



COURSE CODE : TEACHING AND RESEARCH APTITUDE  
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## UNIT-I

### TEACHING AND RESEARCH APITUDE

#### TEACHING:

The Word Teach derived from old English word *Taecan* meaning is to show, Point out, or demonstrates.

Teaching is a Complex process which means bring socially desirable behavioral Change in a person. Teaching is a part of Teaching –learning Process. It is required to bring certain changes in in person according to the need of his Society and Environment in which he is living. Teaching is one of the instruments of education and is a special function is to impart understanding and skill. The main function of teaching is to make learning effective. The learning process would get completed as a result of teaching. So, teaching and learning are very closely related.

#### MEANING OF TEACHING:

Teaching is a process in which one individual teaches or instruct another individual. Teaching is considered as the act of imparting instructions to the learners in the classroom situation. It is watching systematically.

#### DEFINITIONS OF TEACHING:

- ❖ Teaching is interpersonal influence aimed at changing the behavior potential of another person.- **N.L.Gage**
- ❖ Teaching refers to activities that are designed and performed to produce in students behavior- **Clerk**
- ❖ Teaching is an activity with four phases, a curriculum planning phase, an instructing phase, and an evaluating phase. This definition presents the organizational aspect by which we can describe and analyze the teaching process.- **J B Hough**
- ❖ Teaching is an intimate Contact between the more mature personality and less mature one.-**H.C.Morrison**
- ❖ Teaching is a face to face encounters between two or more persons, one of whom (Teacher) intends to effect certain changes in the other participants (Students) –

## **Jackson**

- ❖ Teaching as “an interactive process, primarily involving classroom talk which takes place between teacher and pupil and occurs during certain definable Activities – **Edmund Amidon**
- ❖ Teaching is a system of action intended to induce learning- **B.O.Smith**
- ❖ Teaching is arrangement and manipulation of a situation in which there are gaps or obstructions which an individual will seek to overcome and from which he will learn in the Course of doing.-**John Broacher**
- ❖ Teaching is a Bipolar process, its one pole is teacher and another is the pupil.-**Adams**
- ❖ Teaching is the task of the teacher which is performed for the Development of a Child.-**Green.**

## **CONCEPT OF TEACHING**

Teaching is one of the instruments of education and is a special function is to impart understanding and skill. The main function of teaching is to make learning effective. The learning process would get completed as a result of teaching. So, teaching and learning are very closely related.

**Questioning-** It is the most important device of teaching  
The teacher should ask questions of all the types-Introductory, developing, and capitulatory.

**Discussion-**Discussion clears the doubts of the students and enhances their ability of expressing opinions.

**Investigation-** Investigation may be individual or group and includes the presentation of information by the teacher.

**Expression-**Expression is the last step of Teaching. It will be in the form of Practical activities.

## **NATURE OF TEACHING**

Teaching is a social and cultural process, which is planned to enable an individual to learn something in his life. We can describe the nature and characteristics of teaching in the following way:-

- Teaching is a complete social process- Teaching is undertaken for society and by society. With ever-changing social ideas, it is not possible to describe the exact and permanent nature of teaching.
- Teaching is giving information- Teaching tells students about the things they have to know and students cannot find out themselves. Communication of knowledge is an

essential part of teaching.

- Teaching is an interactive process- Teaching is an interactive process between the student and the teaching sources, which is essential for the guidance, progress, and development of students.
- Teaching is a process of development and learning.
- Teaching causes a change in behavior. Teaching is an art as well as science.
- Teaching is face to face encounter.
- Teaching is observable, measurable and modifiable.
- Teaching is a skilled occupation:- Every successful teacher is expected to know the general methods of teaching-learning situations.
- Teaching facilitates learning
- Teaching is both a conscious and an unconscious process. Teaching is from memory level to reflective level.
- Teaching is a continuum of training, conditioning, instruction, and indoctrination.

### **OBJECTIVES OF TEACHING**

The major objective of teaching covers different types of intended learning outcomes.

- ❖ Acquisition of knowledge
- ❖ Development of Understanding
- ❖ Development of Conceptual, intellectual and subject-specific skills
- ❖ Development of values values
- ❖ To Change behavior and conduct of student
- ❖ To improve the learning skills of students, including methodological, critical thinking, writing, creativity, hypothesis etc.
- ❖ Subject Knowledge
- ❖ To provide a social and efficient member of society.

## **BASIC REQUIREMENTS OF TEACHING**

The following are the basic requirements of teaching:

### **The Teacher**

To teach, a teacher is the main source of knowledge to impart it to the students. They are innovators of information and knowledge. Teachers research, collect, create and transmit knowledge and values to the students for their physical, mental, emotional and social development.

### **The Learner**

After a teacher, learner is the most basic requirement of teaching. There must be a learner to whom a teacher teaches. Learners are dependent on teachers as they are immature. They try to work hard to understand what their teachers are teaching to them. They should be the follower of teachers who obey what their teachers ask them to do. The learners can belong to any category whether it is primary schools, elementary schools, secondary schools, senior secondary schools, or colleges or universities.

### **The Subject**

What a teacher teaches and what a student learn is the topic or the subject. The entire process of learning-teaching revolves around the subject. Teachers decide the topic and after collecting information and content about it, deliver it to the students.

### **The Environment**

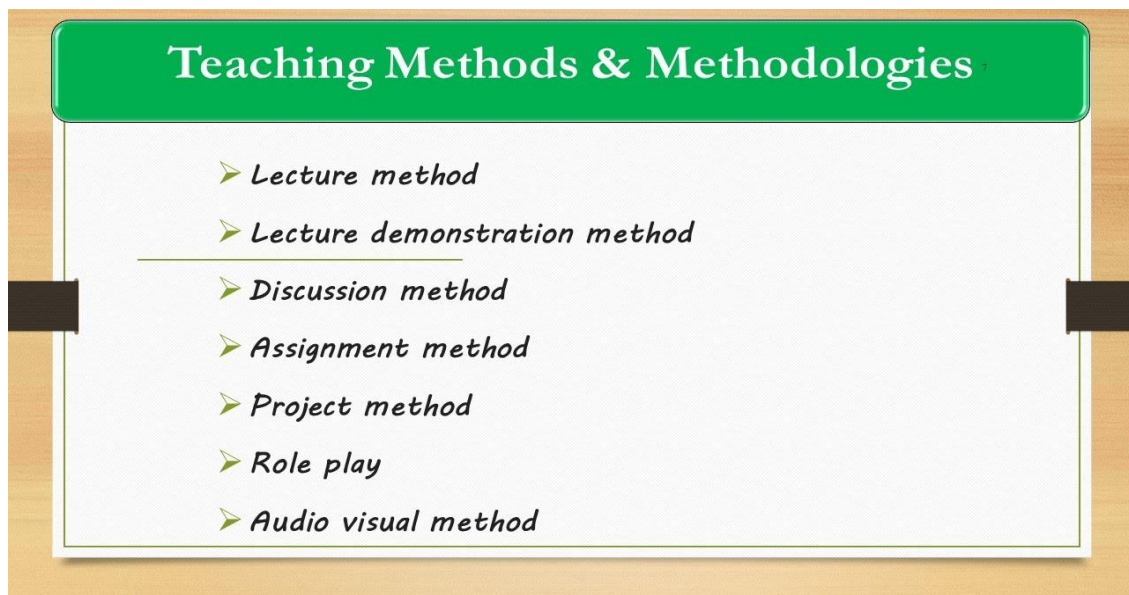
Teaching has the main objective which is the development of the students. It can be possible when a teacher teaches in a suitable environment and conduct the process of teaching-learning in an appropriate environment.

These were the basic requirements of teaching which a teacher must follow to teach learners for better understanding and effective outcome.

### **All the three variables of teaching**

- ❖ Professionalism
- ❖ Suitable-Environment
- ❖ Teacher-Student Relationship
- ❖ Student's discipline
- ❖ Teacher's devotion to teaching and also on the other hand, student's devotion to learning.

## METHODS OF TEACHING



## TEACHING AIDS

Teaching aids aim to promote learning in students. Apart from the traditional textual structure, different types of aids such as video, audio, and hands-on tools etc. are used to help students in increasing their learning experience.

Different tools such as computers, maps, and other tools are required for different types of interaction with students and these tools show the highest level of effectiveness.

The main objectives of these tools to involve the students, promote interaction, and promote faster learning and better comprehension. Aids are the much better method for learning because they relate textual matter with visual, audio and videos, thus enhance the learning in a meaningful way.

How and what tool a teacher can choose to use learning aids in a classroom can vary dramatically. It is necessary for a teacher to be skillful and the ability to decide proper aid to support his teaching.

### Importance of Teaching Aids

- Teaching aids help in retaining concepts more permanently for those students who have the tendency to forget frequently.
- Teaching aids can motivate the student for learning and encourage them to develop deep insights of the matter.

- Students can easily learn and grasp the topic and the concept with the help of teaching aids.
- Teaching aids increase the understanding level of students by creating the proper image in the mind of students
- Teaching aids are helpful for students in increasing their conceptual thinking.
- The teaching aids develop the environment of interest and a craving for learning inside them.
- Teaching aids help to increase the learning faster and accurate.
- It has been seen that visual effects create learning of permanent nature rather than audio effects.
- Teaching aids help the students learning through direct experience.

### **Classifications of teaching Aids**

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- **Traditional Aids:** Teaching/Learning using Books, Periodicals, Blackboard/Chalkboard.
- **Visual Aids:** Adding knowledge through Figure, chart, posters, model, graph or any other type of graphics such as diagrams, cartoon, info-graphs, cut-outs, bulletin board, flannel board, globe, objects, picture, map etc.
- **Mechanical Aids:**
  - Audio: teaching machine, Radio, tape recorder.
  - Visual: motion picture, Projector, epidiastope, filmstrips, etc.
  - Audio-Visual: Video, Cassettes, Films, television, etc. Visual Material Aids: There are many types of charts that are also included in visual material aids such as outline charts, tabular charts, flow charts and organization charts. Flip charts and flow charts are also being used.

### **Types of Teaching Aids**

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Aids can be classified into the different types these days. We may classify these aids as follows-

- **Visual Aids:** Any of various materials depending on the sense of sight, as films, slides, photographs, etc., used as aids in teaching. For example- flash cards, flannel board, bulletin board, chalkboard, overhead projector, slides, actual objects, models, pictures, charts, maps, etc.
- **Audio Aids:** Audio aids mean students able to hearing the study material without seeing messages. For example- Radio, tape recorder, gramophone etc.
- **Audio-Visual Aids:** Audio-Visual aids helpful to hear the message and see the messages are called Audio-Visual Aids. For example- film strips, television, film projector etc.

## CHARACTERISTICS OF GOOD TEACHING

Good teaching is as much about passion as it is about reason. It's about motivating students not only to learn, but teaching them how to learn, and doing so in a manner that is relevant, meaningful and memorable. It's about caring for your craft, having a passion for it and conveying that passion to everyone, but mostly importantly to your students.

**The main characteristics of good teaching are as following:**

1. It gives desirable information.
2. It creates self-motivation for learning.
3. Effective planning is essential for good teaching.
4. The students remain active in good teaching.
5. It focuses on selected information.
6. It is based on democratic ideals.
7. It is sympathetic and full of pity.
8. It is directional in nature.
9. It is based on the co-operation of teacher and students.
10. It is based on previous knowledge of teacher.
11. It is progressive.
12. It includes all sorts of teachers' performances and teaching methods.
13. It produces emotional stability.
14. It attempts to adjust the students with the environment.
15. It is diagnostic and therapeutic in nature.
16. It is the best medium for preparing the next generation for the changing world order.
17. It enhances the potentialities of the students.
18. The teacher works as a philosopher, friend and a direction.
19. The teacher's class room behavior includes both direct and indirect behavior.
20. It reflects harmony between teacher and the students.

