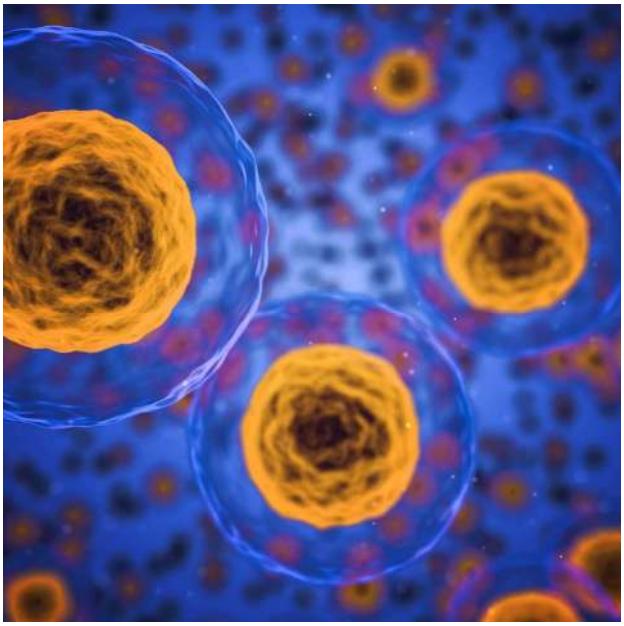
BIOLOGY

Chapter 5: The Fundamental Unit of Life

The Fundamental Unit of Life

Cells are the basic structural and functional unit of life. Cell was discovered by Robert Hooke. A number of cells can work together to form tissues and organs.

History of Cell



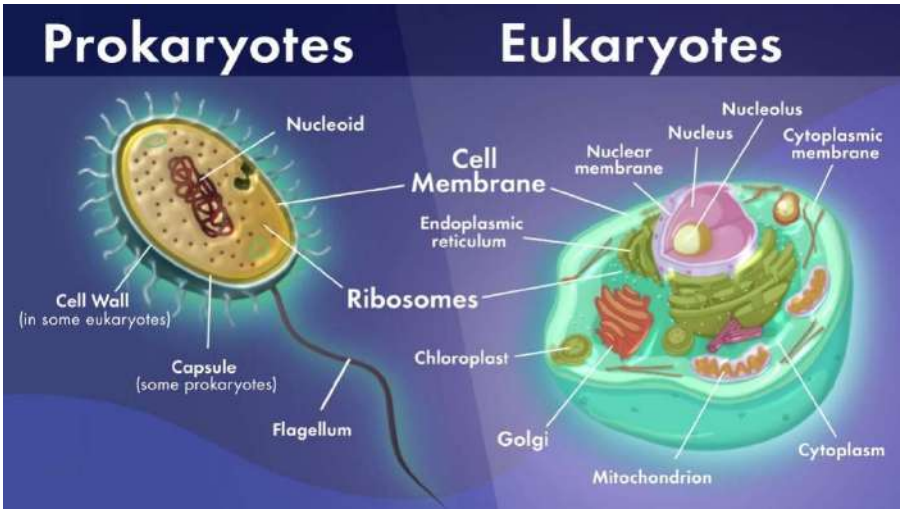
- The **cell** is the basic structural and functional unit of all living organisms. It is the smallest part of the body of an organism which is capable of independent existence and is able to perform all the essential functions oflife.
- The history of cell science began in **1665**, with the observation of a thin section of bottle cork by the English scientist **RobertHooke**.
- In **1838**, **Matthias Schleiden** and **Theodor Schwann** proposed a basic cell theory. In 1858, another scientist, Virchow, made an addition to the existing celltheory.
- The **postulates of the modern cell theory**are
  - The cell is the smallest unit of structure of all livingthings.
  - The cell is the unit of function of all livingthings.
  - All cells arise from pre-existingcells.
- Cells vary in **number**. Examples: Single-celled *Amoeba,* few-celled *Spirogyra*and multi-celled human being. They vary in **size**. Examples: Bacteria are the smallest, nerve cells are the longest and the ostrich egg is the largest. They vary in **shape**. Example: Columnar epithelialcells.

Cellular respiration

Cellular respiration is the process by which the food releases energy in the mitochondria. Cells absorb glucose from the food and burn it to produce energy.

Structural Organization of Cells

Prokaryotic & Eukaryotic cells



Two types of cells Prokaryotic and Eukaryotic cells. Prokaryotic cells are primitive and lack well defined nucleus. Eukaryotic cells are more advanced and have well defined nucleus.

Cell structure in Eukaryotic cells

Eukaryotic cells have the most well-defined structure. These cells have cell membrane, membrane bound cell organelles and a well-defined nucleus. The nucleus has its own membrane called nuclear membrane.

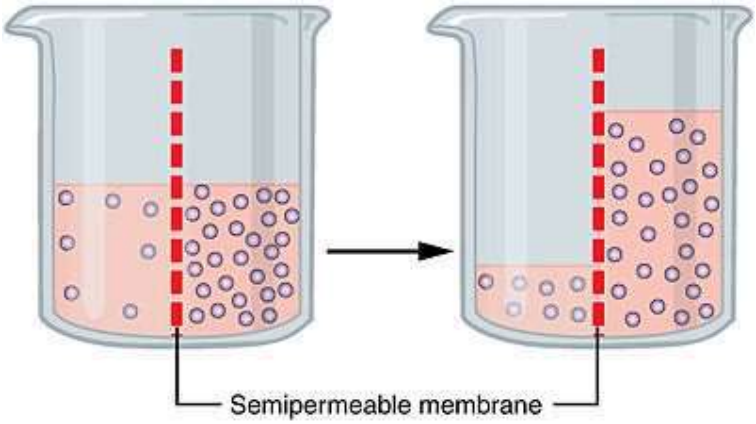
Cell membrane

- Cell membrane is the outer covering of a cell.
- It is made up of phospho-lipid bilayer membrane.
- It is selectively permeable in nature.
- The structure of a cell membrane is best described by the fluid mosaic model.

Diffusion

The movement of molecules from a region of their high concentration to a region of their lower concentration is known as diffusion.

Osmosis in selectively permeable membrane



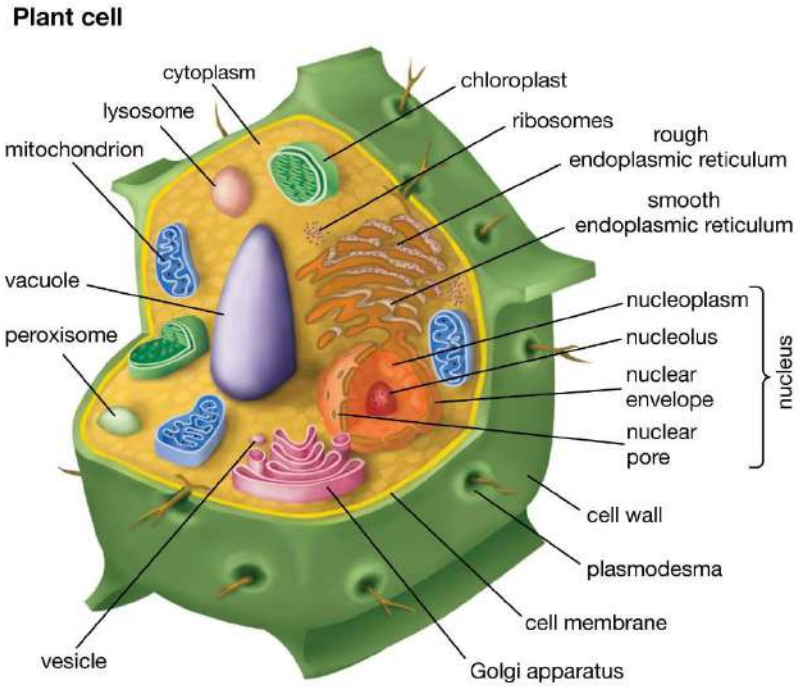
Osmosis is the movement of water across a semi-permeable membrane. Osmosis is a selective process since the membrane does not allow all molecules to pass through it. Water is usually the only free flowing molecule across this membrane.

Isotonic, hypotonic solutions, hypertonic solutions

- **Isotonic solutions** are those which have the same solute and pH concentration as the surrounding body fluid or the cytoplasm.
- **Hypotonic solutions** contain lesser amount of solute concentration compared to the surrounding fluid and can force the cell to rupture due to excess input of water into the cell.
- **Hypertonic solutions** contain higher concentration of solute compared to the surrounding fluid and thus push water out of cell, shrinking it.

Types of Organisms

Cell walls in plants



Plant cells are different from animals cells due to the presence of a cell wall. The cell wall is made of cellulose and gives a rigid structure to the plant cell.

Cell Organelles

- **Endocytosis:** Endocytosis is the invagination of cell membrane, followed by pinching off forming a membrane bound vesicle. This is commonly seen in Amoeba.
- **Nucleus in cells:** Nucleus is the processing unit of the cell. It is a double membrane bound organelle which contains the genetic material for inheritance.
- **Chromosomes:** During the growth phase of the cell, the chromatin condenses into a much thicker structure called chromosome.
- **Chromatin:** Chromatin is a thread like structure which serves as the genetic material present inside the nucleus of the cell. It is made up of DNA and protein molecules. The DNA contains the hereditary information needed for the structure and function of the organism.
- **Cytoplasm:** Cytoplasm is the fluid found inside the cell. It gives the structure to the cell and houses different organelles of the cell.
- **Organelles:** Organelles are structures present in the cytoplasm of the cell that help in several functions of the cell.
- **Endoplasmic Reticulum:** Endoplasmic reticulum is a membrane like cell organelle that plays an integral role in the interpretation of the genetic information present in the nucleus.

- **Rough ER:** Rough ER are the ones that have ribosomes on it. The ribosome is made up of nucleic acids and proteins. They are the site of protein synthesis. The Rough ER is also involved in the modification and folding of protein.
- **Smooth ER:** Smooth ER do not have ribosomes and thus are not involved in protein synthesis. They are however, involved in the lipid metabolism and detoxifying poisonous molecules.
- **Golgi Apparatus:** Golgi Apparatus is also called the post office of the cell. They package and transport the proteins across the cytoplasm.
- **Lysosomes:** They are referred to as suicide bags of the cell as they contain potent enzymes that can digest a cell. Lysosome also help in defense by attacking a foreign object.
- **Mitochondria:** Mitochondria are also called power plant of the cell. They generate ATP via the electron transport chain. They also have a DNA called mtDNA, which makes them semi-autonomous organelle.
- **Plastids:** There are various types of plastids in different cells based on the pigment they contain. The chloroplast is the plastid where the photosynthesis occurs. Some of the other plastids are leucoplast and chromoplast. It is also known as the kitchen of the cell.
- **Vacuoles** Vacuoles are large vesicles that hold water or air in them and give structural rigidity to the cell. Vacuoles are common in plant cells. In animals the vacuoles are either very small or absent. The membrane of vacuole is known as Tonoplast.

UNICELLULAR ORGANISMS	MULTICELLULAR ORGANISMS
1. Made of one cell.	1. Made of many cells.
2. There is no division of labour.	2. Cells are specialised to perform specific functions.
3. A single cell participates in reproduction.	3. Only some cells (germ cells) participate in reproduction.
4. Lifespan is short.	4. Lifespan is long.
5. Examples: *Amoeba*, *Paramoecium*	5. Examples: Fungi, plants, animals

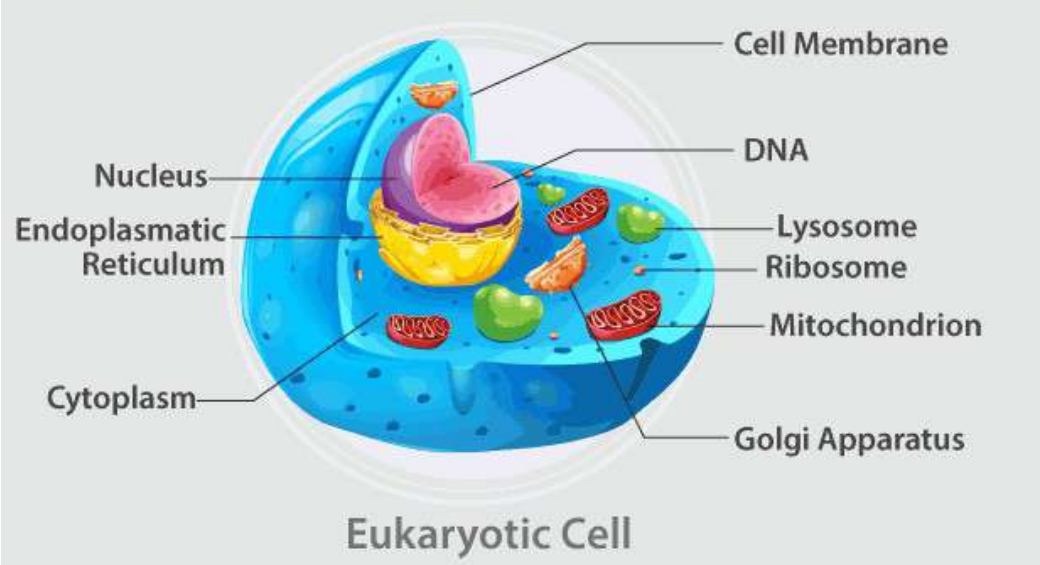
Differences between Prokaryotic and Eukaryotic Cells

PROKARYOTIC CELL	EUKARYOTIC CELL
1. Absence of a well-defined nucleus.	1. Presence of a well-defined nucleus with a nuclear membrane.
2. Nucleolus is absent.	2. Nucleolus is present.
3. Presence of a single length of only DNA.	3. Presence of several lengths of DNA, wound around certain proteins.
4. Presence of smaller ribosomes.	4. Presence of larger ribosomes.
5. Examples: Bacteria, blue-green algae	5. Examples: *Amoeba*, plants, animals

Eukaryotic Cell

The term “Eukaryotes” is derived from the Greek word “eu“, (meaning: good) and “karyon” (meaning: kernel), therefore, translating to “good or true nuclei.” Eukaryotes are more complex and much larger than the prokaryotes. They include almost all the major kingdoms except kingdom monera.

Structurally, eukaryotes possess a cell wall, which supports and protects the plasma membrane. The cell is surrounded by the plasma membrane and it controls the entry and exit of certain substances.



The nucleus contains DNA, which is responsible for storing all genetic information. The nucleus is surrounded by the nuclear membrane. Within the nucleus exists the nucleolus, and it plays a crucial role in synthesising proteins. Eukaryotic cells also contain mitochondria, which are responsible for the creation of energy, which is then utilized by the cell.

Present in only plant cells, chloroplasts are the subcellular sites of photosynthesis. Endoplasmic reticulum helps in the transportation of materials. Besides these, there are also other cell organelles that perform various other functions and these include ribosomes, lysosomes, Golgi bodies, cytoplasm, chromosomes, vacuoles and centrosomes.

Examples of eukaryotes include almost every unicellular organism with a nucleus and all multicellular organisms.

Prokaryotic Cell

The term “prokaryote” is derived from the Greek word “pro“, (meaning: before) and “karyon” (meaning: kernel). It translates to “before nuclei. “

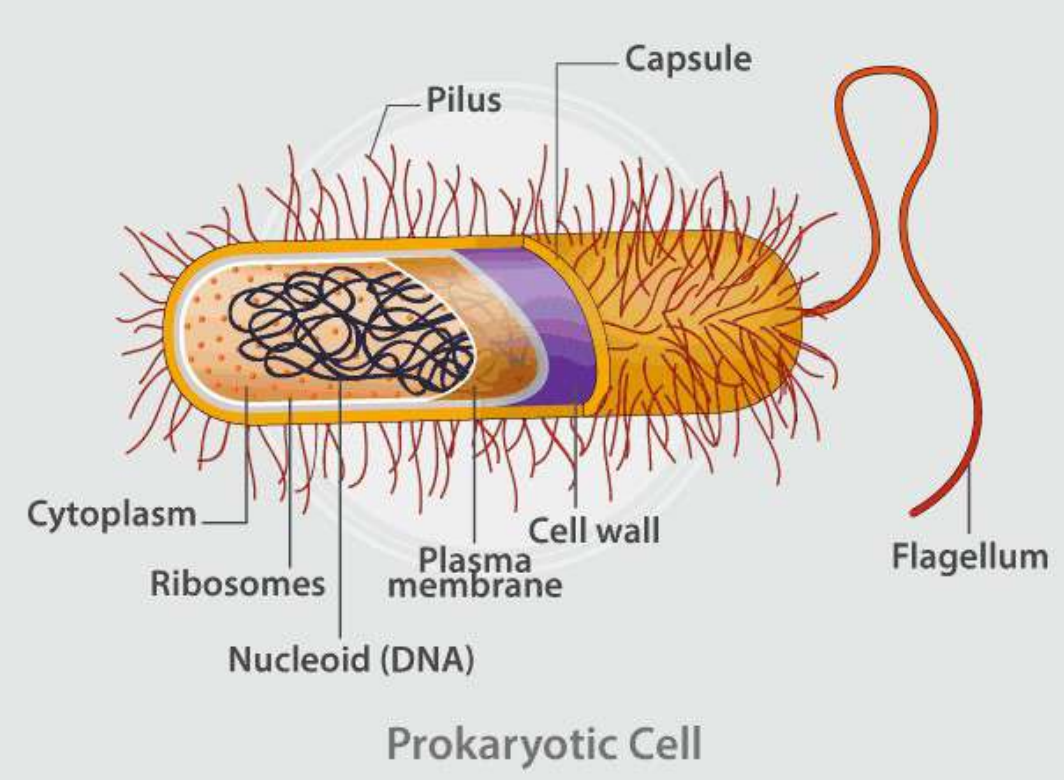
Prokaryotes are one of the most ancient groups of living organisms on earth, with

fossil records dating back to almost 3.5 billion years ago.

