a) teacher's knowledge of the subject
   b) teacher's socio-economic background
   c) communication skill of the teacher
   d) Teachers ability to please students
   e) teacher's personal contact with students
   f) teacher's competence in managing and monitoring the classroom connections

   (A) b,c and d
   (B) c,d and f
   (C) b,d and e
   (D) a,c and f

2. the use of teaching aids is justified on the grounds of

   (A) attracting students attention in the classroom
   (B) minimising in discipline problems in the classroom
   (C) optimising learning outcomes of the students
   (D) effective engagement of students in learning task

3. assertion (A): the purpose of higher education is to promote critical and creative thinking abilities among students
Reason(R): this abilities ensure job placement
choose the correct answer from the following code

(A) both A and R are true and R is the correct explanation of A

(B) both A and R are true but R is not the correct explanation of A

(C) A is true but R is false

(D) A is false but R is true

4. match s the items of the 1st set with that of the 2nd set in respect of evaluation system

Set -1	Set-2
a) formative evaluation	i) evaluating cognitive and co-cognitive aspects with regularity
b) Summit in evaluation	ii) test and their interpretation based on the group and certain yardsticks
c) continuous and comprehensive evaluation	iii) grading the final learning outcomes
d) Norm and criteria reference test	iv) quizzes and discussions

(A) $a-iv, b-iii, c-i, d-ii$

(B) $a-i, b-ii, c-iii, d-iv$

(C) $a-iii, b-iv, c-ii, d-i$

(D) $a-i, b-iii, c-iv, d-ii$

5. research are intends to explore the effect of positive factors for the organization of effective mid-day meal interventions. Which research method will be most appropriate for the study?

(A) historical method

(B) descriptive survey method

(C) experimental method

(D) ex post facto method

6. which of the following is an initial mandatory requirement for pursuing research

(A) developing a research design

(B) formulating a research question

(C) deciding about the data analysis procedure

(D) formulating a research hypothesis

7. the format of thesis writing is the same as in

(A) preparation of the research paper/article

(B) writing of seminar presentation

(C) a research dissertation

(D) presenting a workshop/conference paper

8. in qualitative research paradigm, which of the following features may be considered critical?

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A) data collection with standardized research tool

B) sampling design with probability sample techniques

C) data collection with what of empirical evidences

D) data gathering to take place with top-down systematized evidence

9. from the following list of statements identify the set which is negative implication for research ethics

i) research are critically looks at the finding of another research

ii) related studies are cited without proper references

iii) research findings are made the basis for policy making

iv) conduct a practitioner is screened in terms of reported research evidences

v) a research study is replicated with a view to verify the evidences from other researchers

vi) both policy-making and policy implementing processes are regulated in terms of preliminary studies

A) i,iii and iii

B) ii,iii and iv

C) ii,iv and vi

D) i,iii and v

10. in a research on the effect of child rearing practices on straight proneness of children in completing school projects, the hypothesis formulated is that child rearing practices to influence trade phone lines. At the data analysis stage in our lives the thesis is advanced to find out the inability of research hypothesis. On the basis of the evidence available, the null hypothesis is rejected at 0.01 level of significance. What decision may be warranted in respect of the research hypothesis

A) the research hypothesis will also be rejected

B) the research hypothesis will be accepted

C) both the research type of disease and the null hypothesis will be rejected

D) no decision can be taken in respect of the research hypothesis

read the following passage carefully and answer question number from 11 to 16

in terms of labor, for decades the relatively low cost and high quality of Japanese workers conferred considerable competitive advantage across numerous durable-goods and consumer-electronics industries (e.g., machinery, automobiles, televisions, radios). Then labor-based advantages shifted to South Korea, then to Malaysia, Mexico, and other nations. Today, China appears to be capitalizing best on the basis of labor. Japanese firms still remain competitive in markets for goods, electronics, and other products, but the labor force alone is no longer sufficient for competitive advantage over manufacturers in other industrializing nations. Such shifting of labor-based advantage is clearly not limited to manufacturing industries. Today, a huge number of IT and service jobs are moving from Europe and North America to India, Singapore, and like countries with relatively well-educated, low-cost workforces possessing technical skills. However, as educational levels and technical skills continue to rise in other countries, India, Singapore, and like nations enjoying labor-based competitive advantage today are likely to find such advantage cannot be sustained through the onset of new competitors.