### Classroom Management

Teaching is a powerful profession. With your exceptional mannerism, you can inspire so many students and bring positive changes to their lives. A good teacher always works on their skills and improves continuously. Involve students to create classroom guidelines

**Good classroom management. The skills include:**



- ❖ Model ideal behaviour
- ❖ Let students help establish guidelines
- ❖ Document rules
- ❖ Avoid punishing the class
- ❖ Encourage initiative
- ❖ Offer praise
- ❖ Use non-verbal communication
- ❖ Build excitement for content and lesson plans
- ❖ Assign open-ended projects

## **UNIT-II**

### **RESEARCH APITUDE**

#### **RESEARCH**

The word research is derived from the **Middle French** "recherche", which means "to go about seeking", the term itself being derived from the Old French term "researcher" a compound word from "re-" + "catchier", or "searcher", meaning 'search'. The earliest recorded use of the term was in 1577.

Research is an activity that leads us to finding new facts, information, assisting us in verifying the available knowledge and in making us question things that are difficult to understand as per existing data.

#### **MEANING OF RESEARCH**

Research is a process to discover new knowledge to find answers to a question. The word research has two parts re (again) and search (find) which denote that we are taking up an activity to look into an aspect once again or we want to look for some new information about something. E.g Front Office Executive has to learn about the facilities, timings, keyfeatures of products and services available at the hotel if one wants to become a wonderful sales professional other than being a host. "All progress is born of inquiry. Doubt is often better than overconfidence, for it leads to inquiry, and inquiry leads to invention" is a famous Hudson Maxim in context of which the significance of researchcan well be understood.

#### **DEFINITIONS OF RESEARCH**

- ❖ The word research is composed of two syllables, re and search. re is a prefix meaning again, anew or over again search is a verb meaning to examine closely and carefully, to test and try, or to probe. Together they form a noun describing a careful, systematic, patient study and

investigation in some field of knowledge, undertaken to establish facts or principles. –**Thyer**

- ❖ Research is a careful investigation or inquiry especially through search for new facts in any branch of knowledge." Research is a movement, a movement from the known to the unknown- **Rocco**
- ❖ Research is manipulation of things, concepts or symbols for the purpose of generalizing to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art- **Redman and Mory,**
- ❖ Research is systematic investigation to establish the facts." In the broadest sense of the word, the definition of research includes any gathering of data, information and facts for the advancement of knowledge.- **Creswell,**
- ❖ Research is an art of scientific investigation- **Kara, H**
- ❖ Research is careful investigation or enquiry especially through search for new facts in any branch of knowledge.- **Kumar, Ranjit**
- ❖ Research is a process of steps used to collect and analyze information to increase our understanding of a topic or issue. It consists of three steps: Pose a question, collect data to answer the question, and present an answer to the question.- **Creswell.**

### **CHARACTERISTICS OF RESEARCH**

The Characteristics of research determine whether a research is free of biases, prejudices, and subjective errors or not. The terms are very commonly used in research and the success of any research depends on these terms. They can be summarized as:

- ❖ **Generalized.**
- ❖ **Controlled.**
- ❖ **Rigorous.**
- ❖ **Empirical.**
- ❖ **Systematic**
- ❖ **Reliability.**
- ❖ **Validity.**
- ❖ **Employs hypothesis**
- ❖ **Analytical & Accuracy.**

- ❖ **Accuracy.**
- ❖ **Critical**
- ❖ **Generalized.-** The researcher usually divides the identified population into smaller samples depending on the resource availability at the time of research being conducted. This sample is understood to be the appropriate representative of the identified population therefore the findings should also be applicable to and representative of the entire population. The analytical information obtained from studying these samples should be give a fair idea of total population of being followerof particular ideology, beliefs, social stigmas, driving force, etc.
- ❖ **Controlled -**The concept of control implies that, in exploring causality in relationto two variables (factors), you set up your study in a way that minimizes the effects of other factors affecting the relationship. Some variables are classified as controlling factors and the other variables may be classified as possible effects of controlling factors. Laboratory experiments as in pure sciences like chemistry can be controlled but any study that involves societal issues cannot be controlled
- ❖ **Rigorous. -** One must be careful in ensuring that the procedures followed to find answers to questions are relevant, appropriate and justified. Again, the degree of rigor varies markedly between the physical and social sciences and within the social sciences
- ❖ **Empirical -** The processes adopted should be tested for the accuracy and each stepshould be coherent in progression. This means that any conclusions drawn are based upon firm data gathered from information collected from real life experiences or observations. Empirical nature of research means that the research has been conducted following rigorous scientific methods and procedures. Quantitative research is easier to prove scientifically than qualitative research. In qualitative research biases and prejudice are easy to occur.
- ❖ **Systematic -** The procedure or process being developed to undertake a studyshould be carefully drafted to ensure that resources utilization is optimized. Chaotic or disorganized procedures would never yield expected outcomes. The steps should follow a logical sequence to get to the desired outcome.
- ❖ **Reliability-** This is a the degree to which the result of a measurement, calculation, or specification can be depended on to be accurate.It is difficult to be measured accurately, but now there are instruments which can *estimate* the reliability of a research. It is the

extent to which an experiment, test, measuring procedure, research, research instrument, tool or procedure yields the same results on repeated trials. If any research yields similar results each time it is undertaken with similar population and with similar procedures, it is called to be a reliable research.

- ❖ **Validity** - It is the extent to which a concept, conclusion or measurement is well-founded and likely corresponds accurately to the real world. The word "valid" is derived from the Latin *validus*, meaning strong. This should not be confused with notions of certainty nor necessity. The validity of a measurement tool (for example, a test in education) is considered to be the degree to which the tool measures what it claims to measure. Validity is based on the strength of a collection of different types of evidence. In terms of research validity is the strength with which we can make research conclusions, assumptions or propositions true or false.
- ❖ **Employs Hypothesis** - Any research definitely begins with formulation of a hypothesis. It is a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation. A hypothesis can be defined as an educated guess about the relationship between two or more variables. In simple words a hypothesis is an idea around which one starts working before it is actually converted to research. A question is what forms the base and is later termed as hypothesis and it may or may not draw a logical outcome. Hypothesis may prove to be wrong or null or void after the study is conducted.
- ❖ **Analytical & Accuracy**-A research should be focused not only about what is happening but also on how and why a particular phenomenon, process draws certain conclusions. Any data collected if does not yield results or is unsuitable to be used for further studies or applications disrupts the purpose of research. Therefore, data collected should be reasonable and free of errors to be easily analyzed
- ❖ **Accuracy** -is also the degree to which each research process, instrument, and tool is related to each other. Accuracy also measures whether research tools have been selected in best possible manner and research procedures suits the research problem or not. Selection of appropriate data collection tools is essential for a research.
- ❖ **Critical** - Critical scrutiny of the procedures used and the methods employed is crucial to a research enquiry. The process of investigation must be foolproof and free from drawbacks. The process adopted and the procedures used must be able to withstand critical scrutiny.

## OBJECTIVES OF RESEARCH

A research objective addresses the purpose of the investigation and the types of knowledge generated from one's investigation. Looking at the objectives of the research, one can anticipate what is to be achieved by the study. A research objective indicates the population of interest and independent and dependent variables.

### **The prime objectives of the research are:**

- ❖ to discover new facts
- ❖ to verify and test important facts
- ❖ to analyse an event or process or phenomenon to identify the cause and effect relationship
- ❖ to develop new scientific tools, concepts, and theories to solve and understand scientific and non-scientific problems
- ❖ to find solutions to scientific, non-scientific, and social problems and
- ❖ to overcome or solve the problems occurring in our everyday life.

## TYPES OF RESEARCH

Research can be classified into various categories depending on the perspective under which the research activity is initiated and conducted. The categorization depends on the following perspectives in general:

- ❖ **Fundamental Research** - It is refined and theoretical research established on the principle of generalization. Fundamental Research is headed towards finding information that has a wide base application.
- ❖ **Applied Research** - This type of research discovers a resolution for some specific issue such as identifying social, economic, or political trends. It may concern society or firms.
- ❖ **Descriptive Research** - It is a qualitative study carried out to know about people's choices. Descriptive Research creates a proper and logical explanation of a problem by collecting true, realistic information through surveys.
- ❖ **Analytical Research** - This kind of research examines the facts or information which is already functional using logic and reasoning. It is based on secondary data
- ❖ **Conceptual Research** - It does not implicate fulfilling any practical experiments. Conceptual Research is generally used by philosophers and thinkers to invent new concepts or to interpret innovative ideas such as Newton's Theory

## STEPS OF RESEARCH

Scientific research involves a systematic process that focuses on being objective and gathering a multitude of information for analysis so that the researcher can come to a conclusion. This process is used in all research and evaluation projects, regardless of the

research method (scientific method of inquiry, evaluation research, or action research). The process focuses on testing hunches or ideas in a park and recreation setting through a systematic process. In this process, the study is documented in such a way that another individual can conduct the same study again. .



## RESEARCH PAPER

A research paper is a common form of academic writing. Research papers require students and academics to locate information about a take a stand on that topic, and provide support or evidence for that position in an organized report. The research paper is generally intended to describe an event, a concept, or argue a point. A research paper is a written original work discussing a topic in detail; usually several typed pages in length and is often due at the session.

## **Importance of Research paper**

- ❖ Good reading skills
- ❖ Good writing skills
- ❖ A sense of achievement
- ❖ Skills for future scholarly researches
- ❖ Knowledge about your subject area
- ❖ Learn how to use resources electronic and non-electronic
- ❖ Establish your individuality through writing
- ❖ Exercise critical thinking
- ❖ Learn about originality and creativity

## **RESEARCH ARTICLE**

A research article is a journal article in which the authors report on the research they did. Research articles are always primary sources. Whether or not a research article is peer reviewed depends on the journal that publishes it.

Published research articles follow a predictable pattern and will contain most, if not all, of the sections listed below. However, the names for these sections may vary.

- Title & Author(s)
- Abstract
- Introduction
- Methodology
- Results
- Discussion
- Conclusion
- References

## **WORKSHOP**

Workshops are generally smaller than conferences, and are usually only a day or two long and are dedicated to discussing a specific topic. Although these events are held as part of a department, the best workshops have a specific, action-oriented purpose, and aim to generate some concrete answers to current problems in the field. Workshops are a good opportunity to learn new skills

## **SEMINAR**

A seminar is a smaller event than a conference, and it is typically focused on a single topic. Seminars typically involve a panel of experts who lead a discussion on the topic, and attendees have the opportunity to ask questions and participate in the discussion.

## **CONFERNCES**

A conference is a large gathering of people who come together to discuss a specific topic or theme. Conferences usually have a few keynote speakers who are experts in the field and who deliver speeches to the attendees. There are also usually breakout sessions at conferences where attendees can choose to participate in smaller, more intimate discussions on specific topics.

## **SYMPOSIUM**

A symposium is a meeting of people who share a shared interest that results in a discussion, debate, or another kind of speech. It's a compilation of different people's papers.

A symposium is a formal assembly of scholars, academics, or professionals who discuss a certain subject

## **UNIT-III**

### **COMMUNICATIONS**

The term communication is derived from the Latin word "communis" or "communicare" which means to make common. Thus communication means to make common facts, information's, thoughts and requirements. Communication, therefore, is the exchange of thoughts, message, information etc. by way of speech, signal or in writing.

Communication is a two-way process and works well with feedback, this helps to confirm that the intended message has been successful.

#### **Definition of Communication**

Communication is the sum of all things, and one person does when he wants to create understanding in the minds of another. It involves a systematic and continuous process of telling, listening, and understanding.

– Allen Louis

Communication is an exchange of facts, ideas, opinions, or emotions by two or more persons.

– George Terry

### **EVOLUTION OF COMMUNICATION**

#### **Communication in Ancient Times**

The first means of communication was, of course, the human voice but about 3,200 BC writing was invented in Iraq and Egypt. It was invented about 1,500 BC in China. Other civilizations in central America like the Mayans also invented systems of writing.

The next big step was the invention of the alphabet in what is now Israel and Lebanon about 1,600 BC. In the Ancient World many civilizations including Egypt, Assyria, Persia, Rome, and China had efficient postal systems to deliver messages to parts of their empires using



relays of horses. In the Ancient World, people wrote on papyrus or parchment. However, the Chinese invented paper in about 200 BC. The knowledge of how to make paper passed to the Arabs and in the middle Ages, it reached Europe.