These prokaryotes thrived in the earth's ancient environment, some using up chemical energy and others using the sun's energy. These extremophiles thrived for millions of years, evolving and adapting. Scientists speculate that these organisms gave rise to the eukaryotes.

Prokaryotic cells are comparatively smaller and much simpler than eukaryotic cells. The other defining characteristic of prokaryotic cells is that it does not possess membrane-bound cell organelles such as a nucleus. Reproduction happens through the process of binary fission.

Structurally, prokaryotes have a capsule enveloping its entire body, and it functions as a protective coat. This is crucial for preventing the process of phagocytosis (where the bacteria gets engulfed by other eukaryotic cells, such as macrophages) The pilus is a hair-like appendage found on the external surface of most prokaryotes and it helps the organism to attach itself to various environments. The pilus essentially resists being flushed, hence, it is also called attachment pili. It is commonly observed in bacteria.



Right below the protective coating lies the cell wall, which provides strength and rigidity to the cell. Further down lies the cytoplasm that helps in cellular growth, and this is contained within the plasma membrane, which separates the interior contents of the cell from the outside environment. Within the cytoplasm, ribosomes exist and it plays an important role in protein synthesis. It is also one of the smallest components within the cell

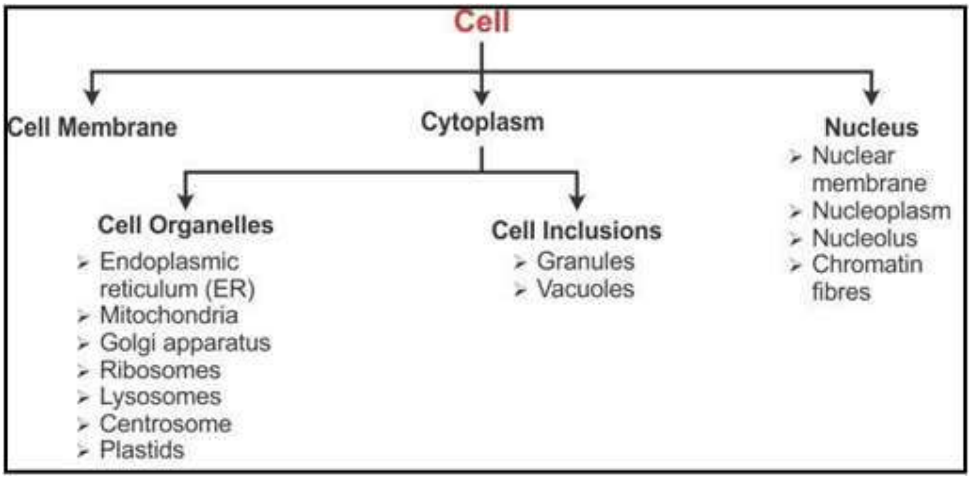
Some prokaryotic cells contain special structures called mesosomes which assist in cellular respiration. Most prokaryotes also contain plasmids, which contains small, circular pieces of DNA. To help with locomotion, flagella are present, though, pilus can also serve as an aid for locomotion. Common examples of Prokaryotic organisms are bacteria and archaea. Also, all members of Kingdom Monera are prokaryotes.

Structural Organisation of a Cell

Organelles without membrane : Lysosomes & Ribosomes

Organelles with single membrane: ER, Golgi bodies, Vacuoles, plasma membrane

Organelles with double membrane: Mitochondria, plastid & nucleus



CHARACTERISTICS	FUNCTIONS
Plasma membrane	
Very thin, flexible and delicate living semi- permeable membrane	Acts as an effective barrier and regulates the entry of certain solutes and ions
Cell wall	
Freely permeable, mainly composed of cellulose	Gives rigidity and shape to the plant cells and provides protection
Cytoplasm	
Contains a mixture of water and soluble organic and inorganic compounds and various cellorganelles	Seat of occurrence of glycolysis (production of pyruvic acid)
Endoplasmic reticulum	
May be smooth (SER) or rough (RER)	Acts as a supportive framework of the cell
Mitochondria	
Double-walled, inner wall thrown into	Seat of aerobic respiration and synthesises

Golgi apparatus (in animalcells)Dictyosomes (in plant cells)	
Consists of a set of membrane-bounded, fluid-filled vesicles and vacuoles	Synthesis of the plasma membrane, cell wall etc. and synthesis and secretion of enzymes and hormones
Ribosomes	
Single-walled, dense, spherical bodies composed mainly of RNA andproteins	Synthesis of proteins
Lysosomes	
Contains 40 different types of enzymes	Intracellular digestion

CHARACTERISTICS	FUNCTIONS
Centrosomes	
Contains one or twocentrioles which are surrounded by radiating microtubules to form an aster shape	Initiates and regulates cell division
Plastids	
Double membrane, proteinaceous matrix containing DNA and disc-like structures called thylakoids containing chlorophyll	Chromoplasts: Impart colour to flowers and fruits Chloroplasts: Trap solar energy for photosynthesis Leucoplasts: Store starch
Nucleus	
Mostly spherical and dense, surrounded by nuclear membrane with pores	Regulates cell cycle and cell functions
Nucleolus	
Round, one or more in number	Participates in protein synthesis by forming and storingRNA
Chromatin fibres	
Network of thread-like structures which are made of DNA	Chromosomes carry hereditary information or genes
Vacuoles	
Non-living structures	Storage of water and other substances, food, pigments and wasteproducts
Granules	

Small particles, crystals or droplets	Starch (in plant cells), glycogen (in animal cells) and fat-containing granules serve as food for the cell

Differences between Plant and Animal Cells

PLANT CELL	ANIMAL CELL
1. Presence of a definite cell wall made ofcellulose	1. Absence of a cell wall
2. Cell membrane present internal tothecell wall	2. Cell membrane forms the boundary ofthe cell
3. Absence of centrosome	3. Presence of centrosome
4. Absence of centriole	4. Presence of centriole
5. Presence of plastids	5. Absence of plastids

Difference Between Plant cell and Animal cell

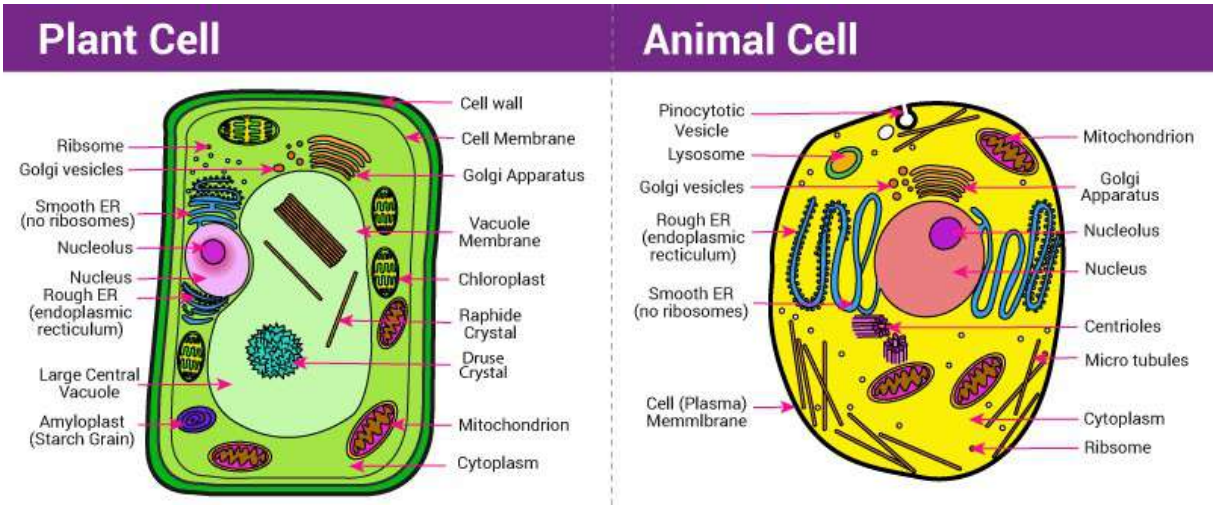
The cell is the fundamental unit of life. All the life activities are carried out by cells. The organisms are classified based on the number of cells present in them. Unicellular organisms are single-celled, while multicellular organisms have a large number of cells.

Unicellular organisms are believed to be one of the earliest forms of life on earth. Eventually, more complex multicellular organisms evolved from these unicellular life forms over the aeons. Multicellular organisms have specialized cells with complicated cell organelles, which unicellular organisms typically lack.

In an ecosystem, plants have the role of producers while animals have taken the role of consumers. Hence, their daily activities and functions vary, so do their cell structure. Cell structure and organelles vary in plants and animals, and they are primarily classified based on their function. The difference in their cell composition is the reason behind the difference between plants and animals, their structure and functions.

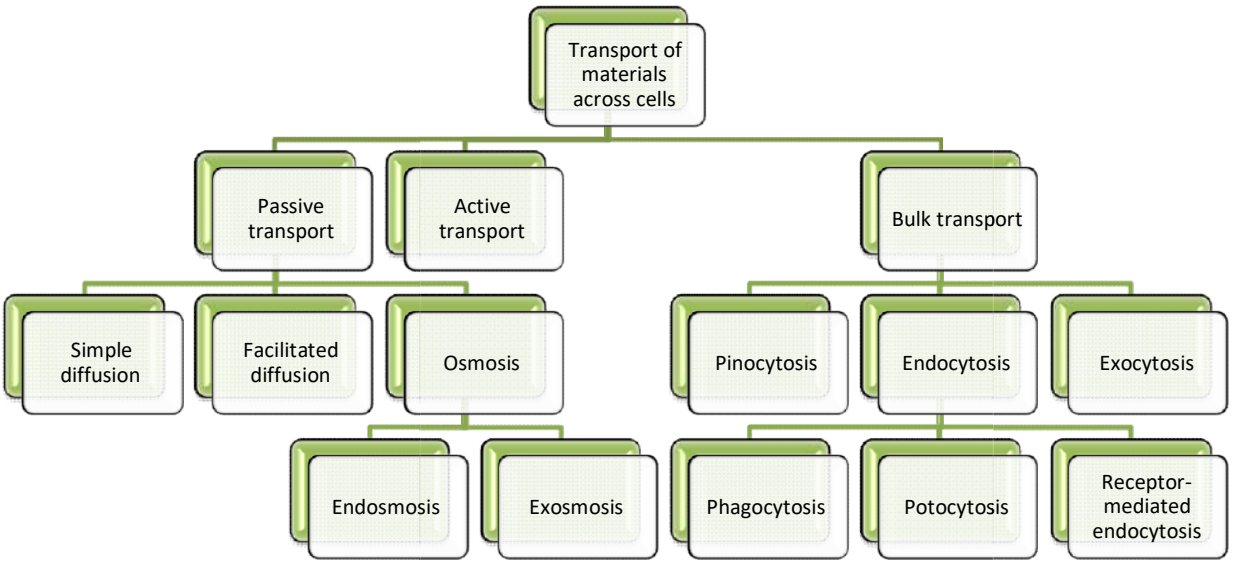
Each cell organelle has a particular function to perform. Some of the cell organelles are present in both plant cell and the animal cell, while others are unique to just one. Most of the earth's higher organisms are eukaryotes, including all plant and animals. Hence, these cells share some similarities typically associated with eukaryotes.

For example, all eukaryotic cells consist of a nucleus, plasma membrane, cytoplasm, peroxisomes, mitochondria, ribosomes and other cell organelles.



As stated above, both plant and animal cells share a few common cell organelles, as both are eukaryotes. The function of all these organelles is said to be very much similar. However, the major differences between the plant and animal cells, which significantly reflect the difference in the functions of each cell.

Transport of Materials across Cells



- **Passive transport** is a kind of diffusion in which an ion or a molecule crossing the cell membrane moves against its electrochemical or concentrationgradient.
- In **simple diffusion**, molecules of gases such as oxygen and carbon dioxide enter the cell without the help of transport proteins such aspermeases.
- In **facilitated diffusion**, ions or molecules cross the membrane rapidly by using specific proteins called transport proteins or permeases which are present in themembrane.
- The spontaneous passage of water molecules from a region of high water concentration to a region of low water concentration through a selectively

permeable membrane is called**osmosis**.

- The process by which water molecules enter a cell is called**endosmosis**.
- The process by which water molecules move out of the cell is called**exosmosis**.
- In plant cells, when excess of exosmosis occurs, the cytoplasm and plasma membrane shrink away from the cell wall. This is known as**plasmolysis**.
- **Active transport** is the movement or transport of substances through a biological membrane such as the cell membrane. This process requiresenergy.
- Large molecules are continuously imported or exported into the cells across the plasma membrane. The process where the cells either release or absorb fluids and particles through their outer membrane is called **bulktransport**.
- Materials enter a cell by invagination and formation of vesicles. As the materials leave the cell, the membrane of a vesicle fuses with the plasma membrane and extrudes its contents to the surrounding medium. This outward transport of materials by using carrier molecules is called **exocytosis**.
- **Endocytosis** is the intake or ingestion of materials by cells through the plasmamembrane.
- **Phagocytosis**, also known as **cell eating**, is a common method in which substances are taken up in the solidform.
- In **potocytosis**, small molecules or ions are specifically internalised into thecell.
- **Receptor-mediated endocytosis** is a pathway for selective uptake of large molecules such asligands in clathrin-coatedpits.
- In **pinocytosis**, also known as **cell drinking**, substances are taken up by the cell in the fluidform.

Cellulose In Digestion

Cellulose is a complex organic compound that occurs abundantly in nature. It is a polymeric carbohydrate molecule consisting of a linear chain having thousands of glycosidic linkages.

It consists of unbranched chains of glucose (linked D-Glucopyranose). They are straight chains linked by hydrogen bonds producing a substance that is inert and insoluble in water, in their pure form.

Modified cellulose and pure cellulose are different in their chemical compositions. They are components of the plant cell wall and have no odour or taste. It is crystalline in nature and does not dissolve water and other solvents. Termites and

herbivorous animals lack the enzyme for cellulose digestion.

Digestion of Cellulose in Termites

Termites have mastigophorans (microbes) in their gut which brings about digestion of cellulose. Herbivorous animals, on the other hand, are ruminants. They have different compartments in their stomach to carry out digestion.

The rumen is the first compartment where ingested food containing cellulose is stored temporarily and later regurgitated to chew their cud. They are able to digest cellulose because of the presence of bacteria and enzymes in the rumen where anaerobic bacterial digestion occurs. A by-product of this type of digestion releases methane which is foul-smelling and causes the destruction of the ozone layer of the Earth.

Digestion of Cellulose in Humans

Cellulose is a fibre which is not digestible by the human digestive system. It, however, helps in the smooth functioning of the intestinal tract.

The presence of beta acetal linkages in cellulose makes it different from starch and is a deciding factor in its digestibility. Humans lack the enzyme required to breakdown the linkages. Furthermore, it forms a major part of the human diet from plant foods.

Fruits and vegetables contain cellulose in small amounts which are easily digestible. Fibres contain cellulose which acts as roughage, adding bulk to consumed food and helps in the smooth passage of the food efficiently and at a much faster pace. High fibre diet reduces the risk of colon cancer as fibre in the diet helps reduce the time the faeces stay in the colon wall.