in terms of capital, for centuries the days of gold coins and later even paper money restricted financial flows. Regional concentrations formed where large banks, industries, and markets coalesced. But today capital flows internationally at the speed of electrons. Global commerce no longer requires regional interactions between business people. Regional capital concentrations in places such as New York, London, and Tokyo still persist, of course, but the capital concentrated there is no longer sufficient for competitive advantage over other capitalists distributed worldwide. Only if an organization is able to combine, integrate, and apply its resources (e.g., land, labor, capital, IT) in an effective manner that is not readily imitable by competitors can such organization enjoy competitive advantage sustainable over time.

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In a knowledge-based theory of the firm, this idea is extended to view organizational knowledge as a resource with at least the same level of power and importance as the traditional economic inputs. An organization with superior knowledge can achieve competitive advantage in markets that appreciate the application of such knowledge. Semiconductors, genetic engineering, pharmaceuticals, software, military warfare, and like knowledge-intensive competitive arenas provide both time proven and current examples. Consider semiconductors (e.g., computer chips), which are made principally of sand and common metals. These ubiquitous and powerful electronic devices are designed within common office buildings, using commercially available tools, and fabricated within factories in many industrialized nations. Hence, land is not the key competitive resource in the semiconductor industry.

11. How can an organization enjoy competitive advantage sustainable overtime?
    - (A) Through regional capital flows
    - (B) Through regional interactions among business players.
    - (C) By making large bank, industries and markets coalesced.
    - (D) By effective use of various instrumentalities.

12. What is required to ensure competitive advantages in specific markets?
    - (A) Access to capital
    - (B) Common office buildings
    - (C) Superior knowledge
    - (D) Common metals

13. The passage also mentions about the trend of
    - (A) Global financial flow
    - (B) Absence of competition in manufacturing industry
    - (C) Regionalization of capitalists
    - (D) Organizational incompatibility

14. What does the author lay stress on in the passage?
    - (A) International commerce
    - (B) Labour-Intensive industries
    - (C) Capital resource management
    - (D) Knowledge-driven competitive advantage

15. Which country enjoyed competitive advantages in automobile industry for decades?
    - (A) South Korea
    - (B) Japan
    - (C) Mexico
    - (D) Malaysia

16. Why labour-based competitive advantages of India and Singapore cannot be sustained in IT and service sectors?

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(A) Due to diminishing levels of skill

(B) Due to capital-intensive technology making inroads

(C) Because of new competitors

(D) Because of shifting of labour-based advantage in manufacturing industries.

17. imagine you are working in an educational institution where people are of equal status. Which method of communication is best suited and normally employed in such a context?

(A) horizontal communication

(B) vertical communication

(C) corporate communication

(D) cross communication

18. identify the important element of a teacher has to take cognizance of while addressing students in a classroom

(A) avoidance of proximity

(B) voice modulation

(C) repetitive pause

(D) fixed posture

19. what are the barriers to effective communication?