### **Communication 1500-1800**

The next major improvement in communication was the invention of printing. The Chinese invented printing with blocks in the 6th century AD but the first known printed book was the Diamond Sutra of 686. In Europe, in the mid-15th century, Johannes Gutenberg invented the printing press, which made books much cheaper and allowed newspapers to be invented. William Caxton introduced the printing press into England in 1476.

The first newspapers were printed in the 17th century. The first newspaper in England was printed in 1641. (However, the word newspaper was not recorded until 1670). The first successful daily newspaper in Britain was printed in 1702. Meanwhile, European monarchs set up postal services to carry their messages. In France Louis XI founded one in 1477 and in England Henry VIII created the Royal Mail in 1512. In 1635 to raise money Charles I allowed private citizens to send messages by Royal Mail, for a fee. Meanwhile, the pencil was invented in 1564.

### **Communication in the 19th Century**

Communication became far more efficient in the 19th century. In the early 19th century the recipient of a letter had to pay the postage, not the sender. Then in 1840, Rowland Hill invented the Penny Post. From then on the sender of the letter paid. Cheap mail made it much easier for people to keep in touch with loved ones who lived a long way off. In 1874 the Universal Postal Union was formed to coordinate postal services in different countries.

Meanwhile, Ralph Wedgwood invented carbon paper in 1806. The telegraph was invented in 1837. A cable was laid across the Channel in 1850 and after 1866 it was possible to send messages across the Atlantic. Meanwhile, the first fax machine was invented in 1843. A Scot, Alexander Graham Bell invented the telephone in 1876. The first telephone exchange in Britain opened in 1879. The first telephone directory in London was published in 1880. The first telephone line from Paris to Brussels was established in 1887. The first line from London to Paris opened in 1891. The first transatlantic telephone line opened in 1927. In 1930 a telephone link from Britain to Australia was established. Meanwhile; the first successful typewriter went on sale in 1874. In 1829 Louis Braille invented an embossed typeface for the blind and in 1837 Isaac Pitman invented shorthand. The first successful rotary printing press was invented by Richard M Hoe in 1846.

## Communication in The 20th Century

Communication continued to improve in the 20th century. In 1901 Marconi sent a radio message across the Atlantic. Radio broadcasting began in Britain in 1922 when the BBC was formed. By 1933 half the households in Britain had a radio. Following the 1972 Sound Broadcasting Act, independent radio stations were formed. In the 1990s new radio stations included Radio 5 Live (1990) and Classic FM (1991).

Television was invented in 1925 by John Logie Baird and the BBC began regular, high-definition broadcasting in 1936. TV was suspended in Britain during World War II but it began again in 1946. TV first became common in the 1950s. A lot of people bought a TV set to watch the coronation of Elizabeth II and a survey at the end of that year showed that about one-quarter of households had one. By 1959 about two-thirds of homes had a TV. By 1964 the figure had reached 90% and TV had become the main form of entertainment – at the expense of cinema, which declined in popularity.

## NATURE AND CHARACTERISTICS OF COMMUNICATION

Most important nature or characteristics of communication are listed below:

- 1. Communication involves at least two persons:** Communication involves at least two persons-the sender and the receiver. The sender sends the message and is known as the communicator. The receiver receives the message and is known as communicate.
- 2. Communication is a two way process:** Communication is essentially a two way process. It does not merely means sending and receiving messages. It is not complete unless and until the message has been understood by the receiver in the same sense.
- 3. Purpose of communication:** Message is a Must. A message is the subject matter of communication .e.g., the contents of the letter or speech, order, instructions or the suggestions. A communication must convey some message. If there is no message there is no communication. The basic purpose of communication is to create an understanding. The receiver should understand the message sent and should response accordingly.
- 4. Form of communication:** Communication may take several forms e.g. order, instruction, report, queries etc. It may be verbal or written. It may be formal or informal.
- 5. Scope of communication:** Communication pervades all human relationship. It is essential in all type of organizational and at all levels of management.
- 6. Communication is a dynamic process:** Communication is influenced by the mood and thinking of the sender and receiver. The way a message is accepted depends upon the fact that which of the fine sensory organs of the receiver is active at that time.
- 7. Communication is much more than words:** Communication is not merely sending or receiving facts, expressed in words. Communication May be Written, Oral or Gestural. It also

involves ideas and emotions. A lot of communication is done through signs, symbols and gestures.

**8. Communication's primary purpose is to motivate a response:** The primary purpose of communication is to motivate response or influence human behaviour. There is no doubt that motivation comes from within but communicator can also motivate people by good drafting of message, proper timing of communication, etc. To create understanding, communication should be relevant to the situation. It must always be remembered that communication is a means of motivating and not an end itself.

**9. Communication is conversational:** Communication sets up a link between facts, ideas, and thus helps the communicator and communicates to progress logically.

**10. Communication is an interdisciplinary science:** Communication to be effective derives knowledge from several sciences like-anthropology (study of body language), sociology (study of human behaviour), psychology (study of attitude) etc

**11. Communication may be formal or informal:** Formal communication follows the formal channels provided in the organisation structure. For example, the Managing Director communicates with the departmental heads, say Finance Manager, finance manager communicates to deputy finance manager, the deputy finance manager with accounts officer and so on. In simple words, in informal communication, there is no direct communication between the Managing Director and the accounts clerks. Informal communication flows from informal channels of communication which are not provided in the organisation structure. These channels develop among members because of personal contacts through working with each other.

**12. It flows up and down and also from side to side:** Communication flows downward from a superior to subordinate and upward from subordinate to a superior. It also flows between two or more persons operating at the same level of authority.

### **TYPES OF COMMUNICATION**

- ❖ Intrapersonal Communication
- ❖ Interpersonal Communication:
- ❖ Group Communication:
- ❖ Mass Communication:
- ❖ Verbal Communication:
- ❖ Non-verbal communication
- ❖ Meta Communication
- ❖ Formal Communication
- ❖ Informal Communication

### **Intrapersonal Communication**

It is talking to oneself in one's own mind. Examples are soliloquies or asides in dramatic works.

### **Interpersonal Communication**

It is the exchange of messages between two persons. For example, a conversation, dialogue, or an interview in which two persons interact (others may also be present as audience). An author communicates interpersonally with his reader, who is always present as a silent audience in the author's mind while he writes. A letter too is an example of interpersonal communication between the writer and the person to whom it is written.

### **Group Communication**

It can be among small or large groups, like an organization, club or classroom, in which all individuals retain their individual identity

### **Mass Communication**

It occurs when the message is sent to large groups of people, for example, by newspaper, radio, or television. In this process, each person becomes a faceless individual with almost no opportunity for personal response or feedback

### **Verbal Communication**

It means communicating with words, written or spoken. Verbal communication consists of speaking, listening, writing, reading, and thinking. It may further be classified as Oral or Written Communication

### **Non-verbal communication**

It includes using of pictures, signs, gestures, and facial expressions for exchanging information between persons. It is done through sign language, action language, or object language. Non-verbal communication flows through all acts of speaking or writing. It is a wordless message conveyed through gestures (sign), movements (action language), and object language (pictures/clothes) and so on. Further non-verbal communication can be identified by personal space (proxemics), sense of smell (olfactics) and time (chronemics)

### **Meta Communication**

Here the speaker's choice of words unintentionally communicates something more than what the actual words state. For example, a flattering remark like "I've never seen you so smartly dressed" could also mean that the regular attire of the listener needed improvement

### **Formal Communication**

A formal channel of communication can be defined as a means of communication that is

formally controlled by managers or people occupying positions in an organization. The communication flows through formal channels, that is, officially recognized positions along the line in the organization. This ensures that the information flows orderly, timely, and accurately. Any information, decision, memo, reminder etc. will follow this path

### **Informal Communication**

Side by side with the formal channel of communication every organization has an equally effective channel of communication that is the informal channel. It is not officially sanctioned, and quite often it is even discouraged or looked down upon. But, then, it is very much there, and has been given the name ‘grapevine’ precisely because it runs in all directions-horizontal, vertical, diagonal. As the management experts put it, “it flows around water coolers, down hallways, through lunch rooms, and wherever people get together in groups

## **CLASSROOM COMMUNICATION**

### **Meaning of Class room Communication**

Communication within the classroom is important in order for students to learn effectively and should be put in place from an early stage of learning. Classroom communication exists in three categories: verbal, nonverbal, and written.

**Verbal communication** refers to sending or receiving a message through sounds and languages. Teachers can address one student or the whole classroom through verbal communication. For example, a teacher may ask a student to stand up which is verbal communication.

**Non-verbal communication** refers to communicating without words through body language, gestures, facial expressions, the tone and pitch of the voice, and posture. For example, if a teacher is nodding their head while a student is speaking, this can be encouraging or show that they agree with the student.

**Written communication** is sending or receiving information through writing. For example, a teacher may arrange a written assignment for students to test their knowledge or present lecture slides or notes for complicated information.

## **USING TECHNOLOGY IN CLASSROOM COMMUNICATION**

Technology provides access to information and helps in establishing contacts with teachers and students located at different locations.

1. OHP or the overhead projector
2. Audio-Video Resources



## **MODES OF INTERACTION IN CLASSROOM**



Teacher - Student



Teacher - Two Students



Students - Students



Small peer group



Teacher – All Classroom Students



All students of the Classroom

### **OBJECTIVES OF COMMUNICATION**

The objectives of communication are dynamic and ever-changing. Some of the common objectives of official communication are to get or give information, to ask for or give instructions or advice or suggestions, to make requests, to persuade other people to agree with us.

The objectives of communication are numerous, depending on the situation. Some of the common goals of official notification are:

- ❖ to get or provide information,
- ❖ to ask for or give instructions or suggestions or advice
- ❖ to make requests,
- ❖ to persuade other people to agree with us.

Sometimes, we communicate with the intention of complaining, or warning; but unfortunately, we do this angrily and get into arguments. If we learn to complain and warn in

an acceptable and constructive manner, our serious intention can be conveyed quite effectively without damaging relationships. In order to caution, counsel, clarify, appraise, evaluate, reprimand, organize, and numerous such objectives, we make use of communication.

### **FUNCTIONS OF COMMUNICATION**

Communication performs many functions, such as informing and generating awareness, educating, persuading, motivating, entertaining, etc. The functions of communication in an organization are to inform, persuade, and motivate. Employees need to have effective organizational communication in order to achieve excellent job performance. The communication between the top management and the employee needs to be effective for better work culture.

#### **Sharing of Information:**

Information is the key to progress in any organization. Business Communication is communication that promotes a product, service, marketing, or organization; relays information within a business, or functions as an official statement from a company. The primary objective of communication in management is to convey information—instructions, policies, procedures, decisions, etc., so the listener will hear, read, understand what is said, agree and accept the message, and react as intended by the manager or sender of the communication.

#### **Decision-Making Process:**

Communication results in the sharing of information, which in turn makes employees knowledgeable and thus productive. Communication provides the information individuals and groups need to make decisions by transmitting the data needed to identify and evaluate choices. Thus communication helps to facilitate decision making. Decision-making is the core of the management process. The relationship between communication and decision-making is inseparable since decision making must rely on the information. The decision is the triggering mechanism of communication. The manager is a decision-maker. But all decisions based on the communication of information to the management

#### **Training and Up skilling of Employees**

Training of personnel is an ongoing process and communication plays an important role in the orientation and training of employees. The degree of learning depends to a great extent not only on the contents of training but also on how effectively the information and skills are shared. As we know, knowledge can be constructed through interaction between learners and peers and also other sources of information. Hence, effective communication results in effective teaching and training.

**Networking & Socialization:**

For the wellbeing of the organization society, nation, and culture it is crucial that we are exposed to different viewpoints so that we understand and appreciate the need for a plurality of ideas and diversity of views. Communication fosters the feeling of oneness in society by exposing the various social groups to different views. It develops the need to share and understand the feelings, emotions, hopes, aspirations, and expectations of varied groups in a social system.