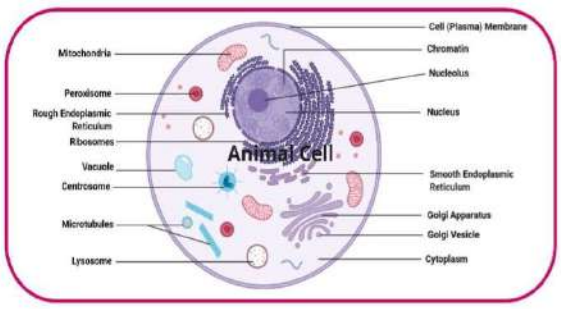
Since it is insoluble in water it binds with other components adding bulk helping to move through the intestines by aiding bowel movements. Consuming food that does not contain cellulose over a period of time results in the bowel becoming weak leading to constipation.

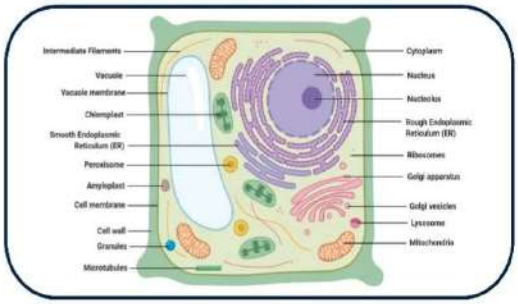
These fibres aid in the growth of bacteria in the gut which feeds on sugars and fibres. They maintain the health of the gut and checks for bacteria causing illness. Fibres also prevent weight gain and aids in weight loss.

Class : 9th Science
Chapter- 5: The Fundamental Unit Of Life

The Fundamental Unit Of Life

- Cell Theories
  - Robert Brown
    - discovered nucleus in cell
    - Schleiden and schwann
      - Gave cell theory and stated that all plants and animals are composed of cells
  - Leavenhock
    - observed the cells in cork-slice with the help of primitive microscope
  - Robert Hooke
    - Virchow
      - expended cell theory by suggestion that cell arise from pre-existing cell
    - discovered and named the cells
- Types of cell
  - Prokaryotic Cell
  - Eukaryotic Cell
- Nucleus
  - Nuclear Membrane
  - Nucleolus
  - Chromatin network
- Cell Organelles
  - Endoplasmic reticulum
  - Golgi apparatus
  - Lysosomes
  - Mitochondria
  - Plastids
- Plasma membrane or cell membrane
  - Lies outside the plasma membrane
    - Cell Wall
- Animal Cell
- Plant Cell





Important Question

➢ Multiple Choice Questions:

1. The basic unit of life is:

(a) tissue

(b) cell

(c) both

(d) none of them

2. Who discovered the cell?

(a) Robert Hooke

(b) Leeuwenhoek

(c) Robert Brown

(d) T. Schwann

3. The cell wall of a plant cell is made up of:

(a) glucose

(b) fructose

(c) protein

(d) cellulose

4. Which of the following controls all biological activities of a cell?

(a) Protoplasm

(b) Cell wall

(c) Nucleus

(d) All of these

5. Which of the following is known as the 'Power House' of a cell?

(a) Nucleus

(b) Golgi Bodies

(c) Ribosome

(d) Mitochondria

6. Digestive Enzymes are found in:

(a) Protoplasm

(b) Cell wall

(c) Lysosomes

(d) Mitochondria

7. Which is the longest cell of the human body?

(a) Nerve cell

(b) Liver cell

(c) Kidney cell

(d) Cardiac cell

8. Which of the following cell organelles functions both as an intracellular transport system and as a manufacturing surface?

(a) Nucleus

(b) Mitochondria

(c) ER

(d) None of these

9. Which of the following cell organelles help in the storage, modification, and packaging of substances manufactured in the cell?

(a) Golgi apparatus

(b) Nucleus

(c) Mitochondria

(d) Chloroplasts

10. Who proposed the “Black Reaction”?

(a) Benda

(b) Camillo Golgi

(c) Schleiden

(d) None of them

11. Who discovered the nucleus in the cell?

(a) Leeuwenhoek

(b) Robert Brown

(c) Schleiden

(d) Robert Hooke

12. Which of the following are formed in bone marrow?

(a) RBC

(b) Cartilage cell

(c) Blood platelets

(d) Fibres

13. Which of the following can be made into crystal?

(a) A bacterium

(b) An amoeba

(c) A virus

(d) A sperm

14. Chromosomes are made up of:

(a) DNA

(b) Protein

(c) DNA and protein

(d) RNA

15. Which of the following are covered by a single membrane?

(a) Mitochondria

(b) Vacuole

(c) Ribosome

(d) Plastid

➢ Very Short Question:

1. What are plastids? Name the different types of plastids found in plant cell.

2. What is plasma membrane made up of?

3. What did Robert Hooke observed first in cork cell?

4. Name the autonomous organelles in the cell.

5. What does protoplasm refer to?

6. Name two cells which keep changing their shape.

7. Name the smallest cell and the longest cell in human body.

8. Name 3 features seen/present in almost every cell.

9.What is diffusion?

10.What is osmosis? This takes place from high water concentration to low water concentration.

➢ Short Questions:

1. State two conditions required for osmosis.

2. What is plasmolysis?

3. How does fungi and bacteria can withstand much greater changes in the surrounding medium than animal cells?

4. Give the function of nuclear membrane.

6. State the difference between smooth endoplasmic reticulum and rough endoplasmic reticulum.

7. What is endocytosis?

8. What is the function of vacuoles?

➢ LongQuestions:

1. Give five points of differences between plant cell and animal cell.

2. Give five points of differences between prokaryotic cell and eukaryotic cell.

3. Draw a neat labelled diagram of plant cell and label its parts.

4. Draw a neat labelled diagram of animal cell.

➢ Assertion Reason Questions:

1. For two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

   a. Both Assertion and Reason are correct, and reason is the correct explanation for assertion.

   b. Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion.

   c. Assertion is true but Reason is false.

   d. Both Assertion and Reason are false.

   Assertion: All plants and animals are composed of cells.

   Reason: Plants and animals made up of DNA.

2. For two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

   a. Both Assertion and Reason are correct, and reason is the correct explanation for assertion.

   b. Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion.

   c. Assertion is true but Reason is false.

   d. Both Assertion and Reason are false.

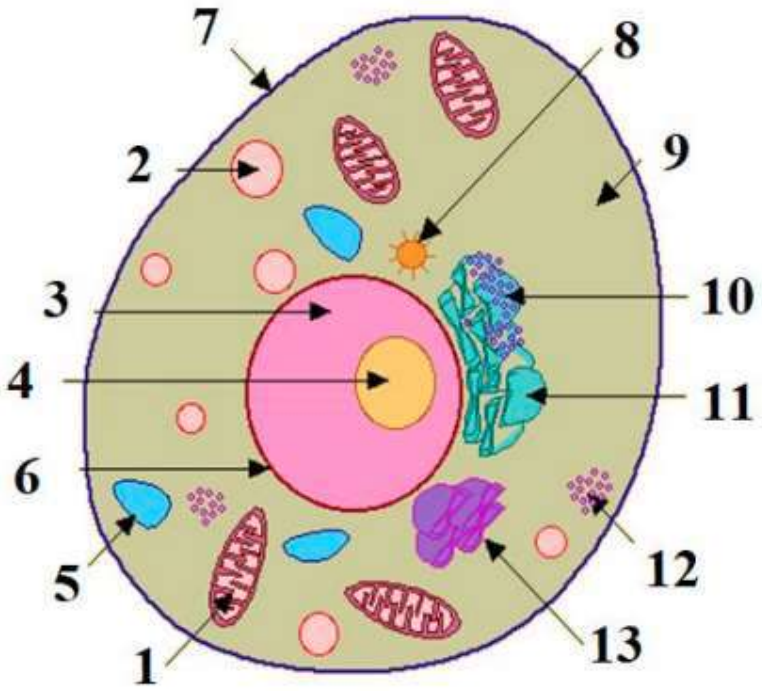
   Assertion: All plants and animals are composed of cells.

   Reason: All plants and animals are composed of cells.

➢ Case Study Question:

1. Read the following and answer any four questions from (i) to (v)

Study the given diagram and answer the following questions.



(i) Identify the given diagram.

(a) Structure of animal cell

(b) Structure of plant cell

(c) Bacterial cell

(d) Prokaryotic cell

(ii) The function of part labelled as 1 is

(a) Release of energy

(b) Protein synthesis

(c) Transmission of heredity characters

(d) Storage

(iii) Mention any two structures which are not found in above cell.

(a) Cell wall and ribosomes

(b) Cell wall and golgi apparatus

(c) Cell membrane and Golgi apparatus

(d) Plastids and cell wall

(iv) Chromosomes are present in

(a) Cell membrane

(b) Golgi apparatus

(d) Nucleus

(v) Lysosomes are also called

(a) suicide bags

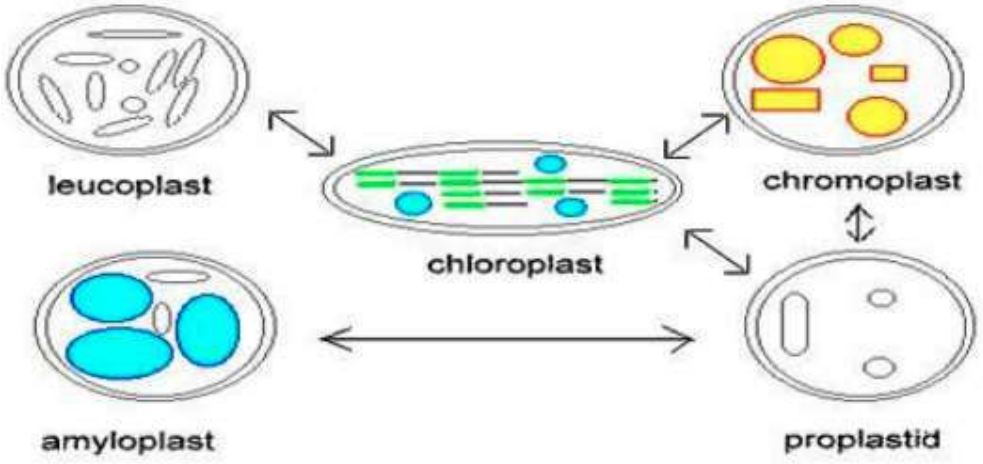
(b) digestive bags

(c) demolition squads

(d) all the above

2. Read the following and answer any four questions from (i) to (v)

Leucoplasts are colourless plastids. They store starch, oil, proteins. Chromoplasts are coloured plastids. They contain pigments. e.g. Chloroplasts contain green pigment present in the plant cell. Chromoplasts provide colour to various flowers and fruits.



(i) What is the function of leucoplasts?

(a) They store starch, oil, proteins.

(b) They provide colour various flowers and fruits.

(c) They help in photosynthesis.

(d) They give support to the plants.

(ii) Which plastids provide colour to fruits and flowers?

(a) Leucoplasts

(b) Chromoplasts

(c) Chloroplasts

(d) Proteinoplast

(iii) Which of the following statement is true?

(a) Plastids are present in both plant and animal cell.

(b) Plastids are absent in plant as well as animal cell.

(d) Plastids are present only in animal cell.

(iv) Which plastids contain green pigment?

(a) Leucoplasts contain green pigment.

(b) Chloroplasts contain green pigment.

(c) Chromoplasts mainly contain green pigment.

(d) None of the plastids contain green pigment.

(v) Which plastids bring about the process of photosynthesis?

(a) Leucoplasts

(b) Chromoplasts mainly

(c) Chloroplasts

(d) None of the plastids bring about photosynthesis.

Answer Key-

➢ Multiple Choice Answers:

1. (b) cell
2. (a) Robert Hooke
3. (d) cellulose
4. (c) Nucleus
5. (d) Mitochondria
6. (c) Lysosomes
7. (a) Nerve cell
8. (c) ER
9. (a) Golgi apparatus
10. (b) Camillo Golgi
11. (b) Robert Brown
12. (a) RBC
13. (c) A virus
14. (c) DNA and protein
15. (b) Vacuole

➢ Very Short Answers:

1. Answer: Plastids are organelles found only in plants. They are:

(a) Chloroplast-Containing chlorophyll

(b) Chromoplast-Containing carotenoids and xanthophyll (coloured plastids)

(c) Leucoplast-Wllite or colourless plastids

2. Answer: Plasma membrane is made up of proteins and lipids.
3. Answer: Robert Hooke observed that cork consists of box like compartments which formed a honeycomb structure.
4. Answer. Chloroplasts and mitochondria are the autonomous organelles in the cells.
5. Answer: Protoplasm refer to cytoplasm and nucleus.
6. Answer: Amoeba and white blood cells.
7. Answer: The smallest cell is the red blood cell or sperm cell in male. Longest cell is the nerve cell.
8. Answer: Plasma membrane, nucleus and cytoplasm.
9. Answer: When gases like CO_2, O_2, move across the cell membrane, this process is called diffusion.
10. Answer: The movement of water molecules through a selectively permeable membrane is called osmosis. This takes place from high water concentration to low water concentration.

➢ Short Answer:

1. Answer:

   (i) The difference in the concentration of water, one should have higher concentration than the other.

   (ii) Semi-permeable membrane is also required through which water will flow.

2. Answer: When a living plant cell loses water through osmosis there is shrinkage or contraction of the contents of the cell away from the cell wall. This phenomenon is known as plasmolysis.
3. Answer: The cell wall present in fungi and bacteria permits these cells to withstand very dilute external medium without bursting.

   The cells take up water by osmosis, swells, and builds the pressure against the cell wall. The wall exerts an equal pressure against the swollen cell. It is because of the cell wall, such cells can withstand much greater changes in the surrounding medium than animal cells.

4. Answer: The nuclear membrane present as outer covering in the nucleus allows the transfer of material inside and out of the nucleus to cytoplasm.
5. Answer: The cell organelles with their own DNA and ribosomes are mitochondria and plastids.
6. Answer:

Smooth Endoplasmic Reticulum	Rough Endoplasmic Reticulum
1. It looks smooth.	1. It looks rough.
2. SER helps in the manufacture of fat molecules or lipids.	2. Ribosomes are attached to RER which synthesise proteins.

7. Answer: The cell membranes flexibility allows the cell engulf in food and other material from its external environment. This process is known as endocytosis. E.g., Amoeba acquires its food through such processes.
8. Answer: Vacuoles are storage sacs for solid or liquid content. In plant cells it provides turgidity and rigidity to the cell. In single-celled organisms vacuoles store food, e.g., Amoeba.

➢ Long Answer:

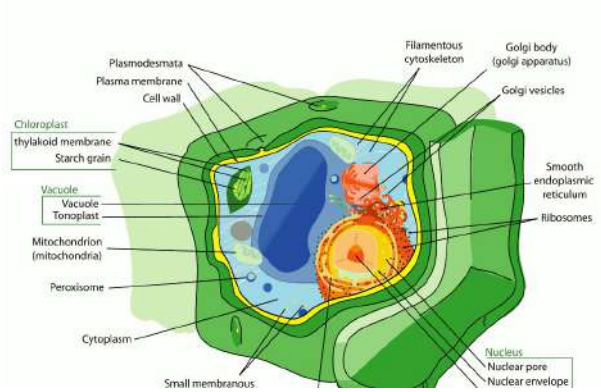
1. Answer:

Plant Cell	Animal Cell
1. Size is usually larger than animal cell.	1. Size is usually smaller than plant cell.
2. Cell wall present.	2. Cell wall absent.
3. Plastids are present.	3. Plastids are absent.
4. Vacuoles are large in number and bigger in size.	4. Vacuoles are small in size and less in number.
5. Centriole absent.	5. Centriole present.

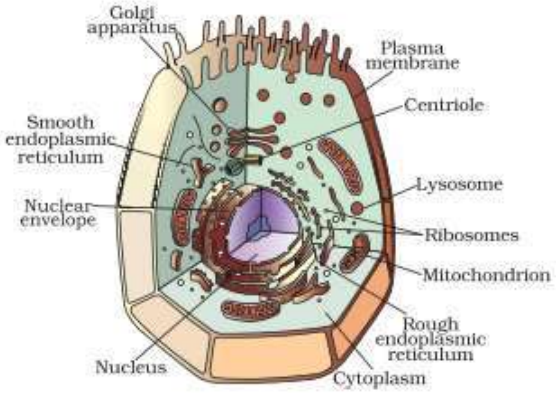
2. Answer:

Characters	Prokaryotic Cell	Eukaryotic Cell
1. **Size**	0.5–5 µm diameter.	Diameter 1 µm–40 µm.
2. **Nucleus**	No true nucleus, single chromosome, nuclear membrane absent.	True nucleus, nuclear membrane is present, more than one chromosome is present.
3. **Organelles**	Membrane-bound organelles are absent.	Membrane-bound organelles are present.
4. **Ribosomes**	Ribosomes are 70s and randomly scattered.	Ribosomes are 80s, can be free or attached to ER.
5. **Cell division**	Cell divides by simple fission.	Cell divides by mitosis or by meosis.