(A) moralising, being judgemental and comment of consolation

(B) dialogue, summary and self review

(C) use of simple words, cool reaction and defensive attitude

(D) personal statements, eye contact and simple narration

20. the choice of communication partners is influenced by factors of

(A) proximity, utility, loneliness

(B) utility, secrecy, dissonance

(C) secrecy, dissonance, deception

(D) dissimilarity, dissonance, deviance

21. as a teacher, select the best option to ensure your effective presence in the classroom

(A) use of peer command

(B) making aggressive statements

(C) adoption of well established posture

(D) being authoritarian

22. every communicator has to experience

(A) manipulated emotions

(B) anticipatory excitement

(C) the issue of homophiles

(D) status dislocation

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23. in a certain code, SELECTION is coded as QCJCARGML. The code of AMERICANS will be

(A) YKCPGAYLQ

(B) BNFSJDBMR

(C) QLYAGPCKY

(D) YQKLCYPAG

24. In the series

$$3, 11, 23, 39, 59 \ldots$$

the next term will be

(A) 63

(B) 73

(C) 83

(D) 93

25. two railway tickets from city A to B and 3 tickets from city A to C costs Rs 177. 3 tickets from city A to B and 2 tickets from city A to C cost Rs 173. The fare for city B from city A will be Rs

(A) 25

(B) 27

(C) 30

(D) 33

26. a person walks 10 meter in front and 10 meter to the right. Then every time turning to his left, he walks 5, 15 and 15 m respectively. How far is he now from his starting point

(A) 20 m

(B) 15 m

(C) 10 m

(D) 5 m

27. A is sister of B. F is daughter of G. C is mother of B. D is father of C. E is mother of D. A is related to D as

(A) granddaughter

(B) daughter

(C) daughter-in-law

(D) sister

28. in the series

$$AB, EDC, FGHI, \ldots ? \ldots, OPQRST$$

the missing term will be

(A) JKLMN

(B) JMKNL

(C) NMLKJ

(D) NMKLJ

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29. among the following propositions who were related in such a way that one is the denial of the other. Which of those propositions? Select the correct code
Propositions

a) all women are equal to men

b) some women are equal to men

c) some men are not equal to men

d) no women are equal to men

(A) a and b

(B) a and d

(C) c and d

(D) a and c

30. if the proposition "all thieves are poor" is false. Which of the following propositions can be claimed certainly to be true?

(A) some thieves are poor

(B) some thieves are not poor

(C) no thief is poor

(D) no poor person is a thief

31. Consider the following statement and select the correct code stating the nature of the argument involved in it: To suppose that the earth is the only populated world in the infinite space is as absurd as to assert that in an entire field of millet only one grain will grow.

(A) astronomical

(B) anthropological

(C) deductive

(D) analogical

32. Select the code which is not correct about Venn diagram

(A) Venn diagram represents propositions as well as clauses

(B) it can provide clear method of notice and

(C) it can be either valid or invalid

(D) it can provide the direct method of testing the validity

33. select the code which is not correct in the context of deductive argument with two premises

(A) An argument with one true premise, one false premise and a false conclusion may be valid.

(B) An argument with two true premises and a false conclusion may be valid.

(C) An argument with one true premise, one false premise and a false conclusion may be valid.

(D) An argument with two false premises and a false conclusion may be valid.

34. Given below two premise and four conclusions are drawn from them (taking singly or together). Select the code that states the conclusion validly drawn
Premises

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i) all religious persons are emotional

ii) ram is a religious person

Conclusions

a) ram is emotional

b) all emotional persons are religious

c) ram is not a nonreligious person

d) some religious persons are not emotional

(A) a,b c and d

(B) a only

(C) a and c only

(D) b and c only

the following table shows the percentage profit earned by 2 companies A and B during the years 2011-2015. Answer question based on the data contained in the table

Year	Percentage Profit%	
	A	B
2011	20	30
2012	35	40
2013	45	35
2014	40	50
2015	25	35

Where, percent (%) Profit $= \frac{Income - Expenditure}{Expenditure} \times 100$

35. if the total expenditure of the 2 companies was 9 lakh in the year 2012 and the expenditure of A and B wherein the ratio 2:1, then what was the income of the company A in that year

(A) 9.2 lakh

(B) 8.1 lakh

(C) 7.2 lakh

(D) 6 lakh

36. what is the average percentage profit earn by the company B

(A) 35%

(B) 42%

(C) 38%

(D) 40%

37. in which year the percentage profit art by the company B is less than that of company B