**Motivation:**

A motivated individual plays a useful and active role in an organization. Communication fosters motivation by clarifying to employees what they must do, how well they are doing it, and how they can improve if performance is subpar. Communication motivates and persuades individuals to meet the mutually agreed-upon goals. Sharing success stories of those who have overcome the odds and have been able to achieve their goals can do this. This function of communication, although relevant in all walks of life is more pronounced in business and industry where communication is being increasingly used as a tool for motivation. The formation of specific goals, feedback on progress toward the goals, and reward for desired behaviour all stimulate motivation and require communication.

**Persuasion:**

Yet another important function of communication is to persuade. This may be to influence us towards a new idea, technique, or a product and also to persuade us to buy these products. The manager will probably desire to influence or persuade the employee in a way that will help maintain favourable relationships. Other motivating goals or objectives of managerial communication may be social interchange, personal advancement, and self-expression. Conversely, the employee also has similar goals of communication in an organization. The industrial and corporate houses and advertising agencies, while taking messages of new products to potential consumers far and wide have amply exploited this function. Different mass communication media are used for this purpose.

**Preservation of Organization Culture:**

Culture is a set of norms, values, and principles shared among people in an organization. Communication helps to preserve the culture and heritage of the organization and the company. Through communication, senior leadership and management share the culture and values of the organization with the employees. The transmission of values from top to bottom has been taking place through internal communications, newsletters, and town halls as well as through written emails. In the modern world, different mass communication media have taken up this function. Effective communication is essential for a positive culture in the workplace.



Transparency in communication is mandatory at all levels for a better understanding of work and better bonding among individuals.

## **EFFECTIVE COMMUNICATION**

The Seven terms, starting with the letter C, which makes communication more understandable, valuable and effective.

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

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

Complete communication develops and enhances the reputation of an organization.

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

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

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

It persuades the audience.

**2. 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:

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

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

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

Concise message is more appealing and comprehensible to the audience.

Concise message is non-repetitive in nature.

**3. Consideration** – Consideration implies “stepping into the shoes of others”. Effective communication must take the audience into consideration, i.e, the audience's viewpoints, 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 a message to suit the audience's needs while making your message complete. Features of considerate communication are as follows:

Emphasize on “you” approach.

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

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.

**4. 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:

It makes understanding easier.

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

Clear message makes use of exact, appropriate and concrete words

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

It is supported by specific facts and figures.

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

Concrete messages are not misinterpreted.

**6. 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. The courteous message has the following features:

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

The courteous message is positive and focused at the audience.

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

It is not at all biased.

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

The message is exact, correct and well-timed.

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

The correct message has a greater impact on the audience/readers.

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

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

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

## BARRIERS TO COMMUNICATION

There are different reasons which drive unsuccessful communication or stop understanding the authentic meaning of the information which are known as communication Barriers. The hardship of successfully delivering the information is classified in different communication barriers based on diverse aspects. Through this article, we are going to examine the Types of Communication Barriers as follows:

### **1.Semantic Barrier**

### **2. Language Barrier**

### **3.Organizational Barrier**

### **4. Interpersonal Barrier**

### **5. Individual Barrier**

### **6. Physical Barrier**

### **7. Psychological Barriers**

### **8. Technological barrier**

**Semantic Barrier** It is established on the same words having various meanings to various peoples. The hardship occurs when different people presume the different meaning of exact information or word, it is called semantic Barrier. The semantic barrier is generated due to the following reasons:

- Identical words with a different meaning
- Wrong Hypothesis
- Technical Language
- Distinct Cultures

**Language Barrier** Different languages, vocabulary, accents illustrate the language communication barrier. The benefit of challenging or inappropriate words, technical jargon, and badly presented or misunderstood messages can confuse the communication process.

**Organizational Barrier** The status of management or management policies is the basis of the Organizational Barrier. This type of barrier occurs due to the void between staff members and management in terms of communication policies, authority layers, filtering of information,

**Interpersonal Barrier** The possibilities of miscommunication occurred when there are discrepancies in education, society, and economic status between sender and receiver. These barriers form due to the values kept in relationships and the attitude of the participants in the operation of communication

**Individual Barrier** It is also comprehended as a psycho-sociological barrier. These barriers contain differences in personality, stereotyping, inattention, and differences in individual competencies to assume and act, which can also include physical disorders or handicaps. Due to the various personality of the sender and receiver in the communication method, the wrong

message is diagnosed.

**Physical Barrier** It is the most appeared barrier in communication due to natural and environmental conditions. The physical barrier contains possibilities like noise, hearing problems, speech difficulties, closed doors, defective equipment, etc. The geographical distance may be the cause for Physical barriers. It is always comfortable to convey the message to a person over a short distance. As more communication channel and technology is needed to provide the message at a large distance.

**Technological Barrier** The trouble during communication happens due to a technical mistake or it is known as Technical Barrier. The network problem, coding error, or defect in electronic equipment is the primary reason for the technological barrier. For example, one cannot be able to communicate over the phone if there is any fault in the phone or if the appropriate network is not available.

## **UNIT-IV**

### **INFORMATION AND COMMUNICATION**

#### **Meaning of ICT**

ICT, or information and communications technology (or technologies), is the infrastructure and components that enable modern computing. Although there is no single, universal definition of ICT, the term is generally accepted to mean all devices, networking components, applications and systems that combined allow people and organizations (i.e., businesses, nonprofit agencies, governments and criminal enterprises) to interact in the digital world.

Information and Communications Technology (ICT) is the convergence of computing, telecommunication and governance policies for how information should be accessed, secured, processed, transmitted and stored.

#### **ICT Components**

ICT components include:

- Hardware components that support the way information is created, transferred, stored and managed.
- Software as a Service (SaaS) and local client applications that support digital design, personal productivity and workflow management.
- Electronic components that support the exchange of digital information, including subscription service delivery mechanisms.
- Services that support IT asset management, data lifecycle management, customer experience management, digital employee experience management and data literacy.

## **Definitions of ICT**

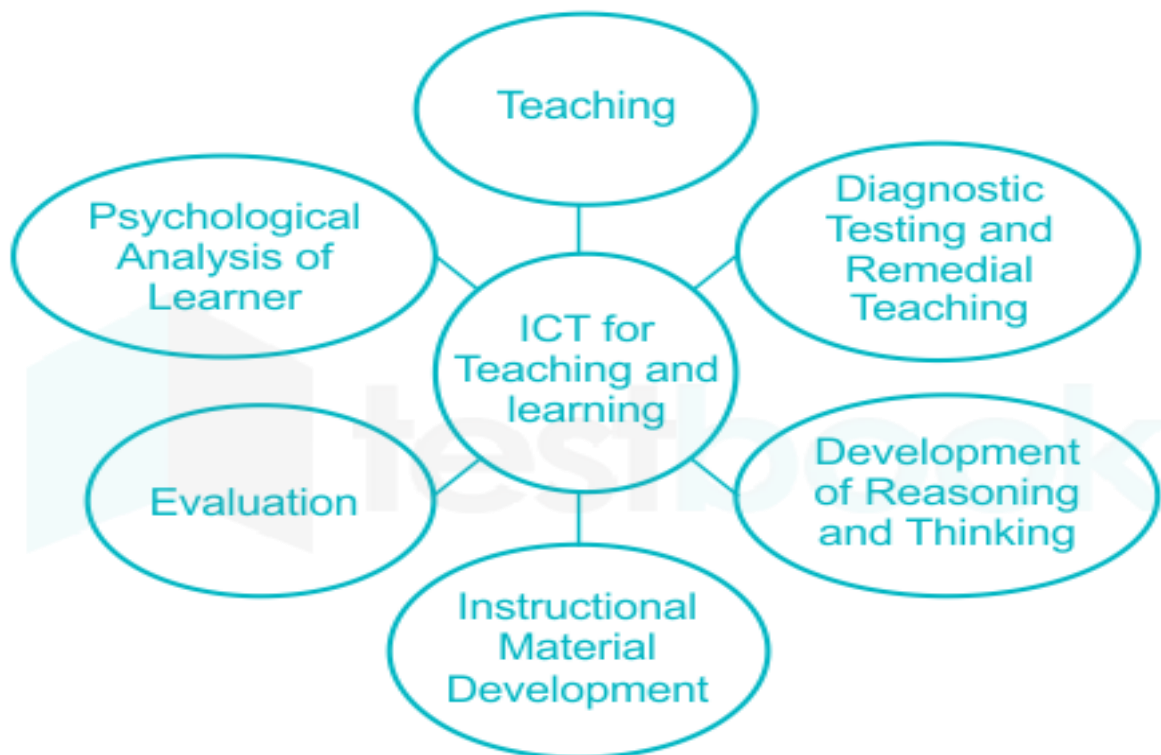
- ❖ The definition of Information and Communication Technology (ICT) is much broader, encompassing nearly every type of business. From manufactures, retailers, banks, and publishers to research firms, medical institutions, law enforcement agencies, government companies and library everywhere rely on Information and Communication Technology workers to run their daily businesses.
- ❖ Information Technology is defined in the Oxford Advanced Dictionary as “the study use of electronic equipment, especially computers for storing out information”
- ❖ Information Communication Technology (ICT) is an imprecise term frequently applied to broad areas of activities and technologies associated with the use of computers and communications.
- ❖ According to UNESCO “ICT is a scientific, technological and engineering discipline and management techniques used in handling information and application and association with social, economic and cultural matters”.
- ❖ The Information and Communication Technology ICT as the use and applications of computers telecommunications, and micro-electronics in the acquisition, storage, retrieval, transfer and dissemination of information.

## **Advantages of ICT**

- ❖ Enhances interaction and increases student engagement
- ❖ Learning is accessible any time, any place
- ❖ Offers new learning techniques as classroom tools are constantly evolving
- ❖ Decreases teacher paperwork improving work-life balance.
- ❖ Improves parent-teacher interaction.
- ❖ Improves and enhances peer support and collaboration between students
- ❖ Enables teachers to differentiate their teaching
- ❖ Teaches new life skills and prepares pupils for future workplaces
- ❖ Allows students to learn at their own pace and encourages individual learning styles
- ❖ Helps children with special needs or disabilities with greater access to more focussed learning resources

## Uses of ICT

- ❖ Education for Everyone
- ❖ Efficient Teachers Training
- ❖ Higher Knowledge Retention
- ❖ Improves Transparency
- ❖ Learner-Centered Approach
- ❖ New Teaching Methods



## Need of ICT in Teaching and Learning Process

# COMPUTER GENERATIONS

## Introduction

The modern computer took its shape with the arrival of your time. It had been around 16th century when the evolution of the computer started. The initial computer faced many changes, obviously for the betterment. It continuously improved itself in terms of speed, accuracy, size, and price to urge the form of the fashionable day computer. This long period is often conveniently divided into the subsequent phases called computer generations:

- ❖ **First Generation Computers (1940-1956)**
- ❖ **Second Generation Computers (1956-1963)**
- ❖ **Third Generation Computers (1964-1971)**
- ❖ **Fourth Generation Computers (1971-Present)**
- ❖ **Fifth Generation Computers (Present and Beyond)**

### **First Generation Computers: Vacuum Tubes (1940-1956)**

The technology behind the primary generation computers was a fragile glass device, which was called vacuum tubes. These computers were very heavy and really large in size. These weren't very reliable and programming on them was a really tedious task as they used high-level programming language and used no OS. First-generation computers were used for calculation, storage, and control purpose. They were too bulky and large that they needed a full room and consume rot of electricity.

ENIAC: Electronic Numerical Integrator and Computer, built by J. Presper Eckert and John V. Mauchly was a general-purpose computer. It had been very heavy, large, and contained 18,000 vacuum tubes.

EDVAC: Electronic Discrete Variable Automatic Computer was designed by von Neumann. It could store data also as instruction and thus the speed was enhanced.

UNIVAC: Universal Automatic Computer was developed in 1952 by Eckert and Mauchly.

### **Second Generation Computers: Transistors (1956-1963)**

Second-generation computers used the technology of transistors rather than bulky vacuum tubes. Another feature was the core storage. A transistor may be a device composed of semiconductor material that amplifies a sign or opens or closes a circuit.