3. Answer:



4. Answer:



➢ Assertion Reason Answer:

1. (b) Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion.
2. (a) Both Assertion and Reason are correct, and reason is the correct explanation for assertion.

➢ Case Study Answer:

1. Answer:

(i) (a) Structure of animal cell

(ii) (a) Release of energy

Mitochondria are sites of cellular respiration. They use molecular oxygen from air tooxidise the carbohydrates and fats (lipids) present in the cell to carbon dioxide and watervapour. Oxidation releases energy, a portion of which is used to form ATP (adenosinetriphosphate). Since the mitochondria synthesize, energy-rich compounds (ATP), theyare known as 'power house' of the cell. The energy stored in ATP is used by the cell.

(iii) (d) Plastids and cell wall (iv) (d) Nucleus (v) (a) suicide bags

Lysosomes serve as intracellular digestive system, hence, called digestive bags.They destroy any foreign material which enter the cell such as bacteria and virus.In this way they protect the cells from bacterial infection.

Lysosomes also remove the worn out and poorly working cellular organelles bydigesting them to make way for their new replacements. In this way, they removethe cell debris and are also known as demolition squads, scavengers and cellularhousekeepers. Thus, lysosomes form a kind of garbage disposal system of the cell

2. Answer:

(ii) (b) Chromoplasts

(iii) (c) Plastids are present only in plant cell.

(iv) (b) Chloroplasts contain green pigment.

(v) (c) Chloroplasts

Q1. What would happen if the plasma membrane ruptures or breaks down?

Ans. Plasma membrane is a selectively permeable membrane of the cell that maintains its constant internal chemical composition of the cell. If it ruptures or breaks down, the constant internal chemical composition of the cell will be lost and it will not be able to perform basic functions like respiration, nutrition, excretion, regeneration etc.

Q2. What would happen to the life of a cell if there was no Golgi apparatus?

Ans. Golgi apparatus is involved in the storage, modification and packaging of materials in vesicles. It is also involved in the formation of lysosomes. The basic metabolic functions of the cells are not possible if Golgi apparatus is not there.

Q3. What organelle is known as the powerhouse of the cell? Why?

Ans. Mitochondria are known as the powerhouses of the cell because they contain enzymes that are needed for stepwise oxidation of food-stuffs (carbohydrates, fats) present in the cells to release CO_2 and water. Oxidation of food releases energy, which is used to form high-energy ATP molecules. ATP is used to bring about energy requiring activities of the cell.

Q4. Where do the lipids and proteins constituting the cell membrane get synthesized?

Ans. Smooth endoplasmic reticulum (SER) helps in the manufacture of lipids which are important for cell function. Ribosomes are the sites of protein synthesis. The manufactured proteins are later sent to different places in the cell depending upon the need using the endoplasmic reticulum (ER).

Q5. How does an Amoeba obtain its food?

Ans. Amoeba acquires its food through endocytosis. Endocytosis refers to invagination of a small region of the plasma membrane, and ultimately forming an intra-cellular membrane-bound vesicle. This process is generally involved for the ingestion of food material. Intake of liquid food using endocytosis is called pinocytosis or cell drinking. Similarly, intake of solid particles by a cell through its cell membrane is called phagocytosis or cell eating. In this process, cell membrane puts up protoplasmic processes around the food particle. The processes join, fuse to form phagosome.

Q6. What is osmosis?

Ans. The diffusion of water or solvent through a semipermeable membrane from a solution of lower concentration of solutes to a solution of higher concentration of solutes, to which the membrane is relatively impermeable, is called osmosis.

Osmosis may also be defined as the diffusion of a solvent, usually water, through a semi-permeable membrane from a dilute or weaker solution into a concentrated or stronger solution.

There are two types of osmosis – endomosis and exosmosis

<u>Endosmosis:</u> Is inward diffusion of water when the surrounding solution is less concentrated. This brings about swelling of the cell.

<u>Exosmosis:</u> Is outward diffusion of water when the surrounding solution is more concentrated. This brings about shrinkage of the cell.

Q7. Why are lysosomes also called as suicidal – bags?

Ans. Lysosoms are small unit membrane bound sacs that store acid – hydrolases. They digest food, foreign – bodies and intracellular debris, and recycle cell – components. Lysosomes are also known as suicidal bags in view of their autolytic role in which a cell may digest its own cell organelles like mitochondria and E.R. In injured and dead cells, the lysosome membrane ruptures spontaneously releasing the enzymes that lyse (dissolve) the weakened cells.

Moreover, lysosomes are also known as "disposal units" of the cell because they digest the incoming food-materials and remove the foreign bodies, toxic molecules and debris.

Ans. ***Cell is the fundamental unit of life. All the organisms from protozoans, bacteria etc to higher organisms are composed of cells. The term "cell" was coined by Robert-Hooke in 1665. While he was examining a slice of cork (substance obtained from bark of tree), under self designed microscope he saw many little compartment. He called these compartments as cells. Cell is a latin word for "little-room".***

Q9. Why is the cell called as structural and functional unit of life?

Ans. ***All organisms are composed of cell or cells. All vital functions of an organism occur within cells. Cells contain hereditary information necessary for regulating cell functions and for transmitting information to the next generation of cell. Thus, cell is called the structural and functional unit of life.***

Q10. How do substances like CO_2 and water move in and out of the cell? Discuss?

Ans. ***CO_2 moves in and out of the cell by diffusion while water does it by osmosis. When CO_2 accumulates in high concentration inside the cell, at that time, the external environment of cell possesses low concentration of CO_2. In such condition, CO_2 moves out of the cell from a region of higher concentration to a region of lower concentration by the process of diffusion. Similarly, water moves in and out through selectively permeable membrane. The movement of water through a selectively permeable membrane is called Osmosis, where the passage of water is from a region of higher water concentration to a region of lower water concentration.***

Q11. Why is plasma membrane called as selectively permeable membrane?

Ans. ***The plasma membrane allows the entry and exit of some selective materials in and out of the cell. Therefore, plasma membrane is called as selectively permeable membrane.***

Q12. Can you name the two organelles we have studied that contain their own genetic material?

Ans. ***Mitochondria and plastids are the organelles, which have their own genetic material in them.***

Q13. If the organisation of a cell is destroyed due to some physical or chemical influences what will happens?

Ans. ***If the organisation of a cell is destroyed due to some physical or chemical influences then cell will not be able to perform the basic functions like respiration, nutrition, excretion, regeneration etc.***

Q14. Where are the proteins synthesized in the cell?

Ans. ***Ribosomes are the sites where proteins are synthesized inside the cell.***

Activity 1: To study endomosis and exosmosis in raisins.

Activity 2: To study plasmolysis and de-plasmolysis in plant cell.

HISTORY

Chapter 1: The French Revolution

9th class

The French Revolution

The French Revolution is regarded as a remarkable event in the history of the world. The storming of the Bastille prison on 14 July 1789 marked the beginning of the French Revolution.

Causes of the French Revolution

Inequalities in French Society

- French society was divided into three estates. The first estate consisted of the clergymen, the second estate consisted of the nobles and the third estate consisted of the common people most of whom were peasants.

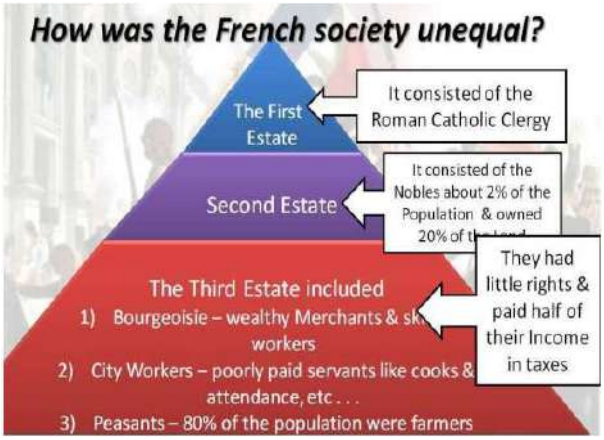
- While the peasants comprised about 90% of the French population, only few owned lands. 60% of the land was owned by the members of the first two estates.

- One of the many reasons why the revolution broke out was because only the members of the third estate paid taxes to the state. The members of the first and second estates were exempted from paying any taxes to the king.

- The nobility and the clergy enjoyed many privileges in French society. The nobles extracted feudal dues from the peasants. The latter were also compelled to provide services to the noblemen by working in his fields and house. They also had to serve in the army.

- The church also collected religious taxes from the people known as '**tithes'**. The

  members of the third estate had to pay direct tax to the state known as '**taille'**. Indirect taxes were imposed on tobacco, salt and many other everyday items. Thus, the third estate was seething with financial difficulties.



The Rise of the Middle Class

- There was the rise and emergence of many social groups in France in the eighteenth century. They were traders, businessmen, lawyers and teachers. The traders and businessmen had acquired wealth through overseas trade.

- The administrative officials, lawyers and teachers were educated and believed that no group should be given special privileges merely on the basis of birth. They believed that the members of the first two estates should also pay taxes to the state.

- The middle class in France was inspired by the writings of social thinkers and philosophers. John Locke and Jean Jacques Rousseau were two such thinkers who rejected the idea of the divine right of the king. Rousseau propounded that the Government should be based on a social contract drawn between the people and the Government.

- These ideas of philosophers were discussed everywhere—in coffee shops and in salons—and spread among the common people. Inspired by these ideas, people began to oppose the special privileges enjoyed by the members of the first and second estates.

- The educated youth in France were inspired by the rights of liberty and equality which were ensued in the American Revolution.

- When the people learned that the king was planning to further increase taxes, they rose in revolt.

The Revolt Breaks

(3)

- Wars had drained the French treasury. The state was under heavy debt and had to pay hefty interests to creditors. To improve the finances of the state, the king decided to increase the taxes levied on people.

- When the king called the meeting of an assembly of the Estates Generals to pass proposals of new taxes, the members of the third estate walked out from the meeting demanding that every person in the Assembly should have one vote contrary to the existing practice of one estate having one vote.

- The members of the third estate assembled in the indoor tennis court on 20 June 1789 determined to draft a constitution which would limit the powers of the king.

Storming the prison of Bastilles

- During this time, the prices of bread rose in France and bakers began to hoard supplies. Agitated by the Unavailability of bread, people including women stormed into shops. When the king ordered his troops to move into Paris, an agitated crowd stormed into the prison of Bastilles and liberated its prisoners.

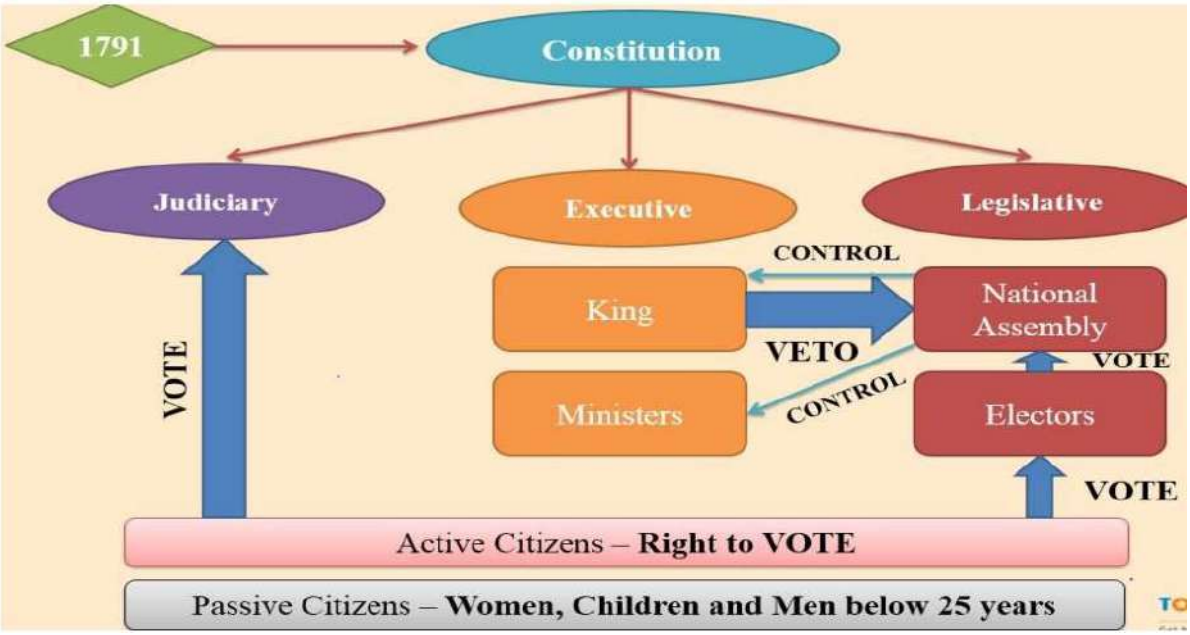
- As the number of revolts began to grow, the French monarch recognized the French Assembly. His powers could now be checked by the Constitution.

France Becomes a Constitutional Monarchy

- The National Assembly consisting of the members of the third estate drafted the Constitution which limited the powers of the king, and the executive, legislative and judicial powers were assigned to different institutions.

- The National Assembly had the powers to frame laws for the country. The members of the National Assembly were elected by the body of electorates. This body of electorates was elected by citizens who paid taxes to the Government who were termed active citizens. Other men and all women had no voting rights.

- The Constitution of France guaranteed the right to life, freedom of speech, freedom of opinion and equality before law.



Abolition of Monarchy in France

- Because the powers of King Louis XVI were reduced, he asked for help from the Prussian and Austrian monarchies. However, the revolutionaries in France formed a large army and declared a war against Prussia and Austria.

- The Jacobin Club in France was formed by the revolutionary forces of the country. It included small shopkeepers, watch makers, pastry cooks, printers, daily wage earners and servants.

(5)

- In 1792, when the supplies of bread reduced, the Jacobins along with people stormed the Tuileries Palace and imprisoned the royal family of France.

- This development led to the changes in the Constitution. Elections were held and everyone more than 21 years of age was given the right to vote. Monarchy was abolished and France became a republic.

- King Louis XVI was executed publicly on 21 January 1793 on the charges of treason. His queen, Mary Antoinette was also executed later.

Reign of Terror

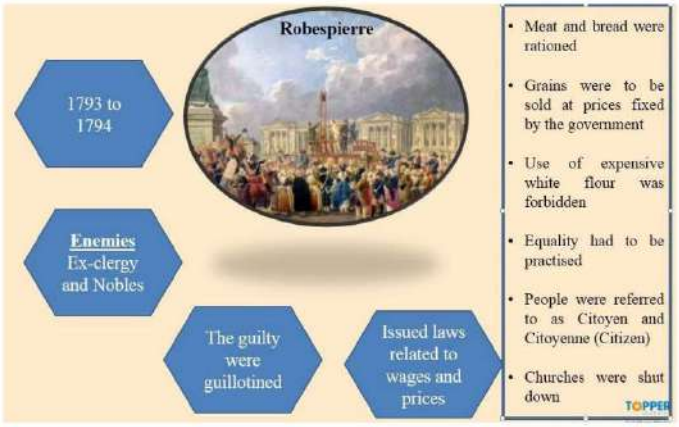
- The period from 1793 to 1794 is called the Reign of Terror. Robespierre, the head of the Jacobin Club, followed the policy of severe control and punishment. Clergymen, nobles and people who were considered enemies to the republic were guillotined. He even ordered the killing of his own party members who did not agree to his methods and ways.

- Robespierre's government put a definite limit on the wages and the prices of essential goods. Meat and bread were rationed. Peasants were also forced to sell grains at a price fixed by the Government. Churches were closed.

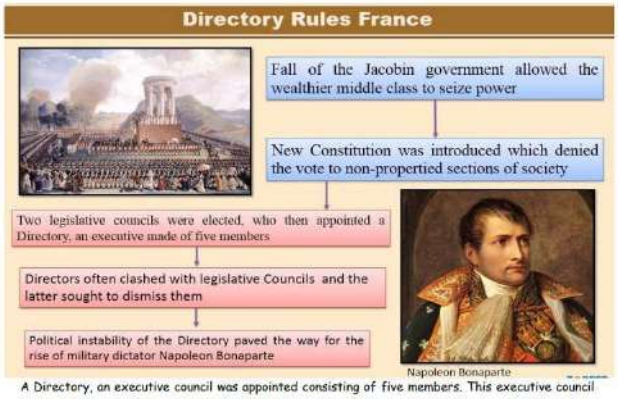
- Robespierre followed his policies so strictly that even his supporters turned against him. Finally, he was convicted by a court in July 1794 and was guillotined.