(A) 2012

(B) 2013

(C) 2014

(D) 2015 the following table shows the number of people in different age groups who responded to a survey about their favourite style of music. Use this information to answer the questions that follow

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Style of music \ Ages	Number of people		
	(years) 15- 20	(years) 21 -30	(years) 31+
Classical	6	4	17
Pop	7	5	5
Rock	6	12	14
Jazz	1	4	11
Blues	2	3	15
Hip-Hop	9	3	4
Ambient	2	2	2

38. approximately what percentage of the total sample aged 21-30

(A) 31%

(B) 23%

(C) 25%

(D) 14%

39. approximately what percentage of the total sample indicates that Hip-Hop is their favourite style of music

(A) 6%

(B) 8%

(C) 14%

(D) 12%

40. what percentage of respondents aged 31 +indicated a favourite style of other than classical music

(A) 64%

(B) 60%

(C) 75%

(D) 50%

41. the statement "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware refers to

(A) information technology

(B) information and collaborative technology

(C) information and data technology

(D) artificial intelligence

42. if the binary equivalent of the decimal number 48 is 110000, then the binary equivalent of the decimal number 51 is given by

(A) 110011

(B) 110010

(C) 110001

(D) 110100

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43. the process of copying files to a CD-ROM is known as

(A) burning

(B) Zipping

(C) digitising

(D) ripping

44. and unsolicited email message sent to many recipients at once is a

(A) worm

(B) virus

(C) threat

(D) Spam

45. ..... is a type of memory circuitry that holds the computers start up routine

(A) read initial memory

(B) random access memory

(C) read-only memory

(D) Cache memory

46. An ASCII is a character encoding scheme that is employed by personal computers in order to represent various characters, numbers and control keys that the computer user selects on the keyboard. ASCII is an acronym for

(A) American standard code for information Interchange

(B) American standard code for intelligent information

(C) American standard code for information integrity

(D) American standard code for isolated information

47. identify the air pollutant in urban areas which irritates eyes and also respiratory tract of human beings

(A) particulate matter

(B) surface Ozone

(C) oxides of nitrogen

(D) carbon monoxide

48. which of the following is the largest source of water pollution in major rivers of India

(A) untreated sewage

(B) agriculture run-off

(C) Unregulated small scale industries

(D) Religious practices

49. sustainable development goals have specific targets to be achieved by

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A 2022

B 2030

C 2040

D 2050

50. Indian government's target of producing power from biomass by the year 2022, is

A 50 MW

B 25 MW

C 15 MW

D 10 MW

51. Assertion(A): conserving our soil resources is critical to human survival
Reason(R): soil is home to many microorganism and contains mineral

A both A and R are true and R is the correct explanation of A

B both A and R are true but R is not the correct explanation of A

C A is true but R is false

D A is false but R is true

52. world metrological organisations objective has been to reduce the number of deaths due to hydro-metrological disaster over the decade 2010 to 2019 by (with reference to the decade 1994 to 2003)

A 25%

B 50%

C 75%

D 80%

53. which of the following core values among the institutions of higher education are promoted by the NACC

a) contributing to national development
b) fostering global competences among the student's
c) inculcating a value system among students and teachers
d) promoting the optimum utilisation of the infrastructure

A b,c and d

B a,b and c

C a,b,c and d

D a,c and d

54. the best way for providing value education is through

A discussion on scriptural texts

B lectures/discourse on values

C seminars/symposia on values

D mentoring/reflective session on values

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55. the National judicial appointments commission has been declared unconstitutional by