Transistors were invented in Bell Labs. The use of transistors made it possible to perform powerfully and with due speed. It reduced the dimensions and price and thankfully the warmth too, which was generated by vacuum tubes. Central Processing Unit (CPU), memory, programming language and input, and output units also came into the force within the second generation.

Programming language was shifted from high level to programming language and made programming comparatively a simple task for programmers. Languages used for programming during this era were FORTRAN (1956), ALGOL (1958), and COBOL (1959).

### **Third Generation Computers: Integrated Circuits. (1964-1971)**

During the third generation, technology envisaged a shift from huge transistors to integrated circuits, also referred to as IC. Here a variety of transistors were placed on silicon chips, called semiconductors. The most feature of this era's computer was the speed and reliability. IC was made from silicon and also called silicon chips.

A single IC, has many transistors, registers, and capacitors built on one thin slice of silicon. The value size was reduced and memory space and dealing efficiency were increased during this generation. Programming was now wiped out Higher level languages like BASIC (Beginners All-purpose Symbolic Instruction Code). Minicomputers find their shape during this era.

### **Fourth Generation Computers: Micro-processors (1971-Present)**

In 1971 First microprocessors were used, the large scale of integration LSI circuits built on one chip called microprocessors. The most advantage of this technology is that one microprocessor can contain all the circuits required to perform arithmetic, logic, and control functions on one chip.

The computers using microchips were called microcomputers. This generation provided the even smaller size of computers, with larger capacities. That's not enough, then Very Large Scale Integrated (VLSI) circuits replaced LSI circuits. The Intel 4004chip, developed in 1971, located all the components of the pc from the central processing unit and memory to input/ output controls on one chip and allowed the dimensions to reduce drastically.

Technologies like multiprocessing, multiprogramming, time-sharing, operating speed, and virtual memory made it a more user-friendly and customary device. The concept of private computers and computer networks came into being within **the fourth generation.**

### **Fifth Generation Computers**

The technology behind the fifth generation of computers is AI. It allows computers to behave like humans. It is often seen in programs like voice recognition, area of medicines, and entertainment. Within the field of games playing also it's shown remarkable performance where computers are capable of beating human competitors.

The speed is highest, size is that the smallest and area of use has remarkably increased within the fifth generation computers. Though not a hundred percent AI has been achieved to date but keeping in sight the present developments, it is often said that this dream also will become a reality very soon.



In order to summarize the features of varied generations of computers, it is often said that a big improvement has been seen as far because the speed and accuracy of functioning care, but if we mention the dimensions, it's being small over the years. The value is additionally diminishing and reliability is in fact increasing

### **Basic Components of Computer**

The Computer Components are the necessary hardware units required to build a complete computing machine. Every computer must have these essential components to build a fully functional computing machine. This article explains the basic components of a computer in detail.

Generally, these components are classified according to their functional flow:

#### ❖ **Input unit**

#### ❖ **Central Processing Unit**

#### ❖ **Output unit**

#### ❖ **Input unit**

The input unit works as a fundamental part of the entire computer system. This process involves interaction with the user. These components can receive information directly from the user to command other devices. Many input devices perform specific functions depending on the type of input required to accomplish that particular task. Examples of input devices are a keyboard, mouse, joystick, etc.

- **Keyboard:** It consists of many keys, which we use to type any instruction. It helps us put commands on the computer system to perform our specific tasks. The device acts as a unit that allows the entire system to note the inputs implemented by the user.
- **Mouse:** Another commonly used input device acts as the computer's pointing and clicking device. It has a scrolling wheel to scroll on display and has some buttons for specific selection purposes.
- **Joystick:** This is an input device used primarily to give commands for the gaming process performed by the computer. We use this device to manage video games because it usually has more pushbuttons.

#### **Central Processing Unit**

The Central Processing Unit (CPU) is a processor, a primary component that performs most of the processing operations in a computer. It performs arithmetic, logic, and other operations to convert data inputs into more helpful information outputs and hence is also called the computer's brain.

It consists of three components: Memory Unit, Arithmetic & Logical Unit, and Control Unit.

- **Memory Unit:** This unit typically stores the processed data received from the input devices, providing the necessary space for managing computational activities.
- **Arithmetic & Logical Unit:** It is the major component of the CPU that deals with the appropriate operations and logical functions. In collaboration with other units, like any other device in the computer system, it uses the input data from the input device using the memory units for performing numerous jobs to obtain a faultless outcome.
- **Control Unit:** It is the major part of the Central Processing Unit. It receives input data from input devices and accomplishes the processed data in a controlled format under instructions provided by system operators.

#### ❖ **Output unit**

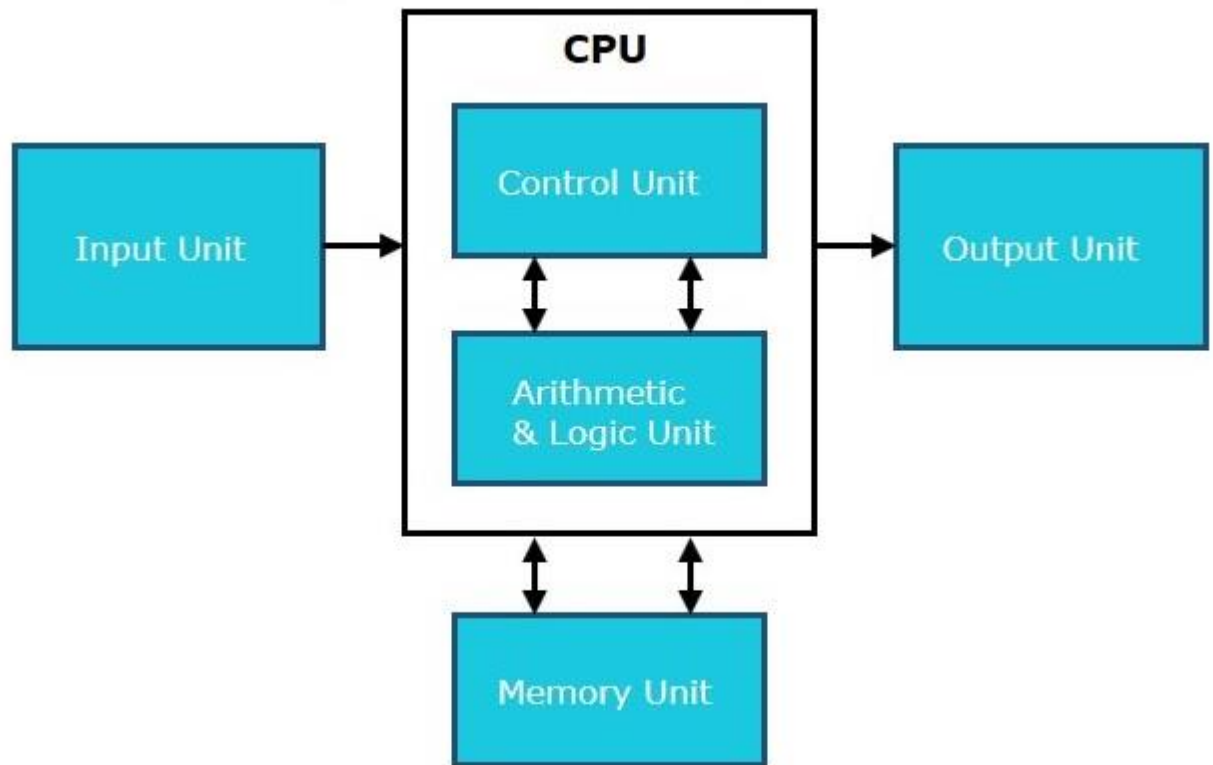
Output units are hardware devices attached to the computer that help the computer system interact with the user or other connected devices. It sends the processed data from the computer to the peripheral devices as per given commands. Most computer data output is in the form of audio and video. Thus, most of the output devices used by humans fall into these categories.

Some of the commonly used output devices are as follows:

- **Monitor:** A monitor is a hardware device that can efficiently display the data processed by the computer in a graphical output form. From monochrome monitors to color monitors and now coming to the latest LED/LCD; Thus, the technology for designing displays evolved.
- **Speaker:** Speaker is one of the most common output hardware devices used with computer systems to play the audio output generated by the sound card.
- **Printer:** A computer printer is an external hardware output device that can transfer electronic data from the computer to a hard copy; It can print text and graphics on paper or print 3D objects in the case of 3D printers.

### **PARTS OF COMPUTER**

- ❖ **Motherboard**
- ❖ **Input Unit**
- ❖ **Output Unit**
- ❖ **Central Processing Unit (CPU)**
- ❖ **Graphics Processing Unit (GPU)**
- ❖ **Random Access Memory (RAM)**
- ❖ **Storage Unit**



### **INPUT DEVICES**

Input device enables the user to send data, information, or control signals to a computer. The Central Processing Unit (CPU) of a computer receives the input and processes it to produce the output.

Following are some of the important input devices which are used in a computer –

- ❖ Keyboard
- ❖ Mouse
- ❖ Joy Stick
- ❖ Light pen
- ❖ Track Ball
- ❖ Scanner
- ❖ Graphic Tablet
- ❖ Microphone
- ❖ Magnetic Ink Card Reader(MICR)
- ❖ Optical Character Reader(OCR)
- ❖ Bar Code Reader
- ❖ Optical Mark Reader(OMR)

## OUTPUT DEVICES

The output device displays the result of the processing of raw data that is entered in the computer through an input device. There are a number of output devices that display output in different ways such as text, images, hard copies, and audio or video.

Some of the popular output devices are:

- ❖ Monitor
- ❖ Printer
- ❖ Headphones
- ❖ Computer Speakers
- ❖ Projector
- ❖ GPS
- ❖ Sound Card
- ❖ Video Card
- ❖ Braille Reader
- ❖ Speech-Generating Device

## STORAGE DEVICES

A storage unit is a part of the computer system which is employed to store the information and instructions to be processed. A storage device is an integral part of the computer hardware which stores information/data to process the result of any computational work. Without a storage device, a computer would not be able to run or even boot up. Or in other words, we can say that a storage device is hardware that is used for storing, porting, or extracting data files. It can also store information/data both temporarily and permanently. Computer storage is of two types:

### Primary Storage Devices

It is also known as internal memory and main memory. This is a section of the CPU that holds program instructions, input data, and intermediate results. It is generally smaller in size.

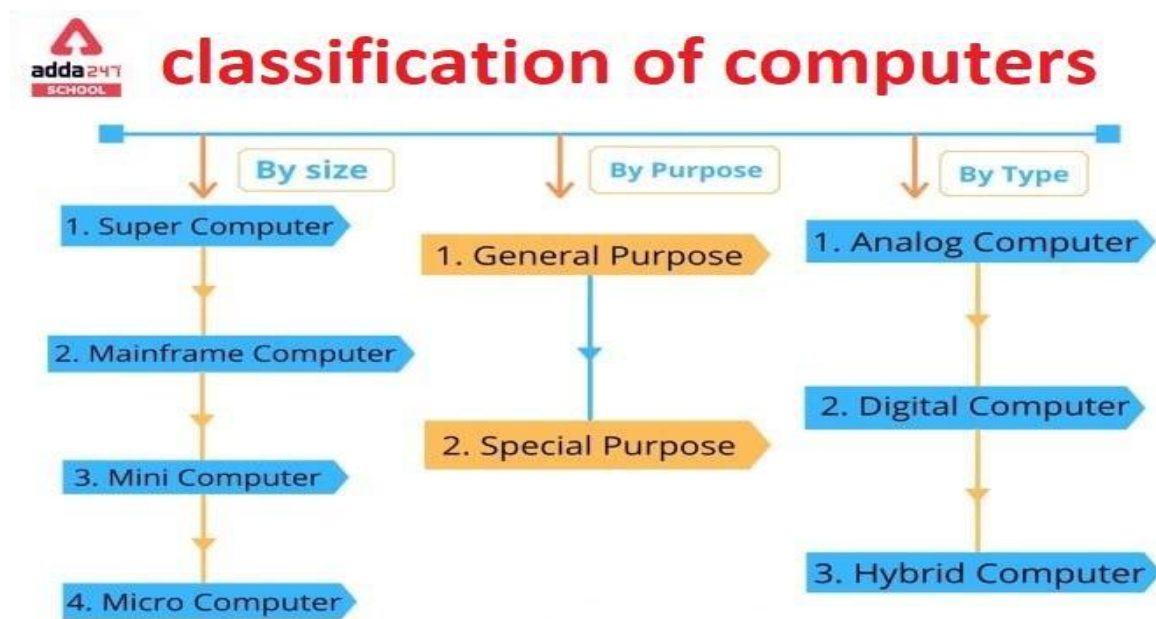
- ❖ RAM (Random Access Memory)
- ❖ ROM (Read Only Memory)

### Secondary Storage Devices:

Secondary storage is a memory that is stored external to the computer. It is mainly used for the permanent and long-term storage of programs and data.