Robespierre

- After the fall the Jacobin Government, the wealthier middle class took the power into their own hands. They introduced a constitution which did not give voting rights to the non-propertied class.



The period from 1793 to 1794 is referred to as the Reign of Terror. Robespierre followed a policy of severe control and punishment. However, Robespierre was himself sent to the guillotine in July 1794



A Directory, an executive council was appointed consisting of five members. This executive council frequently clashed with the legislative councils. This political instability paved a way for the rise of military dictatorship under Napoleon Bonaparte.

Women's Participation in the Revolution

- Women were active participants in the French Revolution. Women in France were not empowered.
- Most of the women of the third estate had to work to earn their livelihood. They worked as seamstresses, sold flowers and vegetables or worked as domestic servants in the houses of wealthy families.
- Women started their own clubs in order to raise their own voices. A famous women's club was the Society of Revolutionary Republican Women. This club demanded that women be given the same political rights as men. Women till now had no right to vote.
- In the beginning, many laws were implemented to improve the condition of women in French society. Schooling was made compulsory for all girls. Fathers could no longer marry off their daughters without obtaining their consent. Divorce was made legal, and women began to be trained for various jobs.
- During the Reign of Terror, many laws were issued which ordered the closing of women's clubs. Many women were tried and guillotined.

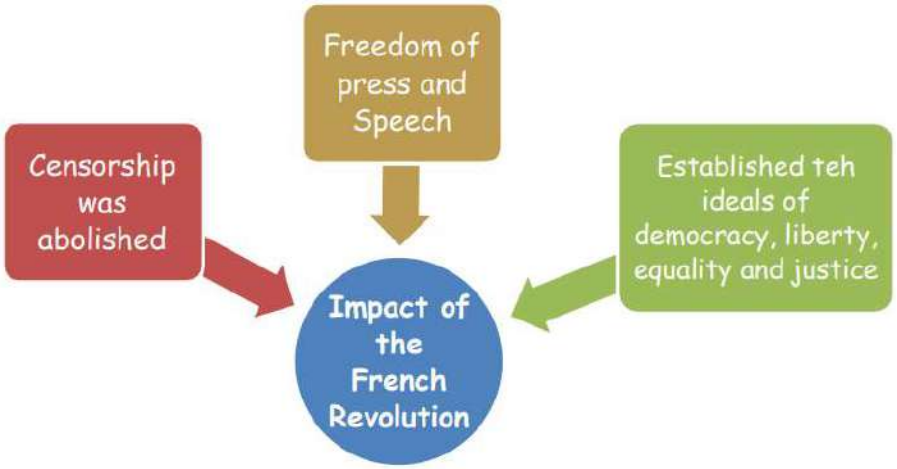
- Women's struggle to demand equal voting rights however continued. The French women were finally granted voting rights in1946.

Olympe de Gouges was politically active in revolutionary France. She protested against the Constitution and the Declaration of Rights of Man and Citizen because they did not even give basic political rights to women.
Thus, in 1791, she wrote a Declaration of the Rights of Woman and Citizen. In 1793, Olympe de Gouges criticised the Jacobin government for forcibly closing down women's clubs. She was later charged with treason and executed.

The Abolition of Slavery

- One of the important reforms of the Jacobin Club was the abolition of slavery in French colonies.
- Slaves were brought from Africa by the Europeans and were then sold to plantation owners. Because of the employment of slaves in the colonies, the growing demands for sugar, coffee and indigo by the European markets were met.
- The system of slavery was hardly criticized in France. This was because slaves were important in the plantations.
- After being banned by the Jacobins, slavery was again reintroduced by Napoleon Bonaparte.

The Impact of the French Revolution



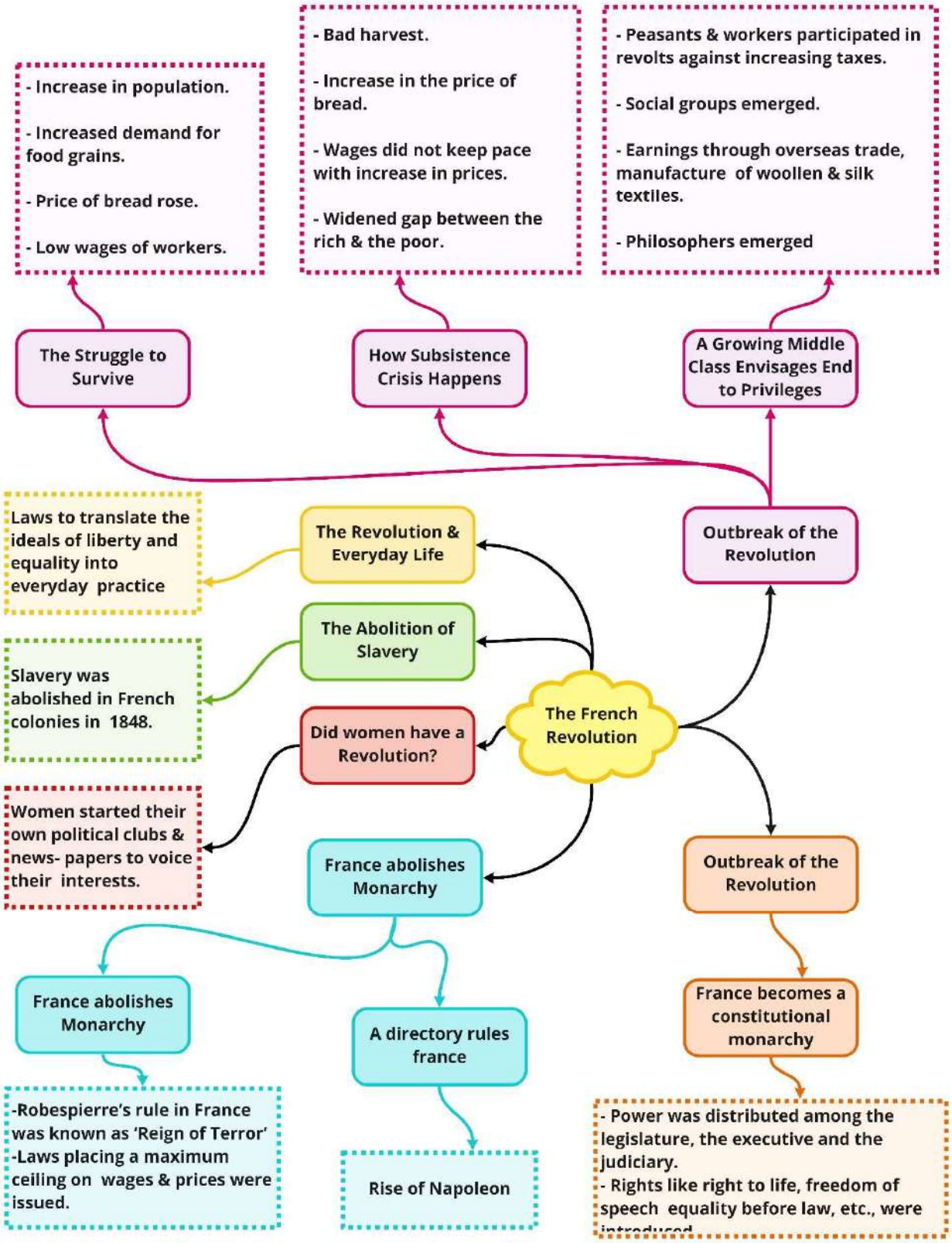
- The political instability in France paved a way for the rise of military dictatorship under Napoleon Bonaparte.
- He along with his troops carried on the ideas of the French Revolution in Europe. He introduced laws such as protection of private property and the uniform systems of weighs and measurements.
- Many of his measures that carried the revolutionary ideas of liberty and modern laws to other parts of Europe had an impact on people long after Napoleon had left.
- However, he also placed his successors on the throne of the countries which he invaded. He thus came to be regarded as an invader.

Napoleon Bonaparte

The ideas of liberty, equality and democratic rights were the greatest gifts of the French Revolution to the world.

In India, Tipu Sultan and Raja Ram Mohan Roy keenly observed the French Revolution and exalted the ideals of the French Revolution.

Class : 9th Social Studies (History)
Chapter-1: The French Revolution



Important Questions

Multiple Choice Questions:

Question 1.Which of the following state of French society paid all the taxes?

(a) 1st estate (b) 2nd estate (c) 3rd estate (d) All a, b and c

Question 2.The tax that was charged by the church from the peasants:

(a) Tithes (b) Taille (c) Indirect tax (d) Irrigation tax

Question 3. Which of the following tax was paid by the peasants of France:

(i) Taille (ii) Tithe (iii) Indirect taxes (iv) No tax was given

(a) (i) and (ii) (b) (ii) and (iii) (c) (iv) (d) (i), (ii) and (iii)

Question 4.What did Montesquieu propose?

(a) He purposed the division of separation of power.

(b) He opposed the theory of separation of power.

(c) He argued that legislature, legislative and judiciary should be depended on each other.

(d) He purposed a division of power between judiciary, executive and legislature.

Question 5.Which one of the following is the author of 'The Social Contract'?

(a) Rosseau (b) Voltaire (c) Montesquieu (d) Mirabeau

Question 6.Which of the following were the two leaders of National Assembly of France?

(a) Mirabeau and Voltaire (b) Mirabeau and Rousseau

(c) Mirabeau and Montesquieu (d) Mirabeau and Abbesieyes

Question 7.Name the French Revolutionary who edited the paper 'L' Ami due peuple.

(a) Jean-Paul Marat (b) Voltaire (c) Abbe-Sieyes (d) Montesquieu

Question 8.Which period is referred to as the 'Reign of Terror?

(a) The period from 1793 to 1794 (b) The period from 1789 to 1794

(c) The period from 1789 to 1785 (d) The period from 1789 to 1799

Question 9.What is Directory?

(a) It was executive made up from 3rd estate of French society

(b) It was executive made up from the members of French parliament.

(c) It was executive made up of five members.

(d) It was an elected body by the French Citizen.

Question 10.When was a legislative, to free all the slaves in the French overseas possession passed?

(a) In 1783 (b) In 1793 (c) In 1795 (d) In 1794

Question 11.The French Revolution started in:

(a) 1789 (b) 1688 (c) 1709 (d) 1749

Question 12.Louis XVII became the king of France in :

(a) 1784 (b) 1764 (c) 1774 (d) 1789

Question 13.The term subsistence stands for:

(a) An extreme condition where basic condition for survival is fulfilled.

(b) A social division of society. (c) A group of French army.

(d) An extreme situation where the basic means of livelihood are endangered.

Question 14.The spirit of laws was written by:

(a) Montesquieu (b) Rousseau (c) Voltaire (d) Locke

Question 15.Name the French philosopher who said that the people are real masters of the rule and king rules with their consent.

(a) Voltaire (b) Rousseau (c) Locke (d) Montesquieu

MCQ:

1. (c)3rd estate
2. (a) Tithes
3. (d)(i), (ii) and (iii) Ans
4. (d)He purposed a division of power between judiciary, executive and legislature.
5. (a)Rousseau
6. (d)Mirabeau and Abbe sieyes
7. (a)Jean-Paul Marat
8. (a) The period from 1793 to 1794
9. (c)It was executive made up of five members.
10. (d) In 1794
11. (a) 1789
12. (c) 1774
13. (d)An extreme situation where the basic means of livelihood are endangered
14. (a)Montesquieu

15.(b)Rousseau

Very Short Questions:

1. Which incident sparked the French Revolution?

2. Why was Bastille prison attacked?

3. Why was the Bastille hated by all?

4. What did the French Revolution of 1789 stand for?

5. What was the immediate cause of rioting in Paris?

6. Which ruler came to power in France in 1774?

7. What activity of the French monarchy hastened the revolution?

8. How did the American War of Independence add more debt to France?

9.Why did the French government increase the taxes?

10.What was the Old Regime?

Very Short Answer:

1. The attack by the third estate on the Bastille State prison (14th July 1789) and setting free the prisoners was the incident which sparked the French Revolution.

2. The attack by the third estate on the Bastille State prison (14th July 1789) and setting free the prisoners was the incident which sparked the French Revolution.

3.Bastille was hated by all because it was seen as a symbol of the despotic power of the king.

4. The French Revolution of 1789 stood for the ideas of Liberty, Equality and Fraternity.

5.The high price of bread was the immediate cause of rioting in Paris.

6.Louis XVI of the Bourbon family ascended the throne of France in 1774.

7.The extravagant lifestyle of the monarch brought France on the verge of bankruptcy and hastened the revolution.

8. The French army supported thirteen colonies of America in the war of independence against Great Britain. It added one billion livres (currency unit in France) that had risen to more than two billion livres with interest.

9. To meet the regular expenses such as cost of maintaining an army, the court and running the government offices or universities, the state was forced to increase taxes.

10. The term Old Regime is usually used to describe the society and institutions of France before1789.

Short Questions:

1. What was the Old Regime?
2. On ascending the throne of France, Louis XVI found the treasury empty. Why was the treasury empty??
3. Describe the divisions of the French society before the French Revolution.
4. Which three causes led to the 'subsistence crisis' in France during the Old Regime.
5. Describe the middle class in three points.
6. What was the tennis court oath? [HOTS]?
7. Explain the turmoil in France while the National Assembly was busy at Versailles.

Short Answer:

Ans: 1. The following events took place on 14th July 1789.

(a) The king had ordered the troops to move into the city. There were rumours that he would soon order the troops to open fire upon citizens.

(b) Around 7,000 men and women formed a militia and broke into a number of government buildings in search of arms.

(c) Then the fortress-prison of Bastille was stormed by hundreds of people with the hope to find hoarded ammunition. Bastille was destroyed completely as it was hated by all.

Ans: 2. The causes for empty treasury at the time of his accession were as follows.

(a) The financial resources of France had drained due to the long years of war.

(b) The high cost of maintaining an extravagant court at the immense palace of Versailles also added to the financial drain.

(c) France had helped the thirteen American colonies to gain their independence from Britain. This increased the debt to more than 2 billion livres.

Ans: 3. Before the French Revolution, the French society was divided into three estates.

(a) The 1st estate was comprised of the Church and the clergy. They enjoyed certain privileges by birth. The most important of these privileges was exemption from paying taxes.

(b) The 2nd estate was comprised of the nobles and other rich people of the society. These were also exempted from paying taxes. They also enjoyed feudal privileges which included collection of feudal dues by the peasants.

(c) The 3rd estate was comprised of big businessmen, merchants, court officials, lawyers, peasants, artisans, landless labourers and servants. Within the third estate, some were rich and others were poor. The peasants obliged the landlords by working on their fields, in their houses, to serve in the army or to participate in the building of roads. They were paying all direct taxes like taille and a number of indirect taxes on salt or tobacco but had no rights.

Ans: 4. The following points show how the subsistence crisis occurred in France during the Old Regime.

(a) The population of France increased from 23 million in 1715 to 28 million in 1789. This led to the increase in demand for foodgrains.

(b) When the production of foodgrains could not keep pace with the growing demand, the price of bread which was the staple food increased rapidly.

(c) On the other hand, the wages could not keep pace with the rise in prices. At the time of drought or hail, harvest reduced and things got worsed. Thus, the gap between the poor and the rich widened and this led to the subsistence crisis.

Ans: 5. The following points describe the middle class in French society.

(a) The middle class was a social group that emerged in France in the 18th century. This class made money through an expanding overseas trade and by manufacturing goods like woollen and silk textiles.

(b) The middle class, along with merchants and manufacturers, included professionals like lawyers and administrative officials.

(c) All these people were educated believed that no group in society should be privileged by birth and a person's position in society should be based on his merit.

Ans: 6. The third estate representatives viewed themselves as spokesmen for the whole French nation. Theyassembled in the hall of an indoor tennis court in the grounds of Versailles on 20 June 1789. Therethey declared themselves as a National Assembly.

Ans: 7. While the National Assembly was busy at Versailles drafting the constitution, the rest of France seethed with turmoil in the following ways.

(a) A severe winter had meant a bad harvest, resulting in rising price of bread thus, the situation was exploited by bakers and hoarded supplies. Angry women stormed into the shops after standing for long hours in bakery queues.

(b) The army was ordered by the king to more into the city. There were rumours that army would be ordered to open fire upon the citizens. Thousands of agitated people gathered and decided to form a militia.

(c) They broke into a number of government buildings in search of arms. They

distroyed the prison of Bastille on 14 July 1789.

Long Questions:

1. Discuss the main causes of the French Revolution. [HOTS]?
2. Explain the events/incidents which led to the outbreak of French Revolution.
3. How did philosophers influence the thinking of the people of France?
4. Explain the features of the constitution of France drafted in 1791.
5. List down the political symbols of France.