(A) Supreme Court of India

(B) High Court

(C) High Court and the Supreme Court both

(D) the president of India

56. which of the following statements about the Indian political system is/are correct

a) the president is both head of the state and head of the government

b) Parliament is supreme

c) the Supreme Court is the guardian of Constitution

d) the directive principle of state policy are justiciable

(A) a,b,c and d

(B) b.c and d

(C) b and c

(D) c only

57. which of the following are the fundamental duties

a) to respect the national flag

b) to protect and improve the natural environment

c) for a parent to provide opportunities for education to his/her child

d) to protect monuments and places of national importance

(A) a,b and c

(B) a ,b and d

(C) a,c and d

(D) a,b,c and d

58. which of the following statements are correct in respect of NITI Aayog?

a) it is a constitutional body

b) it is a statutory body

c) it is neither a constitutional body not a statutory body

d) it is a think tank

select the correct answer from the codes given below

(A) a and d

(B) b and d

(C) c and d

(D) b,c and d is

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59. a college-level assistant professor has planned his/her lectures with an intent to develop cognitive dimension of students centered on scales of analysis and synthesis. Below given are 2 sets of items set I consisting of levels of cognitive and Interchange and set-II comprising basic requirements for promoting them. Match the 2 sets and indicate your answer by choosing the correct alternative from the code

Set -1	Set-2hline
a) memory level	i) giving opportunity for discriminating examples and non-examples of a point
b) understanding level	ii) recording the important points made during the presentations
c) reflective level	iii) asking the students to discuss various items of information
	iv) critically analysing the points to be made and discussed

(A) $a-ii, b-iv, c-i$

(B) $a-iii, b-iv, c-ii$

(C) $a-ii, b-i, c-iv$

(D) $a-i, b-ii, c-iii$

60. which set of learner characteristics may be considered helpful in designing effective teaching learning systems. Select the correct alternatives from the codes given below

a) prior experience of learner's in respect of the subject

b) interpersonal relationship or learner's family friends

c) ability of the learner's in respect of the subject

d) students language background

e) interest of students in following the prescribed dress code

f) motivational orientation of the students

(A) i,ii,iii and iv

(B) i,iii,iv and vi

(C) ii,iii,iv and v

(D) iii,iv,v and vi is

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Prabable answer key (I am not responsible if answer key are wrong)

Answers

1. D	2. D	3. A	4. A	5. D	6. B	7. C	8. C	9. C	11. D	12. C	13. A	14. D	15. B	16. C	17. A
18. B	19. A	21. C	22. B	23. A	24. C	25. D	26. D	27. A	28. C	29. B	31. D	32. C	34. C		
35. B	36. C	37. B	38. C	39. D	40. C	41. A	42. A	43. A	44. D	45. C	46. A	47. B	48. A		
49. B	50. D	51. B	53. B	55. A	56. D	59. C									

Explanations

1 teacher's socio-economic background and contacts with student does not help in effective teaching.

2 .The practical justification is that it is an instrument for accelerating the pace of all human transformation. If option D is followed then A,B is done.

3 the purpose of higher education is to promote critical and creative thinking abilities among students and this abilities ensure job placements. Nowdays job placement depends on critical and creative thinking abilities.

4 A formative evaluation (sometimes referred to as internal) is a method for judging the worth of a program while the program activities are forming (in progress).continuous and comprehensive evaluation evaluates cognitive and co-cognitive aspects with regularity. A criterion-referenced test is a style of test which uses test scores to generate a statement about the behavior that can be expected of a person with that score. Most tests and quizzes that are written by school teachers can be considered criterion-referenced tests

5 Ex post facto design is a quasi-experimental study examining how an independent variable, present prior to the study, affects a dependent variable. An ex post facto research design is a method in which groups with qualities that already exist are compared on some dependent variable. Also known as "after the fact" research. Here researchers attempt to discover whether differences between groups have resulted in an observed difference in the independent variable .

6 formulating a research question is necessary. This is the first step one have to do to understand the problem and not to get the solution.

7 the format of thesis writing is the same as in a research dissertation. The aim of the dissertation or thesis is to produce an original piece of research work on a clearly defined topic.