- ❖ Hard Disk
- ❖ CD
- ❖ DVD
- ❖ Pen/Flash drive,
- ❖

### CLASSIFICATIONS OF COMPUTER



Abbreviation	Full-name
A/D	Analog-to-Digital
ABC	Atanas off Berry Computer
ACM	Association for Computing Machinery
AI	Artificial Intelligence
ALGOL	Algorithmic Language
ALU	Arithmetic Logic Unit
AMD	Advanced Micro Devices
ARPANET	Advanced Research Project Agency Network

ASCII	American Standard Code for Information Interchange
BASIC	Beginners All-purpose Symbolic Instruction Code
BCD	Binary Coded Decimal
BIOS	Basic Input Output System
BIPS	Billions of Instructions Per Second
BPI	Bytes Per Inch
CAD	Computer Aided Design
CAE	Computer Aided Engineering
CAN	Campus Area Network
CASE	Computer Aided Software Engineering
CD	Compact Disk
CDC	Control Data Corporation
CD-R	CD-Recordable
CD-ROM	Compact Disk Read Only Memory
CD-RW	CD Read/Write
CL	Command Language
CLI	Command Line Interface
COBOL	Common Business Oriented
CODASYL	Conference On Data Systems
CPU	Central Processing Unit
CRT	Cathode Ray Tube
D/A	Digital-to-Analog
DAT	Digital Audio Tape
DBMS	Data Base Management System
DBS	Demand Based Switching
DDL	Data Definition Language
DDS	Digital Data Storage

DEC	Digital Equipment Corporation
DMA	Direct Memory Access
DNA	Digital Network Architecture
DPI	Dots Per Inch
DRAM	Dynamic RAM
DSN	Distributed Systems Network
DTS	Digital Theater System
DVD	Digital Video/Versatile Disk
EBCDIC	Extended Binary Coded Decimal Interchange Code
EDSAC	Electronic Delay Storage Automatic Calculator
EDVAC	Electronic Discrete Variable Automatic Calculator
EFM	Eight-to-Fourteen Modulation
ENIAC	Electronic Numerical Integrator And Calculator
EPG	Electronic Programming Guide
EPIC	Explicitly Parallel Instruction Computing
EPROM	Erasable Programmable Read-Only Memory
FAT	File Allocation Table
FDM	Frequency Division Multiplexing
FEP	Front End Processor
FLOPS	Floating Point Operations Per Second
FM	Frequency Modulation
FMS	File Management System
FORTRAN	FORmula TRANslation
FSK	Frequency Shift Keying
FTP	File Transfer Protocol
GB	Giga Bytes
GFLOPS	Giga FLOPS

GHz	Giga Hertz
GNU	Gnu Not Unix
GPRS	General Packet Radio Service
GSM	Global System for Mobile communication
GUI	Graphical User Interface
HP	Hewlett Packard
HSS	Hierarchical Storage System
HTML	HyperText Markup Language
HTTP	HyperText Transport Protocol
IBM	International Business Machine
IC	Integrated Circuit
IDN	Integrated Digital Networks
IP	Internet Protocol
IrDA	Infrared Data Association
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
JPEG	Joint Photographic Experts Group
JRE	Java Runtime Engine
JSP	Java Server Pages
KB	Kilo Bytes
KHz	Kilo Hertz
LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LPM	Line Per Minute
LSI	Large Scael Integration
MAN	Metropolitan Area Network



MAR	Memory Address Register
MB	Mega Bytes
MBR	Memory Buffer Register
MHz	Mega Hertz
MIDI	Musical Instrument Digital Interface
MIPS	Millions of Instructions Per Second
MNP	Microcom Network Protocol
MPEG	Moving Pictures Experts Group
MS-DOS	MicroSoft Disk Operating System
MVT	Multiprogramming with Variable Tasks
NIC	Network Interface Card
NICNET	National Informatics Center NETWORK
NOS	Network Operating System
OCR	Optical Character Recognition
OMR	Optical Mark Reader
OS	Operating System
OSI	Open System Interconnection
OSS	Open Source Software
PAN	Personal Area Network
PC	Personal Computer
PDF	Portable Document Format
PDL	Program Design Language
PDP	Program Data Processor
PIP	Peripheral Interchange Program
PROM	Programmable Read-Only Memory
QoS	Quality of Service
RAM	Random Access Memory

ROM	Read Only Memory
SDLC	Software Development Life Cycle
SEQUEL	Structured English QUery Language
SGML	Syntax for Generalized Markup Language
SIMM	Single In-line Memory Module
SNA	Systems Network Architecture
SNOBOL	StriNg Oriented and symBOLic Language
SQL	Structured Query Language
SRAM	Static RAM
SSI	Small Scale Integration
TB	Tera Bytes
TCP	Transport Control Protocol
TDM	Time Division Multiplexing
UDP	User Datagram Protocol
ULSI	Ultra Large Scale Integration
UPC	Universal Product Code
URL	Uniform Resource Locator
USB	Universal Serial Bus
UTF	Unicode Transformation Format
VAN	Value Added Network
VCR	Video Cassette Recorder
VDT	Video Display Terminal
VGA	Video Graphics Array
VOD	Video-On-Demand
VoIP	Voice over Internet Protocol
VSAT	Very Small Aperture Terminal
WAN	Wide Area Network

WAP	Wireless Application Protocol
WiMAX	Worldwide Interoperability for Microwave Access
WLAN	Wireless Local Area Network
WLL	Wireless Local Loop
WORM	Write Once Read Many
WWW	World Wide Web
XHTML	Xtensible HyperText Markup Language
XML	Xtensible Markup Language
X.400	Electronic Mail Protocol
X.500	Directory Server Protocol

## **UNIT- V**

### **PEOPLE AND ENVIRONMENT**

The definition of an environment can be stated as a system encompassing all biotic and abiotic elements affecting human life. The biotic or living components comprise all flora and fauna, and abiotic components include water, sunlight, air, climate, etc.

#### **Components of Environment**

The five fundamental elements of the environment are the lithosphere, or the rocks and soil, the atmosphere, or the air, the hydrosphere, or the water, and the biosphere, or the biological element of the environment.

#### **Types of Environment**

The classification of the environment broadly divides it into two categories – geographical and manmade environment,

#### **Geographical Environment**

Geographical environment is the terrestrial environment that is a creation of complex natural and environmental conditions. Although it arose independently of humankind, it is the complement of direct interaction between nature and human society. The geographical environment revolves around the subjects of climatology, geology, biogeography, etc. They are direct aspects of how human society conceptualizes the geography of the earth.

A geographical environment is also called a natural environment as it interacts with nature. The earth's surface, rivers, mountains, deserts, land, water, oceans, volcanoes, etc. come under the natural environment examples.

## **Man-Made Environment**

Man cannot directly live in the geographical environment, so he creates some of his environmental conditions to adjust to it. This is a man-made or human-made environment, a human creation. A man-made environment is also called a social environment.

## **Pollution**

The word pollution comes from the Latin 'polluere' that simply means contamination. Hence, in layman terms, pollution is something that contaminates the environment. The presence of harmful substances in the air, land, and water, which can have an adverse effect on living beings and on the environment, is pollution.

### **Types of Pollution**

**The different types of pollution are as follows:-**

- **Air Pollution:** - It is the contamination of the natural air by mixing it with different pollutants such as harmful fumes and chemicals. This type of contamination can be caused by burning material or by gases emitted by vehicles or harmful fumes emitted as a by-product of industries. Global warming is one of the biggest side effects of air pollution as per the experts.
- **Water Pollution:-** It is the contamination of the water on the planet Earth. It includes water contamination by pollutants such as bacterial, chemical, and particulate that reduces the purity of the water. Oil seepage, as well as littering is one of the most common forms of pollution. It mainly occurs in lakes, oceans, rivers and even underground reservoirs.
- **Soil Pollution:-** It is also known as land pollution. It is the contamination of the soil or the land that prevents the growth of natural life. It includes land usage for irrigation, wildlife as well as habitation. The very common causes of soil pollution include hazardous wastage, mining as well as littering, non-sustainable farming practice, seepage into the soil, etc.
- **Noise Pollution:-** It is the loud noises which are fashioned by human activities that disturb the standard of living in the affected area. It can shoot from things such as railroads, traffic, loud music, concerts, aeroplanes, fireworks etc. This can even result in permanent or temporary loss of hearing as well as disturbances to wildlife.
- **Radioactive Pollution:-** This is one of the most dangerous forms of pollution. It is enormously harmful and can even result in death. We are witnessing this type of pollution from the 20th century. It evolved with the rise of atomic physics and nuclear weapons. Radioactive pollution results in the pollution of the air and land with radioactive poisoning. Leakages or accidents at nuclear power plants, as well as from improper disposal of nuclear waste are also reasons for this pollution. This pollution results in birth defects, cancer, deteriorating of health and even death.

## **Sources of Pollution**

- ❖ The Burning of Fossil Fuels
- ❖ Industrial Emission
- ❖ Indoor Air Pollution
- ❖ Wildfires
- ❖ Microbial Decaying Process
- ❖ Transportation
- ❖ Open Burning of Garbage Waste
- ❖ Construction and Demolition
- ❖ Agricultural Activities
- ❖ Use of chemical and synthetic products
- ❖ Oil storage facilities
- ❖ Urban storm water discharges
- ❖ Landfill sites
- ❖ Fish farming
- ❖ Pesticide use
- ❖ Power generation facilities
- ❖ arm wastes and silage
- ❖ Contaminated land
- ❖ Mining

## **Impact of Pollution**

- ❖ Human health is also severely affected by particulates in the atmosphere. The Particulates can cause nasal irritation and swelling. It can also cause a runny nose.
- ❖ Air pollution is additionally linked to lung damage and limited lung function
- ❖ Air pollution can also have an inflammatory effect on the heart – it can elevate blood Pressure and aggravate pre-existing conditions of the heart.
- ❖ The risk of death significantly increases with long term exposure to polluted air. For Instance, people susceptible to heart diseases are at higher risk.
- ❖ Diseases such as amoebiasis, typhoid and hookworm are caused by polluted drinking Water.
- ❖ Water polluted by chemicals such as heavy metals, lead, pesticides and hydrocarbon Can cause hormonal and reproductive problems, damage to the nervous system, liver And kidney damage and cancer – to name a few. Being exposed to mercury causes Parkinson's disease, Alzheimer's, heart disease and death.
- ❖ A polluted beach causes rashes, hepatitis, gastroenteritis, diarrhea, encephalitis, Stomach aches and vomiting.
- ❖ Water pollution affects marine life which is one of our food sources.

## Natural Resources

Natural resources are the raw materials and sources of energy that we use. Petrol, metals, soil, sand, wind, water, and everything in between are natural resources. Manufactured items such as plastic, sheet metal, fabrics, microchips, electricity and concrete are not natural resources, but are most definitely derived from natural resources.

### Natural Resources in India

#### Solar Energy

- ❖ Sunlight generates solar energy. The photovoltaic cells are exposed to sunlight dependent on the type of power required.
- ❖ The energy is used for cooking and water distillation.
- ❖ Some large solar power plants are being built in various areas of India, which would reduce rural communities' reliance on firewood and dung cakes.
- ❖ Therefore contributing to environmental conservation and a sufficient supply of manure in agriculture.
- ❖ India's geographical area receives over 5,000 trillion kWh of energy each year, with most sections receiving 4-7 kWh per sq. m every day.
- ❖ Solar photovoltaic electricity can be successfully harnessed in India, allowing for massive scalability.
- ❖ India just surpassed Italy to take fifth place in the world for solar power installations.
- ❖ In the previous five years, solar power capacity has expanded by more than 11 times, from 2.6 GW in March 2014 to 30 GW in July 2019.
- ❖ Solar tariffs in India are now highly competitive and have reached grid parity.