Long Answer:

Ans: 1. The following are the main causes of French Revolution:

(a) Despotic rule of Louis XVI. Long years of wars and extravagance of the king led to financial crises in France. This forced king to increase taxes mostly paid by thethird estate. It created chaos in the society.

(b) Privileges and Burdens of the French Society. First and the second estate had certain privileges by birth. The first two estates were comprised of the clergy and nobility which was 10% of the total population. Rest of the 90% population made up the third estate that paid all the various direct and indirect taxes. This discrimination led to the revolution by the 3rd estate.

(c) Rising prices. The population of France had increased. This resulted into more demand of foodgrains. So, the price of bread rose rapidly, the poor were not able to buy the high-priced bread. So, the gap between the rich and poor widened.

(d) Inspiration by the Philosophers. The philosophers like Locke, Rousseau and Montesquieu spread the ideas of having a society where the people enjoy freedom, equal laws and equal opportunities. They inspired the people of France to realise their dreams.

(e) Role of Middle class. Another major cause was the role of the middle class who earned their wealth through expanding trade of manufactured goods, being exported.

(f) Storming of Bastille prison. During the political turmoil, France experienced severe winters leading to bad harvest. The price of bread increased, as the stocks were hoarded in the market. Angry women attacked the shops. At the same time troops were ordered into Paris. Agitated crowd stormed and destroyed Bastille prison administrative officials, i.e., those who were educated. They believed that no person in the society should be privileged by birth.

Ans: 2. The following events/incidents led to the outbreak of the French Revolution:

(a) Meeting of the Estate General. On 5 May 1789, Louis XVI had called a meeting of Estate General to increase the taxes. Representatives of all the three estates came. But

the members of the 3rd estate were made to stand while women, peasants, artisans and women were not allowed entry to the assembly.

(b) Demand for one vote one person. The third estate at the meeting of the Estate General demanded one vote for each member. This demand was rejected by the king and the members of the third estate walked out in protest.

(c) Meeting of the newly-formed National Assembly. Since the members of the third estate were more, they considered themselves the voice of the people/whole nation. They assembled in the indoor tennis court of Versailles and declared themselves as the 'National Assembly'. They believed in removing the feudal privileges of the nobles and clergy.

(d) Winters created worse situation. Harvest declined, prices rose and bakers exploited poor by hoarding supplies. Angry crowd stormed the shops.

(e) Revolt in the countryside by the peasants. There were rumours that their ripe crops would be destroyed by the lords hired bands. The peasants in several districts seized hoes and pitchforks and attacked manors of the lords. They looted the hoarded grains and burnt the documents containing the records of manorial dues.

Ans: 3. The philosophers influenced the thinking of the people of France in the following ways:

(a) Philosophers such as John Locke and Jean Jacques Rousseau put forward ideas envisaging a society based on freedom and equal laws and opportunities for all.

(b) In Two Treatises of Government, John Locke sought to refute the doctrine of the divine and absolute rights of the monarch.

(c) His ideas were carried forward by Rousseau as he was proposing a form of government based on social contract between the people and their representatives.

(d) In The Spirit of the Laws, Montesquieu proposed a division of power within the government between the legislative, the executive and the judiciary.

(e) The ideas of these philosophers were discussed intensively in salons and coffee-houses and were spread among people through books and newspapers.

Ans: 4.(a) The constitution of 1791 was the first written constitution in France, created after the collapseof the absolute rule.

(b) Its main aim was to limit the powers of the monarch.

(c) Powers were then divided/separated and assigned to different institutions like legislative, executive and judiciary.

(d) According to this, active citizens of France elected electors who inturn voted to elect the National Assembly.

(e) Not all citizens had the right to vote. Only men of 25 years of age who paid taxes equal to atleast three days of a labourer's wage. They were called active citizens.

(f) The remaining men and all women were called the passive citizens.

(g) The National Assembly controlled the king. France became constitutional monarchy. (any five points)

Ans: 5. Most of the people (i.e. men and women) in the 18th century. France could not read and write. So

images and symbols instead of printed books were used to communicate ideas. These symbols were

used to convey the content of declaration of rights. The important symbols were:

(a) Broken Chains: Chains were used to restrain the slaves from running away. Broken chains signify the act of becoming free.

(b) A bundle of rods: It was used to convey the message that strength lies in unity.

(c) The eye within or triangle radiating light: The all-seeing eye stands for knowledge. The rays of the sun will drive away the dark clouds of ignorance.

(d) Sceptre: It symbolises royal power.

(e) Snake bitting its tail to form a ring: A symbol of eternity. The ring has neither beginning nor end.

(f) Red phrygian cap: It was worn by slaves when they were freed.

(g) Blue-white-red: These are the national colours of France.

(h) The winged woman: Personification of the law.

(i) The law tablet: The law is same for all and all are equal before it. (any five points)

Assertion Reason Questions:

1. In the following questions, a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct option out of the choices given below each question.
   Assertion (A): Tithe was a tax levied by the Church.
   Reason (R): It comprised of one tenth of the agricultural produce.
   A) Both A and R are true and R is the correct explanation of A
   B) Both A and R are true, but R is not the correct explanation of A
   C) A is true, but R is false
   D) A is false, but R is true
2. In the following questions, a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct option out of the choices given below each

question.

Assertion (A): On 21st September, 1792 the monarchy was abolished and France was declared as a republic.

Reason (R):A republic is a form of government where the people elect the government including the head of the government.

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

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

C) A is true, but R is false

D) A is false, but R is true

Assertion Reason Answer:

1. A) Both A and R are true and R is the correct explanation of A
2. A) Both A and R are true and R is the correct explanation of A

Case Study Based Question:

1. Read the passage given below and answer the following questions.

The constitution of 1791 vested the power to make laws in the National Assembly, which was indirectly elected. That is, citizens voted for a group of electors, who in turn chose the Assembly. Not all citizens, however, had the right to vote. Only men above 25 years of age who paid taxes equal to at least 3 day of a labourer's wage were given the status of active citizens, that is, they were entitled to vote. The remaining men and all women were classed as passive citizens. To qualify as an elector and then as a member of the Assembly, a man had to belong to the highest bracket of taxpayers.

(1) The new constitution made France a

A) Communist state

B) Constitutional Monarchy

C) Democratic state

D) Totalitarian state

(2) Which of these rights were not established as natural and inalienable rights by the constitution of 1791?

A) Right to life

B) Freedom of speech and opinion

C) Equality before the law

D) All of the above

(3) In the case of constitutional monarchy, the monarch.....

A) has no or few legal limitations in political matters.

B) retains a distinctive legal and ceremonial role but exercise limited or no power.

C) has so all the power and no legal limitation in the political matter.

D) has no legal and ceremonial roles in the government.

(4) What was the main objective behind drafting of constitution of 1791?

A) To limit the power of the monarch.

B) To regulate the powers of the monarch.

C) To increase the powers of the monarch.

D) None of the above

2. Read the source and answer the following questions.

The situation in France continued to be tense during the following years. Although Louis XVI had signed the Constitution, he entered into secret negotiations with the King of Prussia. Rulers of other neighbouring countries too were worried by the developments in France and made plans to send troops to put down the events that had been taking place there since the summer of 1789. Before this could happen, the National Assembly voted in April 1792 to declare war against Prussia and Austria.

Thousands of volunteers thronged from the provinces to join the army. They saw this as a war of the people against kings and aristocracies all over Europe. Among the patriotic songs they sang was the Marseillaise, composed by the poet Roget de LTsle. It was sung for the first time by volunteers from Marseilles as they marched into Paris and so got its name. The Marseilhise is now the national anthem of France.

(1)Which of the following statements justify the support of other neighbouring rulers toward France during the French Revolution?

A) Rulers of the neighbouring countries wanted to make an association.

B) Rulers of the neighbouring countries preferred the policies of Louis XVI.

C) Rulers of the neighbouring countries were worried by the development in France.

D) All of the above.

(2) Identify the reason, why thousands of volunteers from the different provinces joined the army of National Assembly?

A) They thought they would get a good remuneration for it.

B) They wanted to take part in war.

C) They saw this as a war of people against kings and aristocracies of European countries.

D) None of the above.

(3) Why did the large section of French people thought that the revolution had to be carried further?

A) Leaders only could achieve desired freedom.

B) It made the society livable.

C) The Constitution of 1791 gave political rights only to the richer sections of society.

D) The Third Estate wanted economic freedom.

(4) Political club during the French people thought that the revolution had to be

carried further?

A) Revolution became very significant in society as it became a rallying for discussing government policies.

B) they planned their own forms of action.

C) they wanted cultural upliftment of the society.

D) Both (a) and (b).

Case Study Answer:

1. **Answer:**

(1) B) Constitutional Monarchy

(2) D) All of the above

(3) B) retains a distinctive legal and ceremonial role but exercise limited or no power.

(4) A) To limit the power of the monarch.

2. **Answer:**

(1) B) Rulers of the neighbouring countries preferred the policies of Louis XVI.

(2) C) They saw this as a war of people against kings and aristocracies of European countries.

(3) C) The Constitution of 1791 gave political rights only to the richer sections of society.

(4) B) they planned their own forms of action.

Textual Questions

Q1 Describe the circumstances leading to the outbreak of revolutionary protest in France?

A. France was a strong and powerful state in the 18th century. She had vast territories in North America and islands in the west indies. The most obvious reason for the outbreak of the French revolution was the decline of the political system. The king of France was absolute ruler. He lived a splendid and secluded life in Versailles caring little about what was happening to the people in the kingdom. The ministers were irresponsible and wasteful. People were really fed up with such a rotten system of government. The shattered economy of France proved a major cause of the revolution. The clergy and nobility were able to pay taxes but they were completely exempted from all the taxes. A wide gulf had developed between the people and the monarchy.

Q2 Which groups of French society benefited from the revolution? Which groups were forced to relinquish power? Which sections of the society would have been disappointed with the outcome of the revolution?

A. It was the middle class that got benefited from the revolution. These were the merchants, manufacturers and professionals such as lawyers and administrative officials. The feudal lords and clergy were forced to relinquish power. The common people were disappointed with the outcome of the revolution. Although principles of equality, liberty and fraternity were implemented in France but the social and

economic conditions of the common people didn't improve as much they had expected.

Q3 Describe the legacy of French Revolution for the people of the world during the nineteenth and twentieth centuries?

A. French revolution had a far reaching effect on the life of the people throughout the world.

i. It inspired revolutionary movements in almost every country of Europe and South America.

ii. The social and political changes that took place in different parts of Europe can be traced to the French revolution.

iii. When France occupied many areas of Europe, they spread new ideas among the people of the occupied areas.

iv. Thus the greatest effect was the starting of mass movements all over the world and instilling a spirit of nationalism among the people.

Q4 Draw up a list of democratic rights we enjoy today whose origin could be traced to the French revolution?

A. Some of the democratic rights we enjoy today whose origin can be traced to the French Revolution are:-

i. Right to speech and expression.
ii. Equality before law.
iii. Right to life
iv. Right to vote.

Q5 Would you agree with the view that the message of universal rights was beset with contradictions? Explain?

A. Yes, we agree with the view that the message of universal rights was beset with several contradictions. It could be well understood by taking following points.

i. Women were not given equal rights as the men were given.

ii. Not all citizens had the right to vote. Only men above 25 years of age who paid taxes equal to atleast 3 days of the laborer's wage were given the status of active citizens, that is they were entitled to vote. To qualify as an elector and then as a member of the assembly, a man had to belong to the highest bracket of tax payers.

iii. The task of representing the people has been given to rich, the lot of the poor and oppressed will never be improved by peaceful means alone. Here we have absolute proof of how wealth influence the law.

Q6 How would you explain the rise of Napoleon?

A. Naploean Bonaparte was the result of an instable directory that ruled France. Due to the weak directory, he found an opportunity to rise to political power. In 1804, he crowned himself emperor of France.

i. He setout to conquer neighbouring European countries, dispossessing dynasties and creating kingdoms, where he placed members of his family.

ii. Napleon saw his role as a modernizer of Europe. He introduced many laws such as the protection of private by the decimal system.

iii. But soon, the Napoleonic army came to be viewed everywhere as an invading force. Due to excessive military campaigns and invasions of Russia and Spain. Napoleon became a major threat for other European Kings. They combined together and defeated him. He was finally defeated at the Battle of Waterloo in 1815.

Lesson No: 2

GULLIVER IN LILLIPUT - I

Task to do:

Q: What was the cause of conflict between the two political parties of Lilliput.

Or

Explain, why the emperor wanted Gulliver to help them against Blefescuns?

(150-200)

Q1. Ans. Reldresal visited Gulliver to discuss some important problems of state with him.

Q2. Ans: Gulliver received Reldressal warmly and with honour.

Q3. Ans. The two political parties of Lalliputs were called high heels and low heels: the difference between them was that people of high heels wore shoes with high heels, while as people of low heels had low heel in their shoes. With this difference they bitterly hated and opposed each other.

Q4. Ans. The Emperor was in favour of low heels and himself wore low heels only. So the govt. was in the hands of low heels though they were less in number than high heels.

Q5. Ans. The external danger that the country had to face was that the country was threatened with an invasion from Blefusc, which according to Lilliputs was second greatest empire in the universe. The two countries were engaged in a bloody war.

Q6. Ans. The question of religious principle that gave rise to the war was whether to break an egg at the bigger end or at the smaller. The emperors grandfather once accidentally had cut his finger while breaking an egg at the bigger end so the emperor had prohibited the practice of breaking an egg at the bigger end. There was an opposition against the new law where thousands of people lost their lives this gave rise to the war against Blefuso who gave shelter and encouragement to the rebels.

Q7. Ans. The grandfather of the present emperor of Lilliput had cut his finger while breaking an egg at the bigger end when he was a boy, thus his father prohibited ancient way of breaking an egg.

Q8. Ans. The people refused to accept the new law. There were frequent rebellion on account of it. One emperor lost his life and another his crown in these rebellions.

Q9. Ans. The emperor of Blefusco played an important part in the troubles of Lilliput. He gave shelter to the rebels of Lilliput he also encouraged them. Thus he interfered in the internal affairs of Lilliput.

Q10. Ans. According to their ancient religion people should break eggs at the convenient end. The order was written in the 54th chapter of their holy book.

Q11. Ans. In Reldresal's opinion their religion gave option to the individual to break eggs at the end they liked.

Q12. Ans. Gulliver promised the emperor to protect Lilliputians against any attack by the Blefuscu and that he was his loyal soldier, ready to defend the honour of the emperor and his country.

LESSON NO: 3

GULLIVER IN LILLIPUT - II

Task to do : Explain how Gulliver Captured the Blefuscan fleet?
(150-200)

Q1. Ans. Blefuscu was situated to the north east of Lilliput. An eight hundred meters wide water channel separated it from Lilliput.

Q2. Ans. Gulliver avoided appearing on the north east coast of Lilliput, lest the enemy should see him as they had no news of his presence on the Island of Lalliput so far.

Q3. Ans. In most places the channel was five feet deep and nowhere it was more than six. Gulliver made fifty strong cords by twisting the cables and fifty hooks by joining three bars together at a time. He also took eye glasses for protecting his eyes, an ointment for relieving the pain and binoculars with him.

Q4. Ans. He did so because he wanted to get proper information about the channel and wanted to frame a plan for how he could capture the fleet

Q5. Ans. When Gulliver was fastening hooks to war ships of Blefuscans. The soldiers shot several thousand arrows as big as knitting needles on him, which struck in his hands and face and gave him sharp pain.

Q6. Ans. In order to save his eyes from the arrows shot by the Blefuscus, he put on his eyeglasses and then went on with his work.

Q7. Ans. The ships didn't move for they were all held fast by their anchors.

Q8. Ans. In order to relieve the pain caused by the arrow he pulled out the arrows from his hands and face and rubbed an ointment that the Laliputians had given him for purpose.

Q9. Ans. When the emperor and his court saw the fleet at a distance they thought that the Gulliver was drowned and the enemy fleet was advancing for the battle.

Q10. Ans. Gullivar saved the Lalliput from the great threat of Blefuscan attack he attacked the enemies and seized their fleet. Thus he proved his loyalty to the king by risking his own life.

Q11. Ans. The emperor and the people of Lalliput were thankful to Gulliver for saving them from a great danger. They received him with great honour at the shore. The emperor made him a great lord on the spot.