8 The most common method used to generate data in qualitative research is an interview which may be structured, semi-structured or unstructured.

9 Literature survey must be cited in proper way. Both policy-making and policy implementing processes are regulated in copyright form.

10 If the null hypothesis, is rejected, the alternative hypothesis is accepted.

17 Horizontal communication refers to the flow of messages across functional areas on the same level of an organization.

18 The teacher's voice needs to be effective in a variety of circumstances. Teachers need to be audible. Students at the back of the class must be able to hear them as well as those at the front. Switching from one-to-one and small groups to whole-class and games situations, teachers have to have adaptability as one of their abilities. Audibility,

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however, cannot be divorced from voice quality. Our voices can be varied along a number of parameters: volume (how loud or softly we speak), pace (how quickly or slowly we speak, and how we use pausing), pitch (how high or low in our voice range we go), modulation (how we adjust the tone of our voice to convey a mood).

19 moralising, being judgemental and comment of consolation are the barriers to effective communication. All options are not a barrier except A

20 the choice of communication partners is influenced by factors of proximity, utility, loneliness

21 Posture expresses your self.

22 Anticipatory describes the feeling you get when you know whats coming. It can also describe something that happens because something else is going to happen later

24 $2n^2+2n-1$. For $n=1$ it is 3 $n=2$ it is 11, $n=3$ it is 23 sop for $n=6$ it is $2*36+2*6-1=72+12-1=83$

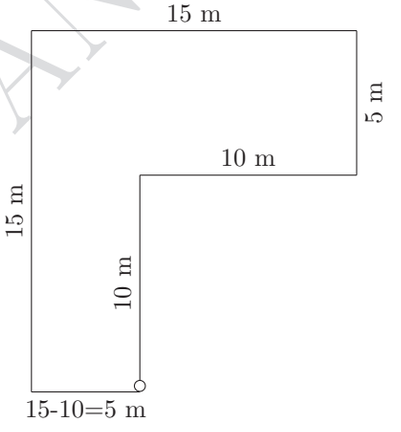
25 Let Rs. x be the fare of city B from city A and Rs.y be the fare of city C from city A.

$$2x+3y=177$$
$$3x+2y=173$$

$$4x+6y=354$$
$$9x+6y=519$$

$5x=165 \Rightarrow x=33$

26



27



28 First term cosist AB in order second term consist next three terms in opposite order then third is next four terms in order next term will be the next five in opposite order.

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29 First statement says all women are equal to men and last one says no women are equal to men both are denial of each other

30 "all thieves are poor" is false. let $T(x)$ means x is thieve. then $\forall x T(x)$ is false means $\neg\forall x T(x)$ is true. Now if $\neg$ moves over for all it becomes some so it means some thieves are not poor is true.

31 An analogical argument is an argument in which one concludes that two things are alike in a certain respect because they are alike in other respects.

32 Venn diagram gives always valid result. The proposition can be valid or invalid

33 No valid argument can have true premises and a false conclusion.

$$\frac{\text{Cats are mammals.} \qquad \text{Dogs are mammals.}}{\text{Therefore, dogs are cats.}}$$

34 this can easily proof by tree method.

35 Expenditure of A in year 2012 is $\frac{2}{2+1} * 9 = \frac{2}{3} * 9 = 6\ lakhs$ It is given that percent (%) Profit $= \frac{Income - Expenditure}{Expenditure} \times 100$

Year	Percentage Profit%	
	A	B
2011	20	30
2012	35	40
2013	45	35
2014	40	50
2015	25	35

In 2012 profit for A is 35 and expenditure is 6 so

$$35 = \frac{Income - 6}{6} \times 100 \Rightarrow Income - 6 = \frac{210}{100} = 2.1 \Rightarrow Income = 8.1$$

36

Year	Percentage Profit%	
	A	B
2011	20	30
2012	35	40
2013	45	35
2014	40	50
2015	25	35
Total		190