#### ○ Biogas

- ❖ In rural regions, shrubs, farm trash, animal and human waste are utilised to make biogas for home use.
- ❖ In comparison to kerosene, dung cake, and charcoal, decomposition of organic materials produces gas, which has a better thermal efficiency.
- ❖ In rural India, plants that use cow manure are known as 'Gobar gas plants.'
- ❖ These give the farmer two benefits: more energy and enhanced manure quality. By far the most efficient use of animal manure is biogas.
- ❖ It enhances manure quality while also preventing tree and manure loss owing to the burning of fuel wood and cow dung cakes.
- ❖ More than 4,000 homes already have their own biogas plant, allowing them to take use of the free and renewable energy contained in their animals' waste.
- ❖ In 2014-15, India's biogas output is expected to be at 20,757 lakh cubic metres.

- ❖ This is the equivalent of 6.6 crore LPG cylinders on the home market. This is the equivalent of 5% of the country's total LPG use today.
- ❖ The major goal of the biomass power and cogeneration programme is to promote technologies that make the most use of the country's biomass resources for grid power generation.
- ❖ Bagasse, rice husk, straw, cotton stalk, coconut shells, soya husk, de-oiled cakes, coffee waste, jute wastes, groundnut shells, saw dust, and other biomass products are used to generate electricity.

### **Wind power**

- ❖ Wind energy is created by harnessing the power of the wind and is mostly used to power irrigation water pumps.
- ❖ In terms of wind power generation, India is the second-largest country.
- ❖ Tamil Nadu has the biggest wind farm cluster, stretching from Nagercoil to Madurai.
- ❖ Apart from these, major wind farms can be found in Andhra Pradesh, Karnataka, Gujarat, Kerala, Maharashtra, and Lakshadweep.
- ❖ The wind industry's growth has resulted in a robust ecosystem, project operating capabilities, and a manufacturing base of roughly 10,000 megawatts per year.
- ❖ With a total installed capacity of 39.25 GW (as of March 31, 2021), the country now ranks fourth in the world for wind installed capacity and generated roughly 60.149 billion units in 2020-21.
- ❖ The government has installed over 800 wind-monitoring stations across the country and issued wind potential maps at 50m, 80m, 100m, and 120m above ground level through the National Institute of Wind Energy (NIWE).
- ❖ According to a recent evaluation, the country's gross wind power potential is 302 GW at 100 metres and 695.50 GW at 120 metres above ground level.

### **o GeoThermal Energy**

- ❖ The heat and electricity created by utilising heat from the Earth's interior are referred to as geothermal energy.
- ❖ Geothermal energy exists because the Earth gets hotter as you go deeper into it.
- ❖ In such situations, groundwater takes heat from the rocks and becomes hot.
- ❖ It's so hot that when it reaches the earth's surface, it condenses into steam.
- ❖ This steam powers turbines and generates energy.
- ❖ In India, two pilot projects to capture geothermal energy have been established. One is in Himachal Pradesh's Parvati Valley in Manikaran, while the other is in Ladakh's Puga Valley.
- ❖ Geothermal energy is an alternate, long-term energy source that India needs to take use of.

- ❖ India has a large geothermal energy potential; it is believed that India has around 10,000 MW of geothermal power potential, which may be used for a variety of applications.
- ❖ In India, the Geological Survey of India (GSI) has identified 350 geothermal energy sites. The Puga valley in Ladakh is the most promising of them.

### **Nuclear or Atomic Energy**

- ❖ It is created by modifying the structure of atoms.
- ❖ When such a change is performed, a large amount of energy is released in the form of heat, which is then used to create electricity.
- ❖ Uranium and Thorium, which are found in Jharkhand and Rajasthan's Aravalli mountains, are used to generate atomic or nuclear power.
- ❖ Kerala's Monazite sands are likewise high in Thorium.
- ❖ From uranium discovery and mining through fuel fabrication, heavy water production, reactor design and construction, reprocessing, and waste management, India's nuclear energy self-sufficiency was extensive.
- ❖ It already has a tiny fast breeder reactor and is planning to build a much larger one. It is also working on developing technologies to use its substantial thorium deposits as a nuclear fuel.
- ❖ India is the only developing country to have generated power using nuclear reactors that were built, demonstrated, and deployed domestically. India is the world's third-largest producer of electricity, with a total output of 1207 TWh.
- ❖ Nuclear power is India's fifth-largest source of electricity. India is also ranked seventh in terms of nuclear reactors, with over 23 nuclear reactors in seven power stations around the nation, producing 6780 MW of nuclear energy.
- ❖ With a goal of increasing its nuclear power contribution from 3.2 percent to 5% by 2031, India's nuclear energy contribution would aid the country's transition to a more sustainable and economic future.

### **Hydro Power Energy Sources**

- ❖ The conversion of energy from flowing water into electricity is referred to as hydropower or hydroelectricity.
- ❖ Hydropower is a renewable form of energy because it utilises rather than consumes water in the creation of electricity, leaving this critical resource accessible for other applications.
- ❖ Hydropower is the cheapest and cleanest form of electricity, but there are numerous environmental and social challenges involved with large dams, as witnessed in projects like Tehri, Narmada, and others. Small hydropower, on the other hand, is free of these issues.



- ❖ There are 197 hydropower plants in India.
- ❖ The end of the nineteenth century saw the rise of authority in India. Darjeeling received electricity in 1897, and a hydropower station at Shivasamudram, Karnataka, was inaugurated in 1902.
- ❖ Small hydro power facilities with a capacity of 25MW or less are categorised as small hydro in India, including micro (100kW or less), mini (101kW-2MW), and small hydro (2-25MW) sectors.
- ❖ India's installed utility-scale hydroelectric capacity was 46,000 MW as of March 31, 2020, accounting for 12.3 percent of the country's total utility power production capacity.

### **Tidal Energy**

- ❖ Tidal energy is created by harnessing the power of the sea's tidal waves. Due to a lack of cost-effective technologies, this supply has yet to be tapped.
- ❖ Tides in the ocean may be exploited to create power.
- ❖ Floodgate dams are constructed across inlets.
- ❖ The Gulf of Khambhat, the Gulf of Kachchh in Gujarat on the western coast, and the Gangetic delta in the Sunderban districts of West Bengal provide perfect conditions for tidal energy utilisation in India.
- ❖ Ocean energy includes tidal power, which is generated by transforming energy from the natural rise and fall of ocean tides and currents into electricity.
- ❖ Energy conversion devices can be used to harvest wave energy in the form of ocean wave motion.
- ❖ India's ocean energy potential is projected to be roughly 54 gigawatts (GW) - tidal power (12.45 GW) and wave power (41.3 GW)
- ❖ India aims to reach 175 GW of installed capacity by 2022 and 450 GW by 2030.
- Conventional Energy
- **Conventional Energy**
- ❖ Conventional energy sources are those that have been widely used for the majority of human history.
- ❖ They are non-renewable in nature, which means that once a sample of a conventional energy source has been depleted, it cannot be used again.
- ❖ Non-renewable materials either take a long time to develop or do not occur naturally in the environment.
- ❖ The most common resource featured in this category is minerals. When the pace of consumption exceeds the rate of replenishment/recovery, resources are called non-renewable.

- ❖ A notable example of this is fossil fuels, which fall into this category since their rate of creation is incredibly slow (possibly millions of years), making them non-renewable.
- ❖ Metallic minerals can be reused through recycling, whereas coal and petroleum cannot. It takes millions of years to replace them once they are entirely depleted.

### **Coal**

- ❖ Coal is the most readily available fossil fuel in India. It meets a significant portion of the country's energy requirements.
- ❖ It is used to generate electricity, as well as to deliver energy to industry and households.
- ❖ It provides 55 percent of the country's energy requirements. The country's industrial history is based on domestic coal.
- ❖ India is heavily reliant on coal to cover its commercial energy needs.
- ❖ Coal is created as a result of millions of years of compression of plant material.
- ❖ As a result, coal can be discovered in a variety of shapes, depending on the degree of compression as well as the depth and period of burial.
- ❖ Peat is produced by decaying plants in marshes.
- ❖ Low carbon and moisture content, as well as a limited heating capability.
- ❖ Lignite is low-grade brown coal that is mushy and contains a lot of moisture. The main lignite deposits are in Tamil Nadu's Neyveli, and they are utilised to generate energy.
- ❖ Bituminous coal is coal that has been dug deep and exposed to high temperatures. It is the most widely used coal in industry.
- ❖ Metallurgical coal is a high-grade bituminous coal with a specific use in blast furnaces for smelting iron. The best quality hard coal is anthracite.
- ❖ As of 2016, India ranked fifth in the world with 107,727 million tonnes of proven coal reserves, accounting for nearly 9% of the world's total coal reserves of 1,139,471 million tonnes.
- ❖ India has proven reserves of 111.5 times its annual consumption rate.
- ❖ India is the world's second-largest consumer of coal, accounting for around 84.8 percent of global consumption of 1,139,471,430 tonnes.
- ❖ India imports 22% of the coal it consumes.

### **Petroleum**

- ❖ The majority of petroleum occurrences in India are connected with anticlines and fault traps in tertiary rock strata.
- ❖ It occurs in regions of folding, anticlines, or domes where oil is trapped in the crest of the upfold.
- ❖ The oil-bearing layer is a porous limestone or sandstone that allows oil to flow through it. Intervening non-porous layers keep the oil from rising or sinking.

- ❖ Petroleum can also be discovered in fault traps formed by porous and non-porous rocks.
- ❖ Due to the gas being lighter than oil, it frequently appears above it.
- ❖ In India, important petroleum-producing locations are Mumbai High, Gujarat, and Assam.
- ❖ In the fiscal year 2021, India's petroleum product consumption was estimated to be around 141 million metric tonnes.
- ❖ In terms of primary energy consumption, the country was rated third in the world. With the industry's fast growth, inland petroleum product manufacturing is no longer sufficient.
- ❖ India is the world's third-largest oil consumer, consuming around 4.6 percent of the world's total of 97,103,871 barrels per day.
- ❖ 96 percent of India's oil usage is imported.

### **Natural Gas**

- ❖ Natural gas is considered an environmentally beneficial fuel due to its minimal carbon dioxide emissions and is hence the fuel of the twenty-first century.
- ❖ Natural gas deposits of significant size have been identified in the Krishna-Godavari basin.
- ❖ The reserves of Mumbai High and related fields are enhanced along the west coast by discoveries in the Gulf of Cambay.
- ❖ Andaman and Nicobar Islands are also major places with significant natural gas deposits.
- ❖ During the fiscal year 2021, the fertilizer industry consumed the most natural gas in India.
- ❖ The non-energy use of natural gas, which accounted for 35 percent of overall consumption, included the fertilizer sector, petrochemicals, sponge iron, and LPG shrinkage.
- ❖ As of 2017, India consumed 1,957,546 million cubic feet of natural gas per year.

### **Electricity**

- ❖ Electricity is produced primarily in two ways: by flowing water, which drives hydro turbines to produce hydroelectricity, and by burning other fuels such as coal, petroleum, and natural gas, which drives turbines to provide thermal power.
- ❖ Fast flowing water, a renewable resource, is used to create hydroelectricity.
- ❖ Hydroelectric power is produced by a variety of multi-purpose projects in India, including the Bhakra Nangal, Damodar Valley Corporation, and the Kopili Hydel Project.
- ❖ Coal, petroleum, and natural gas are used to create thermal electricity.
- ❖ Thermal power plants generate energy using nonrenewable fossil sources.
- ❖ India's power consumption is expected to grow at a significantly faster rate than the country's entire energy demand.
- ❖ India is the world's third-largest power generator.