GEOGRAPHY

Chapter 1: India – Size and Location

9th

India – Size and Location

India has a long and a remarkable history. It is a country which has abundant natural resources. After independence, India has made tremendous progress in the fields of agriculture and technology. India is one of the oldest civilizations and have a remarkable history. After Independence from British rule, it achieved multi-faceted socio-economic progress. Also made a remarkable progress in the field of agriculture, industry, technology and overall economic development.

Map showing the location of India in the world

India – Location and Size

- If you look at the above map, you would find that India lies to the north of the 0^0 latitude, i.e., Equator. She thus entirely lie in the northern hemisphere. Its mainland extends from latitude 8°4'N to latitude 37°6'N. Its longitudinal extent is from 68°7'E to97°25'E.

- India also lies to the east of the 0^0 longitude, the Prime Meridian. She thus lies in the eastern hemisphere.

- India is divided into almost two equal parts by the Tropic of Cancer. It passes through eight Indian states—Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura andMizoram.

- India is a part of the Asian continent. It is the seventh largest country in the world and the third largest country inAsia.
- It has two main groups of islands—the Andaman and Nicobar Islands in the Bay of Bengal and the Lakshadweep Islands in the ArabianSea.
- India occupies about 2.4% of the total geographical area of theworld.
- The young fold Himalayan Mountains form the boundary of India in the northwest, north and northeast.
- India is a peninsula which tapers to the south dividing the Indian Ocean into the Arabian Sea and the Bay of Bengal.
- India has a vast longitudinal extent. There is a difference of two hours when one travels from Gujarat to ArunachalPradesh.
- To maintain one standard time, the time along the Standard Meridian of India passing through Uttar Pradesh is taken as the standard time for the wholecountry.

Its Size

- Total Area of India is 3.28 million square km which is 2.4 percent of the total area of the world.
- It is seventh largest country in the world in terms of landmass.
- It has land boundary of about 15,200 km and the total length of the coast line of the mainland

including Andaman and Nicobar and Lakshadweep islands is 7,516.6 km.

- In the northwest, north and north east of India, young folds mountains bounds it.
- South of about 22° north latitude, India narrows and finally extends towards the Indian Ocean. It also divides it into two seas, the Arabian Sea on the west and the Bay of Bengal on its east.
- The latitudinal and longitudinal extent of the mainland is about 30°.
- India's east-west extent appears to be smaller than the north-south extent.
- The time along the Standard Meridian (82°30' E) passing through Mirzapur in UP is taken as

the Indian Standard Time for whole country.

• The time gap between Arunachal Pradesh present in the east and Gujarat present in the west is about 2 hours. The latitudinal extent influences the duration of day and night, as one moves from south to north.

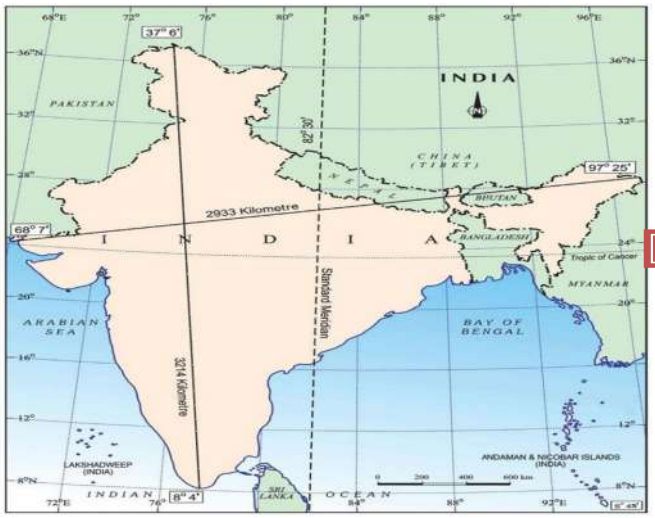
The Tropic of Cancer passes through the middle of the country through eight Indian states. She thus experiences tropical type of climate.

India and the World

- India is almost located centrally between the east and the west of Asia. It lies in the southern part of the Asiancontinent.
- The oceanic routes which link Europe in the West with the East Asian countries give an important strategically central location to India which helped establish oceanic trade links with the other countries in thepast.
- The Deccan Peninsula which extends into the Indian Ocean has helped India in maintaining close relations with Africa, West Asia and Europe from its western coast and East Asia and Southeast Asia from its easterncoast.
- The Indian Ocean is named after India because India occupies an important strategic

position in the ocean.

- India had trade relations with other parts of the world through land routes which were used long before the oceanic routes wereused.
- Its mountain passes provided land routes to various travelers during the ancient and mediaeval times.
- The land and sea routes made the existence of trade and cultural exchanges of India possible with the other countries. While the Indian decimal number system travelled far and wide, India was influenced by Greek architecture and sculpture during the ancient period and the West Asian style of architecture since the early mediaevalperiod.



Time along the Standard Meridian of India ($82^0 30'$) passing

The Neighbours of India

- India has 29 states and 7 Union Territories. Area wise, Rajasthan is the largest and Goa is the smalleststate.
- India is strategically located in the south of Asia. It is divided into 29 states and seven union territories. While Rajasthan is the largest state, Goa is the smalleststate.
- India shares its boundaries with Afghanistan and Pakistan in the northwest, China, Nepal and Bhutan in the north and Myanmar and Bangladesh in the east. In the south, Sri Lanka and Maldives are its neighbours.

While Sri Lanka is separated from India by a narrow channel of sea formed by the Palk Strait and the Gulf of Mannar, the islands of Maldives are located to the south of the Lakshadweep Islands.

Political Map of India

Class : 9th Geography
Chapter-1 : India

India

Location

Northern Hemisphere
• Latitudes: 8°4'N and 37°6'N
• Longitudes: 68°7'E and 97°25'E

Size

Landmass of India has
• Area: 3.28 million square km.
• Land boundary: 15,200 km.
• Length of coast line: 7,516.6 km. •
Standard Meridian: 82°30'E

India's Neighbours

• Pakistan and Afghanistan in the north west. • China (Tibet), Nepal & Bhutan in the north.
• Myanmar and Bangladesh in the east.
• Southern neighbours are two island countries: Sri Lanka and Maldives
• Sri Lanka is separated by the Palk Strait & the Gulf of Mannar.

India & the world

• Central location between the East & the West Asia.
• Trans Indian Ocean routes connect West European countries & East Asian countries.
• Various passes across northern mountains provided passages to ancient travellers.
• Routes have contributed in the exchange of ideas and commodities.

Map showing India's neighbours

Important Questions

Multiple Choice Questions:

Question 1.The area of India is about-

(a) 3.82 million sq. kilometers (b) 3.28 million sq. kilometres

(c) 3.16 million sq. kilometers (d) 3.61 million sq. kilometres

Question 2.India has a land boundary of about-

(a) 15,860 km. (b) 15,250 km. (c) 15,680 km. (d) 15,200 km.

Question 3.How much times is India bigger than France?

(a) 6 times (b) 16 times (c) 4 times (d) 9 times

Question 4.Standard Meridian of India passes through-

(a) Uttaranchal (b) Punjab (c) Mirzapur (d) Alipur

Question 5.India has ……. Union Territories-

(a) 28 (b) 7 (c) 6 (d) 14

Question 6……. ocean will have to be crossed by a ship going from Singapore to Mogadishu?

(a) Indian Ocean (b) Passific Ocean (c) Arctic Ocean (d) Antarctic Ocean

Question 7.Which of these countries is located towards the east of India?

(a) Nepal (b) Sri Lanka (c) Bangladesh (d) China

Question 8.The longitudinal extent of India is ……. km.

(a) 3000 (b) 3200 (c) 3020 (d) 3060

Question 9.The Tropic of Cancer does not pass through-

(a) Rajasthan (b) Chhattisgarh (c) Orissa (d) Tripura

Question 10.The capital of Mizoram is-

(a) Imphal (b) Kohima (c) Agartala (d) Aizwal

Question 11.The easternmost longitude of India is-

(a) 97° 25’ E (b) 68° 7’ E (c) 77° 6’ E (d) 82° 32’ E

Question 12.Uttaranchal, Uttar Pradesh, Bihar, West Bengal and Sikkim have common frontiers with-

(a) China (b) Bhutan (c) Nepal (d) Myanmar

Question 13.If you intend to visit the Island Kavaratti during your Summer Vacations, which one of the following Union Territory of India will you be going to-

(a) Pondicherry (b) Lakshadweep (c) Andaman and Nicobar (d) Diu and Daman

Question 14.My pen friend hails from a country which does not share land boundary with India, identify the country-

(a) Bhutan (b) Tajikistan (c) Myanmar (d) Nepal

Question 15.Which one of the following is the smallest state in Indian

(a) Sikkim (b) Tripura (c) Goa (d) Uttaranchal

MCQ

1. (b)3.28 million sq. kilometres
2. (d) 15,200 km.
3. (a)6 times
4. (c)Mirzapur
5. (b) 7
6. (a)Indian Ocean
7. (c)Bangladesh
8. (a) 3000
9. (c)Orissa

10.(d) Aizwal

11.(a)97° 25’ E

12.(b) Bhutan

13.(b)Andaman and Nicobar

14.(b)Tajikistan

15.(c)Goa

Very Short Questions:

1. In which hemisphere does India lie?

2. What is the latitudinal extent of India?

3. What is the longitudinal extent of India?

4. Name the parallel of latitude which divides India roughly into two equal halves.

5. Name the two seas located around India.

6. What is the southernmost point of the Union of India?

7.In which year did ‘Indira Point’ submerge under water due to tsunami?

8. What is the total area of the Indian landmass?

9.What is the size of India among the countries of the world?

10.What is the total land frontier of India?

Very Short Answer:

1. India lies in the Northern hemisphere.

2.The latitudinal extent of India is between 8°4’ N (southernmost) and 37°6’ N and (northernmost) latitude.

3.The longitudinal extent of India is 68°7’ E (westernmost) to 97°25’ E (easternmost) longitude.

4.The parallel of latitude which roughly divide India into two equal halves is the Tropic of Cancer (23° 30’ N).

5.The two seas located around India are the Arabian Sea in the west and the Bay of Bengal in the east.

6.Southernmost point of the Union of India is Indira Point.

7.In 2004 ‘Indira Point’ got submerged under the sea water.

8. The landmass of India has an area of 3.28 million square km. It is 2.4% of the total area of the world.

9.India is the seventh largest country in the world.

10.The total land frontier of India is 15,200 km.

Short Questions:

1. Write the size and extent of India.?
2. Explain why 82°30′ E an odd value has been chosen as the standard meridian of India.
3. Why is the difference between the durations of day and night hardly felt at Kanyakumari but not so in Kashmir?
4. What is a subcontinent? Name the countries that constitute the Indian subcontinent. How is India different from other countries of Asia?
5. Justify the naming of Indian Ocean after India.
6. What do you know about India and her neighbours? [HOTS]
7. India's land routes have been important since ancient times. Explain.

Short Answer:

Ans: 1.(a) India is the 7th largest country in the world. It has an area of 3.28 million square km. It accounts for 2.4% of the world's total area.

(b) India has a land frontier of 15,200 km.

(c) India has a coastline of 7516.6 km including the Andaman and Nicobar islands and the Lakshadweep islands.

Ans: 2. The odd value has been chosen as the standard meridian because the longitudinal extent of India is 68°7′ E to 97°25′ E and this meridian passes through the centre of India.

It passes through Mirzapur i.e. the centre of India. Then there is an understanding among the countries of the world that the degrees of the meridian should be divisible by 712 i,e. 82° 30′ E. This

enables us to overcome the difference of 2 hours of time between Arunachal Pradesh and Gujarat. The time is Indian Standard Time.

Ans: 3. The difference in the durations of day and night and Kanyakumari and Kashmir are respectively due to their latitudinal locations. Kanyakumari is located closer to the equator and experiences a maximum difference of 45 minutes between day and night. However, Kashmir lies further away from the equator and experience a significant gap between the duration of day and night that can extend to as much as 3-5 hours.

Ans: 4.A subcontinent is a distinctive geographical unit which stands out distinctively from rest of the region because of its large size, varied climates, varied relief etc.

Countries that make up the Indian subcontinent are – India at the centre, Pakistan in the west, Nepal and China (Tibet) in the north, Bhutan and Bangladesh in the east.

India is different from other countries of Asia regarding climate, vegetation and culture.

Ans: 5. India ocean is named after India because:

(a) India has a long coastline on the Indian Ocean.
(b) India has a central location between east and west Asia.
(c) India's southernmost extension, the Deccan Peninsula, protrudes into the Indian Ocean which makes it significant to international trade done through the Indian Ocean.
(d) India was the favorite destination of the traders of the world.

Ans: 6.(a) India occupies an important strategic position in south-east Asia. India has 29 states, 6 Union

Territories and one National Capital Territory.

(b) India shares her land borders with Pakistan and Afghanistan in the north-west, China (Tibet), Nepal and Bhutan in the north, and Myanmar and Bangladesh in the east. Our southern neighbours across the sea consists of two island countries i.e. Sri Lanka and Maldives.

(c) Sri Lanka is separated from India by Palk Strait and Gulf of Mannar while Maldives islands are situated to the south of the Lakshadweep islands.

Ans: 7.(a) India's contacts with the outside world have continued through the ages, but her relationships

through the land routes are much older than her maritime contacts.

(b) The various passes across the mountains in the north have provided passages to the ancient travellers. These routes (Kyber and Bolan pass) across the mountains have contributed in the exchange of ideas and commodities since ancient times.

(c) The ideas of Upanishads and the Ramayana, the stories of Panchatantra, the Indian numerals,

the decimal system could reach many parts of the world through the land routes. The spices and muslin cloth along with other commodities were taken from India to other countries. The Greek sculpture and the architectural style of dome and minarets from west Asia can be seen in many parts of our country. This is the result of the exchange of commodities and ideas movement of people.

Long Questions:

1. Why are Ahmedabad and Kolkata able to see the noon seen exactly overhead twice a year but not Delhi?
2. India occupies an important strategic position in south Asia. Discuss. [HOTS]
3. Describe how the geographical features of India have fostered unity and homogenity in the Indian society.
4. Locate and Label the Indian States and Capital on the outline map of India.
5. On the political map given locate and label the following.

(a) Tropic of cancer

(b) Standard meridian with degrees.

(c) Union Territories- Andaman and Nicobar, Lakshadweep, Chandigarh, Daman and Diu.

Long Answer:

Ans: 1. The sun's apparent movement towards north and south of the equator is within two tropics.

(a) All the places located within the tropics have overhead sun twice a year.

(b) Both Ahmedabad and Kolkata lie to the south of the Tropic of Cancer. That is why these two stations see the noon sun overhead twice a year.

(c) Delhi is located at 29°N latitude much to the north of Tropic of Cancer.

(d) The sun's rays are near overhead in sub-tropical zone. It will never see noon sun overhead, at anytime of the year.

Ans: 2.(a) The Indian landmass has a central location between the east and the west Asia. India is a

southward extension of the Asian continent.

(b) The trans Indian Ocean routes which connect the countries of Europe in the west and the countries of east Asia provide a strategic central location to India.

(c) The part that is attached to the Asian continent connects India through the land routes and mountain passes to the various countries lying to its north, west and east.

(d) The Deccan Peninsula protrudes into the Indian Ocean, thus helping India to establish close contact with west Asia, Africa and Europe from the western coast and southeast and east Asia from the eastern coast.

Ans: 3. India has a distinct physical and cultural identity: India's unity and homogenity have been enabled by its physical diversity i.e., physical features.

(a) The lofty mountains in the north which run east-west for thousands of kilometres. They provide a natural wall against all possible intrusions. It gives India an intact structure.

(b) The southern part of India is surrounded by the seas and oceans on the sides. These physical features have also ensured that the people from outside could enter India only through well defended routes through sea or passes in the mountains.

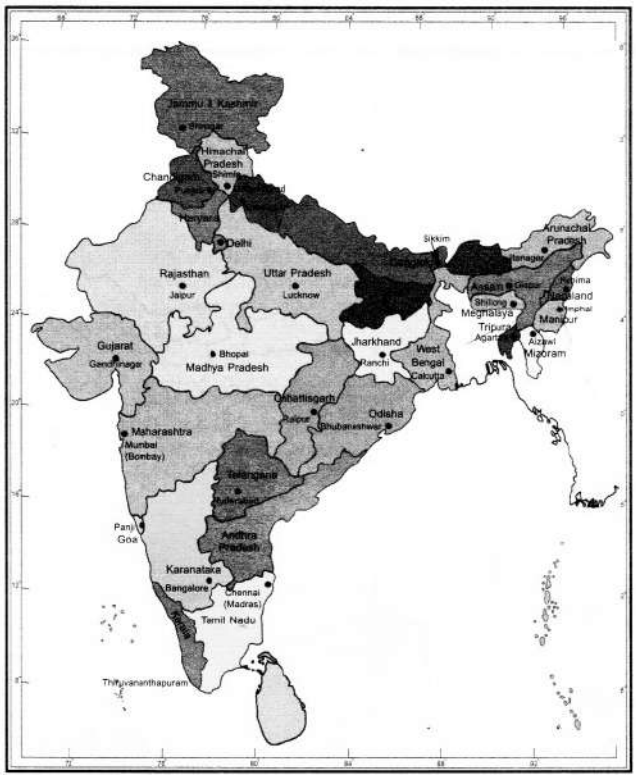
(c) Standard meridian 82'30" has been taken as local time all over India providing uniformity.