So average is $\frac{190}{5}$

37 percent (%) Profit $= \frac{Income - Expenditure}{Expenditure} \times 100$

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Year	Percentage Profit%	
	A	B
2011	20	30
2012	35	40
2013	45	35
2014	40	50
2015	25	35

In the year 2013 the value in column B is less than the value in column A

38

Style of music \ Ages	Number of people		
	(years) 15- 20	(years) 21 -30	(years) 31+
Classical	6	4	17
Pop	7	5	5
Rock	6	12	14
Jazz	1	4	11
Blues	2	3	15
Hip-Hop	9	3	4
Ambient	2	2	2
Total	33	33	68

Total sample is $33 + 33 + 68 = 134$ so percentage is $\frac{33}{134} * 100 \approx 24.62 = 25\%$

39

Style of music \ Ages	Number of people			Total
	(years) 15- 20	(years) 21 -30	(years) 31+	
Classical	6	4	17	
Pop	7	5	5	
Rock	6	12	14	
Jazz	1	4	11	
Blues	2	3	15	
Hip-Hop	9	3	4	16
Ambient	2	2	2	
Total	33	33	68	134

$\frac{16}{134} * 100 = 11.9402 \approx 12\%$

40 Other than clasical is $5 + 14 + 11 + 15 + 4 + 2 = 51$. So, answesr is $\frac{51}{68} * 100 = 75\%$

41 the study or use of systems (especially computers and telecommunications) for storing, retrieving, and sending information is called IT

42 convert it

43 The data are recorded on CD-ROM by a laser changing the properties of a dye or phase transition material in a process that is often referred to as “burning”.

44 irrelevant or unsolicited messages sent over the Internet, typically to large numbers of users, for the purposes of advertising, phishing, spreading malware, etc. i called spam.

45 The CPU loads and executes the ROM BIOS code starting at ROM memory address "FFFF:0000" which is only 16 bytes from the top of ROM memory.

46 ASCII stands for American Standard Code for Information Interchange. Computers can only understand numbers, so an ASCII code is the numerical representation of a character

47 At ground level, ozone is a health hazard for all of us, especially the young and elderly. Those who are active and exercising outdoors may experience breathing difficulties and eye irritation. Prolonged exposure may result in reduced resistance to lung infections and colds. Ozone can also trigger attacks and symptoms in individuals with pre-existing conditions, like asthma or other respiratory infections like chronic bronchitis and COPD (Chronic Obstructive Pulmonary Disease).

48 70% Of Urban India's Sewage Is Untreated. The largest source of water pollution in India is untreated sewage. Other sources of pollution include agricultural runoff and unregulated small scale industry. Most rivers, lakes and surface water in India are polluted.

49 The Sustainable Development Goals are a UN Initiative. The Sustainable Development Goals (SDGs), officially known as Transforming our world: the 2030 Agenda for Sustainable Development, are an intergovernmental set of aspiration Goals with 169 targets.

50 Of the total 1,75,000 mw proposed to be tapped by 2022, solar power will have a lion's share of 1,00,000 mw followed by 60,000 mw from wind energy, 10,000 mw biomass energy and 5,000 mw of small hydro projects

51 Think both the statement are correct. But we need to conserve soil for our existence not because microorganism living in soil or it contains mineral

52 The World Meteorological Organization (WMO) is an intergovernmental organization with a membership of 191 Member States and Territories. It originated from the International Meteorological Organization (IMO), which was founded in 1873. Established in 1950

53 NACC do not look about optimum infrastructure utilization.

54

55 In a collective order, on 16 October 2015 the Supreme Court by a majority of 4:1 had struck down the NJAC Act, 2014 meant to replace the two-decade old collegium system of judges appointing judges in the higher judiciary.

56 The Directive Principles, though not justiciable, are fundamental in the governance of the country.Comparing the SC and the Parliament in terms of power is like comparing diamonds to platinum.

57

58

Explanations

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