- ❖ As of December 31, 2021, India's national electric grid had an installed capacity of 393.389 GW.
- ❖ Renewable energy plants, including big hydropower plants, account for 37% of India's total installed capacity.
- ❖ The gross electricity generated by utilities in India in fiscal year (FY) 2019-20 was 1,383.5 TWh, while total power generation (utilities and non-utilities) was 1,598 TWh.
- ❖ In FY2019, per capita, gross power usage was 1,208 kWh.

### **Indian Environment Acts**

Environmental laws are an important part of any governance body. It comprises a set of laws and regulations concerning air quality, water quality, and other aspects of the environment.

The environmental laws in India are guided by environmental legal principles and focus on the management of specific natural resources, such as forests, minerals, or fisheries.

The environmental laws in India are a direct reflection of what was envisaged in the constitution. The need for protection and conservation of the environment and sustainable use of natural resources is reflected in the constitutional framework of India and also in the international commitments of India.

#### **Environment Related Provisions in the Indian Constitution**

**Environment protection is mentioned in the Indian Constitution as part of Directive Principles of State Policy as well as Fundamental Duties.**

#### **Directive Principles of State Policy (Part IV) Article 48A**

Protection and improvement of environment and safeguarding of forests and wildlife The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country.

#### **Fundamental duties (Part IV A) Article 51A**

Protect and improve the natural environment including forests, lakes, rivers, and wildlife, and to have compassion for living creatures.

#### **The Wildlife (Protection) Act, 1972**

The Act provides for the protection of wild animals, birds, and plants; and for matters connected therewith or ancillary or incidental thereto. It extends to the whole of India.

#### **The Water (Prevention and Control of Pollution) Act, 1974**

Objective: To provide prevention and control of water pollution. Maintaining or restoring of wholesomeness and purity of water in the various sources of water.

It vests regulatory authority in Centre Pollution Control Boards (CPCB) and State Pollution Control Board (SPCB).

CPCB and SPSB are statutory bodies created under the Water Act, 1974. It empowers CPCB and SPCB to establish and enforce effluent standards for factories discharging pollutants into water bodies.

### **The Air (prevention and control of pollution) act, 1981**

The act targets to control and prevent air pollution in India and its main objectives are:

- To provide for prevention, control, and abatement of air pollution.
- To provide for the establishment of the boards at the central and state levels to implement the act.

### **The Environment (Protection) Act, 1986**

This act was passed under article 253 (legislation for giving effect to international agreements)

This was passed in the wake of the Bhopal gas tragedy in December 1984.

It was enacted to achieve the UN conference on the human environment, 1972- Stockholm declaration.

Eco-sensitive zones or ecologically fragile areas are notified by MoEFCC under EPA, 1986 – 10 km buffer zones around protected areas.

Statutory bodies under the EPA, 1986:

**National Coastal Zone Management Authority** (later converted to **National Ganga Council** under Ministry of Jal Sakthi)

### **The ozone-depleting substances (regulation and control) rules, 2000.**

It set deadlines for phasing out of various Ozone Depleting Substances (ODSs) and regulating production, trade import, and export of the product containing ODS.

These rules prohibit the use of CFCs, halons, ODSs such as carbon tetrachloride and methyl chloroform, and SFC except in metered-dose inhalers and for other medical purposes.

### **The energy conservation act, 2001**

It was enacted as a step towards improving energy efficiency and reducing wastage. It specifies the energy consumption standards for equipment and appliances.

It prescribes energy consumptions norms and standards for consumers. It prescribes energy conservation building codes for commercial buildings.

**Bureau of energy efficiency (BEE)** is a statutory body established under the act

### **Biological diversity act 2002**

It was implemented to give effect to **CBD, Nagoya Protocol**.

To check biopiracy, protect biological diversity, and local growers through a three-tier structure of central and state boards and local committees.

Set up National Biodiversity Authority (NBA) State Biodiversity Boards (SBBS), and Biodiversity Management Committees (BMCS).

### **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA)**

The act recognizes and vests the forest rights and occupation in forest land in **Forest Dwelling Scheduled Tribes (FDST)** and **Other Traditional Forest Dwellers (OTFD)** who have been residing in such forests for generations. This act comes under the aegis of the Ministry of Tribal Affairs.

The act also establishes the responsibilities and authority for sustainable use, conservation of biodiversity, and maintenance of the ecological balance of FDST and OTFD.

### **The National Green Tribunal Act, 2010**

It was established in concurrence to **Rio Summit 1992** to provide judicial and administrative remedies for the victims of the pollutants and other environmental damage.

It also agrees with **article 21, the Right to a healthy environment to its citizens of the constitution.**

The NGT has to dispose of the cases presented to it within 6 months of their appeals.

NGT has original jurisdiction on matters related to substantial questions of the environment..

## **GLOBAL WARMING**

Global warming is the slow increase in the average temperature of the earth's atmosphere because an increased amount of the energy (heat) striking the earth from the sun is being trapped in the atmosphere and not radiated out into space.

The earth's atmosphere has always acted like a greenhouse to capture the sun's heat, ensuring that the earth has enjoyed temperatures that permitted the emergence of life forms as we know them, including humans.

### **Causes for global warming**

Global warming occurs when carbon dioxide (CO<sub>2</sub>) and other air pollutants collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth's surface. Normally this radiation would escape into space, but these pollutants, which can last for years to centuries in the atmosphere, trap the heat and cause the planet to get hotter. These heat-trapping pollutants—specifically carbon dioxide, methane, nitrous oxide, water vapour, and synthetic fluorinated gases—are known as greenhouse gases, and their impact is called the greenhouse effect.

## Effects of global warming

Each year scientists learn more about the consequences of global warming, and each year we also gain new evidence of its devastating impact on people and the planet. As the heat waves, droughts, and floods associated with climate change become more frequent and more intense, communities suffer and death tolls rise. If we're unable to reduce our emissions, scientists believe that climate change could lead to the deaths of more than 250,000 people around the globe every year and force 100 million people into poverty by 2030.

Global warming is already taking a toll on the United States. And if we aren't able to get a handle on our emissions, here's just a smattering of what we can look forward to:

- **Disappearing glaciers**, early snowmelt, and severe droughts will cause more dramatic water shortages and continue to increase the risk of wildfires in the American West.
- **Rising sea levels** will lead to even more coastal flooding on the Eastern Seaboard, especially in Florida, and in other areas such as the Gulf of Mexico.
- **Forests**, farms, and cities will face troublesome new pests, heat waves, heavy downpours, and increased flooding. All of these can damage or destroy agriculture and fisheries.
- **Disruption of habitats** such as coral reefs and alpine meadows could drive many plant and animal species to extinction.
- **Allergies**, asthma, and infectious disease outbreaks will become more common due to increased growth of pollen-producing ragweed, higher levels of air pollution, and the spread of conditions favourable to pathogens and mosquitoes.

Though everyone is affected by climate change, not everyone is affected equally. Indigenous people, people of colour, and the economically marginalized are typically hit the hardest. Inequities built into our housing, health care, and labour systems make these communities more vulnerable to the worst impacts of climate change—even though these same communities have done the least to contribute to it.

## Ozone Layer

The ozone layer is the layer present in the Stratosphere. It absorbs the harmful ultraviolet rays that come from the sun. Moreover, it causes harmful radiation that has a high concentration of ozone (O<sub>3</sub>) which is harmful to living beings on the earth.

The ozone layer is basically present in the lower stratosphere that is near about 20 to 35 kilometres above the earth. Moreover, the thickness of the ozone layer may differ depending upon the seasonal and geographical changes.

## Ozone Layer Depletion

Ozone layer depletion means the thinning of the ozone layer present in the upper atmosphere. That is harmful to nature and the atmosphere. Ozone layer depletion is one of the major problems for the atmosphere and also for all the living beings including the flora and fauna of this earth.

## **Causes of Depletion of the Ozone Layer**

Human activities are the main cause of the depletion of the ozone layer. It occurs due to the excessive use of the man-made chemicals that are bromine and chlorine which release from the man-made compounds such as:

- ❖ Chlorofluorocarbons (CFCs)
- ❖ CFCs (chlorofluorocarbons)
- ❖ Halon
- ❖ CH<sub>3</sub>CCl<sub>3</sub> (Methyl chloroform)
- ❖ CCl<sub>4</sub> (Carbon tetrachloride)
- ❖ H CFCs (hydro-chlorofluorocarbons)
- ❖ Chlorofluorocarbons
- ❖ Methyl bromide

### **• Ozone Layer Depletion Effect on Human Beings**

If the ozone layer gets depleted, more UV rays enter the atmosphere. When these UV rays come in contact with the human skin, it can cause malignant skin cancers. There are two types of cancers. Melanoma and non-melanoma. Melanoma is serious while non-melanoma is commonly seen. It can also cause cataracts, as the eye lens gets damaged by oxidative agents. In our body, Vitamin D is synthesized when it reacts with UV rays. Excess vitamin D can also raise blood calcium levels, increasing mortality rates. It also causes sunburn. UV radiations are also identified to play a role in breast cancer and leukaemia. It also affects the immune system.

### **• Ozone Layer Depletion Effect on Animals**

High UV rays have shown that there has been epidermal damage in whales due to the thinning of the ozone layer. More sun damage has been noticed in many aquatic animals due to ozone layer depletion. Diseases on the non-pigmented parts of sheep, cattle and squamous cell carcinoma are likely to occur if the depletion continues. Another UV-B related sickness found in dogs is Uber Reiter's Syndrome. (New Forest eye) is another severe condition found in cattle.

### **• Ozone Layer Depletion Effect on Plants**

Increased UV rays can affect plant life by damaging them under extreme exposure to UV rays. Plant growth will be affected as well. It affects the total vegetation of an area, reducing the life span of many plants. The ozone enters opening pores present in the epidermis of plants called the stomata. These stomata functions as a medium of gas exchange and photosynthesis. Damage in stomata causes a threat to the survival of plants. Ozone also negatively affects the moisture content of the soil, insects etc.



## **Solutions to Ozone Layer Depletion**

**Less use of Fuel:** by reducing the usage of the fuels and petroleum used in vehicles nowadays we can help in reducing the ozone layer depletion

**Less use of pesticides:** pesticides help in growing your farms and plants but cause harm to the ozone layer and contribute to ozone layer depletion.

**Use of chemicals:** the chemicals used for making cleaning products results in depletion of the ozone layer.

## **THE NATIONAL DISASTER MANAGEMENT AUTHORITY (NDMA)**

- ❖ The National Disaster Management Authority (NDMA) is India's apex disaster management statutory authority. The National Disaster Management Authority (NDMA) was formally established on **September 27, 2006**, in compliance with the Disaster Management Act of 2005.
- ❖ The headquarters of National Disaster Management Authority (NDMA) is located in **New Delhi**.
- ❖ The National Disaster Management Authority (NDMA) is the **apex statutory body for disaster management**.
- ❖ The National Disaster Management Authority (NDMA) was formally established on September 27, 2006, in compliance with the Disaster Management Act of 2005, with **The Prime Minister as its Chairperson** and nine additional members, one of whom was named as Vice-Chairperson.
- ❖ Its main goal is to coordinate emergency response, both natural and man-made, as well as to enhance disaster resiliency and crisis response capabilities.
- ❖ It is also the top body for establishing Disaster Management policies, plans, and recommendations to ensure a fast and effective response to disasters.
- **Functions of National Disaster Management Authority**
  - ❖ Approving the National Disaster Plan.
  - ❖ Establish disaster management policies.
  - ❖ Approve plans prepared by central government ministries or departments in conformity with the National Plan.
  - ❖ Establish criteria for state officials to follow while drafting legislation. Plan for the State
  - ❖ Establish rules for different Ministries or Departments of the Central Government to follow in order to incorporate disaster prevention or mitigation measures into their development plans and initiatives.

- ❖ Coordinate disaster management policy and plan enforcement and implementation.
- ❖ Recommend that money be made available for mitigation.
- ❖ As determined by the Central Government, provide such assistance to other countries impacted by significant calamities.
- ❖ Take any other measures it deems essential for disaster prevention, mitigation, readiness, and capacity building in the event of a dangerous disaster situation or disaster.
- ❖ Establish comprehensive policies and guidelines for the National Institute of Disaster Management's operation.

THANK YOU