(d) Rivers and their tributaries provide irrigation facility throughout the country bring uniform development.

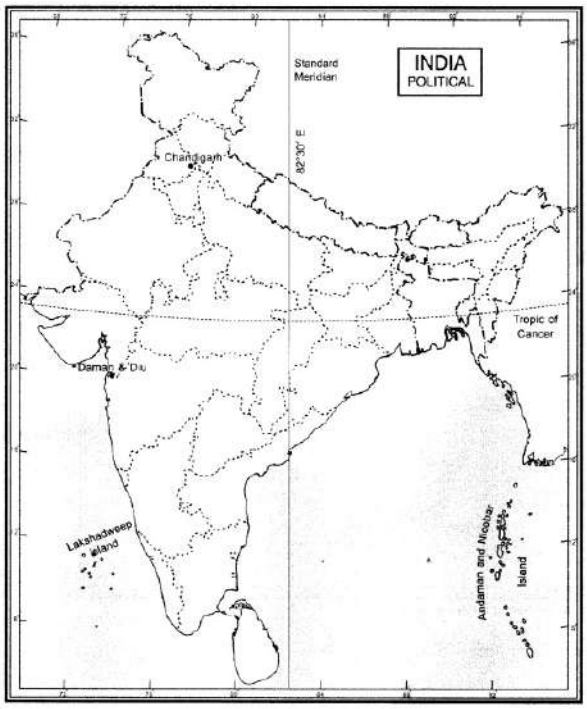
(e) Monsoons foster unity. Many festivals are associated with it. Apart from that agricultural and domestic needs are also met by monsoons.

Thus, by adopting new norms and values and accepting as their own, unity and homogenity of India has been promoted.

Ans: 4.



Ans: 5



Assertion Reason Questions:

1. In the following questions, a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct option out of the choices given below each question.

Assertion (A) : The Southernmost point of the Indian Union, 'Indira Point, got submerged under the sea water in 2004.

Reason (R) : In 2004 Indian Islands and coastal areas were hit by a huge Tsunami.

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

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

C) A is true, but R is false.

D) A is false, but R is true.

2. In the following questions, a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct option out of the choices given below each question.

Assertion (A) : India is bounded by young fold mountains in the North-West, North and North-East.

Reason (R) : The Himalayas lie on the Northern part of India.

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

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

C) A is true, but R is false.

D) A is false, but R is true.

Assertion Reason Answer:

1. A) Both A and R are true and R is the correct explanation of A.
2. A) Both A and R are true and R is the correct explanation of A.

Case Study Based Question:

1. Read the source and answer the questions that follow.

India is a vast country. Lying entirely in the Northern Hemisphere the main land extends between latitudes 8°4' N and 37°6 N and longitudes 68°7 'E and 97°25 'E. The Tropic of Cancer (23°30' N) divides the country into almost two equal parts.

To the South-East and South-West of the mainland, lie the Andaman and Nicobar Islands and the Lakshadweep islands in Bay of Bengal and Arabian Sea respectively. The Southernmost point of the Indian Union- 'Indira Point' got submerged under the sea water in 2004 during the Tsunami.

The land mass of India has an area of 3.28 million square km. India's total area accounts for about 2.4 per cent of the total geographical area of the world.

India is the seventh largest country of the world.

(1) What makes India unique in Asia?

A) Its food B) Its economy C) Its location D) Its culture

(2) Why is the Tropic of Cancer significant for India?

A) It is a plateau B) It is the highest peak of the South India

C) It is a salt water lake

D) Due to this India's climate has characteristics of tropical as well as subtropical climates.

(3) Indira Point is located in which islands group of India?

A) The Lakshadweep islands group B) The Aminidivi islands group
C) The Andaman and Nicobar islands group D) None of the above

(4) India comes after which country in terms of area?
A) Russia B) China C) Canada D) AII of these

2. Read the source and answer the questions that follow.
India has a land boundary of about 15,200 km and the total length of the coastline of the mainland, including Andaman and Nicobar and Lakshadweep, is 7,516.6 km. India is bounded by the young fold mountains in the North-West, North and North-East. South of about 22° North latitude, it begins to taper, and extends towards the Indian Ocean, dividing it into two seas, the Arabian Sea on the West and the Bay of Bengal on its East.

(1) The length of Indian coastline, excluding the Andaman and Nicobar and the Lakshadweep islands group is
A) 6100Km B) 7516.6Km C) 7000Km D) 5100Km

(2) India is bounded by which of the following mountains in the North?
A) The Javadi hills B) The Nilgiris C) The Himalayas D) None of these

(3) The Arabian Sea and the Bay of Bengal are part of which of the following oceans?
A) The Pacific ocean B) The Atlantic ocean C) The Antarctic ocean
D) The Indian ocean

(4) The Arabian Sea forms a part of the principal sea route between ..... and .....
A) India, Australia B) India, China C) India, Europe D) India, the USA

Case Study Answer:

1. Answer:

(1) C) Its location
(2) D) Due to this India's climate has characteristics of tropical as well as subtropical climates.
(3) C) The Andaman and Nicobar islands group
(4) D) AII of these

2. Answer:

(1) A) 6100Km
(2) C) The Himalayas
(3) D) The Indian ocean
(4) C) India, Europe

Textual Question

Choose the right answer from the four alternative given below.

1. The tropic of cancer does not pass through
a) Rajasthan b) Chhattisgarh
c) Orissa d) Tripura
Ans. C)
2. The eastern most longitude of India is

a) 97^0 25' E *b) 77^0 6' E*
c) 68^0 71E *d) 82^0 32'E*
Ans. a)
3 Uttarakhand, Uttar Pradesh, Bihar, West Bengal and Sikkim have common frontiers with
a). China *c). Nepal*
b). Bhutan *d). Myanmar*
Ans. C)
4. If you intend to visit kavarati during your summer vacations, which one of the following union territories of India you will be going to:-
a) Pondicherry *b) Andaman and Nicobar*
c) Lakshadweep *d) Diu and Daman*
Ans. C)
5. My friend hails from a country which does not share land boundary with India. Identify the country
a). Bhutan *b). Bangladesh*
c). Tajikistan *d). Nepal*
Ans. C)

Q2. ANSWER THE FOLLOWING QUESTIONS BRIEFLY

i. Name the group of islands lying in the Arabian sea.
Ans. Lakshadweep
ii. Name the countries which are larger than India.
Ans. Russia 170, 75000 sq. km
Canada *99,76140 sq km*
China 95, 97 000 sq km
U.S.A 93,63,169 sq km,
Brazil 85m 11m 965 sq km
Australia 76, 82, 300 sq km
iii. Which island group of India lies to its south-east?
Ans. The Andaman and Nicobar island lies to its south-east.
iv. Which island countries are our Southern neighbours
Ans. Sri Lanka and Maldives are island countries of our southern neighbours.
Q3. The sun rises two hours earlier in Arunachal Pradesh as compared to Gujarat in the west but the watches show the same time. How does this happen?
Ans. India is situated between 68°7' to 97°25'E longitude as such the longitudinal extent of India is about 30°(97°25'-68°7')degrees. Therefore it has a great significance of its own. It means that the sun rises(30*4=120 mts) or two hours earlier in the eastern most part of India(i.e. in Arunachal Pradesh) than in the western most part (i.e.in Gujarat). We have accepted 82°30'E longitude as the Standard Meridian of India. The local time at this place has been accepted as the Standard Time all over India. We have accepted 82°30'E longitude as the Standard Meridian because it lies almost in the middle of India and as such it suits us the most. It has brought

harmony in time throughout the country therefore, the watches show the same time.

Q4. In what way central location of India in the Indian Ocean has been to its advantage?

Ans. The central location of India at the head of Indian Ocean was of great advantage. Countries of east Africa, West Asia, South and South East Asia and East Asia could be reached through sea routes. Hence, India established close cultural and commercial contacts with these countries. India enjoys a favourable situation on the international high way of trade and commerce unlike land locked countries it has an easy access to outside world.

Q5. Explain why Ahmedabad and Kolkata are able to see the noon sun exactly over head twice a year but not Delhi?

Ans. Ahmedabad in the west, and Kolkata in the east are situated south of the tropic of cancer ($23^0$30`N). They enjoy overhead noon sun twice a year, once some days before $22^{nd}$ June and twice some days after it when the sun moves towards the south. Delhi is much further north of the tropic of cancer, at $28^0$6`N. Hence the sun never shines overhead in Delhi.

Q6. Why do we need a standard meridian for India? Explain?

Ans. The latitudinal and longitudinal extent of the India is about 30 degrees. But in kilometers the northern south extension (about 3200 km) is more than that of the east-west (about 3000 km). Due to the vast longitudinal extent, the time difference between the two extreme points in east and west is of two hours. So as not to get the time confusion in different parts of the country, we need a standard meridian of India ($82^0$30`E) passing through Allahabad is taken as the standard time for the whole country.

Q7. Describe how geographical features of the country have fostered unity and homogeneity in the Indian society?

Ans. The Indian landmass is a southward extension of the continent of Asia. On its north, a chain of lofty mountains run east to west uninterruptedly for thousands of kilometers. They are such formidable barriers that land communication with Tibet and China is possible only through a few passes which are located on high altitudes. On the south, the seas and the ocean from three sides surround the Indian peninsula. Yet, people have been coming and going through land and sea routes. However, the partially enclosed character of the land, on the whole, has strengthened its uniqueness by assimilating new cultural elements coming from outside and yet fostering unity and homogeneity in the Indian society remarkably well.

Q8. Give a brief account of India's contact with the outside world in ancient and medieval times?

Ans. India's contacts with the world have continued through the age. The exchange of ideas and commodities dates back to the ancient times. The ideas of the Upanishad and Ramayana, the stories of Panchatantra, the Indian numerals and the decimal system thus could reach many parts of the world. The spices, muslin and other merchandise were taken from India to different countries. On the other hand, the influence of Greek sculpture and the architectural style of done and minarets from west Asia can be seen in different parts of our country.

Map Skill

Identify the following with the help of map reading.

i). The island groups of India lying in the Arabian sea and the Bay of Bengal.

Ans. The island groups which are lying in the Arabian sea and the Bay of Bengal are Lakshadweep and Andaman and Nicobar.

ii). The countries constituting Indian subcontinent.

Ans. The countries constituting Indian sub continent are Pakistan, Nepal, Bhutan, Sri-Lanka, Bangladesh and India.

iii) The state through which the tropic of cancer passes.

Ans. The tropic of cancer passes through Mizorum, west Bengal, Jharkhand, chhatisgarh, Madhya Pradesh, Rajasthan and Gujarat.

iv) The northern most latitude in degrees.

Ans. The northers most latitude in degree is 37^0 6`N.

v) The southern most latitude of the Indian main land in degrees.

Ans. The southern most latitude of Indian main land in degrees is 8^0 4`.

vi) The eastern and the western most longitude in degrees.

Ans. Eastern($97^0$25`E) and western ($68^0$7`E).

vii) The place situated in the three seas.

Ans. Kanya Kumari.

viii) The strait separating sri lanksa from India.

Ans. Palk Strait.

ix) The Union territories of India?

Ans. a. Chandigarh b. Lakshadweep c. Andaman and Nicobars islands
d. Dadara and Nagar Haveli e. Daman and Diu
f. Pondichery g. Delhi

انسانِ کامل

مضامین کئی طرح کے ہوتے ہیں۔

انسان کامل خواجہ غلام السّیدین کی کتاب "آندھی میں چراغ" سے ماخوذ ایک سیرتی مضمون ہے۔سیرت کے معنی ہیں راستہ اور طریقہ۔

ہمارے نبی حضرت محمدؐ کی زندگی یا حالات کے بارے میں جو کچھ لکھا یا بتایا جاتا ہے۔سیرت کہلاتا ہے۔رسول اکرمؐ کی مبارک سیرت اہل ایمان کو زندگی گذارنے کے لئے بہترین اور کامیاب نمانہ ہے۔

چنانچہ ابتدائے اسلام سے لے کر آج تک بے شمار کتابین سیرت کے موضوع پر لکھی گئی ہیں جو اہل اسلام کے لئے مشعلِ راہ کا کام دیتی ہیں۔

اردو میں مولانا شبلیؒ،سید سلیمان ندوی،ابوالکلام آزاد،نعیم صدیقی وغیرہ اور دوسرے علماء اور ادیبوں نے سیرت کے موضوع پر کئی ساری کتابیں لکھی ہیں۔

نوٹ۔ خواجہ غلام السّیدین کا نوٹ کتاب سے یاد کریں۔

سوالات

س۱ : حضرت محمدؐ کو زندگی کے ابتدائی دور میں کن مشکلات سے سابقہ پڑا؟

ج : حضرت محمدؐ کی پیدائش سے چند ماہ پہلے آپکے والد کا انتقال ہوگیا تھا۔ابھی آپکی عمر چھ سال بھی نہیں تھی کہ ماں بھی چل بسیں۔دادا نے اس یتیم کو سہارا دینا چاہا کہ وہ بھی انتقال کر گئے۔اسطرح آپؐ کو زندگی کے ابتدائی دور میں ہی بہت سی محرومیوں سے سابقہ پڑا۔

س۲ : کن خصوصیات کی بناء پر حضرت خدیجہؓ آپؐ سے متاثر ہوئیں؟

ج : آپؐ کی نوجوانی میں ہی آپکی دیانت،امانت،ذہانت،شرافت،مروّت،انسانی ہمدردی اور آپکی عفت و پاک دامنی کی شہرت پھیل چکی تھی۔یہ وہ صفات تھے جن سے حضرت خدیجہؓ متاثر ہوئے بغیر نہ رہ سکیں۔

س۳ : معرفت الٰہی اور خدمتِ خلق کی وضاحت کیجئے؟

ج : اللہ تعالیٰ کی ذات کو پہچان کر اسکی عبادت میں ہمہ وقت مشغول ہوجانا معرفت الٰہی ہے اور اللہ کے بندوں کی اصلاح و خدمت کرنا خدمت خلق کہلاتا ہے۔

گرائمر:

انسان کے منہ سے جو بات نکلتی ہے اسکو لفظ کہتے ہیں۔

لفظ دو طرح کا ہوتا ہے۔۱ معنی دار ۲ بغیر معنیٰ

معنیٰ دار لفظ کو موزوں کہتے ہیں۔بے معنیٰ لفظ کو مہمل کہتے ہیں۔

کلمہ کی چھ قسمیں ہیں،۱ اسم، ۲ فعل، ۳ حرف ۴ متعلق فعل ۵ صفت، ۶ ضمیر

۱۔ اسم وہ کلمہ ہے جو کسی شخص، چیز یا جگہ کے نام کو ظاہر کرے۔جیسے رشید،سائیکل، سرینگر

اسم کی تین قسمیں،اسم جامد، اسم مصدر، اسم مشتق

اسم جامد وہ اسم ہے جو نہ خود کسی کلمے سے بنا ہو اور نہ اس سے کوئی کلمہ بنتا ہو۔

اسم مصدر وہ اسم ہے جو خود تو کسی کلمہ سے نہ بنا ہو لیکن اس سے دوسرے کلمے بنتے ہوں۔

جیسے چلنا، اٹھنا، بیٹھنا، سونا وغیرہ۔

مصدر: وہ کلمہ ہے جس میں کسی کام کا ہونا یا کرنا پایا جائے اور زمانے کی کوئی قید نہ ہے مثلاً پڑھنا، کھانا، جلنا۔ اردو میں مصدر کے آخر میں ''نا'' ہوتا ہے۔ البتہ اردو میں ایسے بھی الفاظ پائے جاتے ہیں جن کے آخر میں 'نا' ہوتا ہے لیکن وہ مصدر نہیں ہوتے مثلاً نانا، تانا، گھرانا

مصدر کی پہچان یہ ہے کہ مصدر کے آخر میں لگا ہوا 'نا' جب مٹا دیا جائے تو فعل امر باقی رہ جاتا ہے مثلا چلنا سے چل، دوڑنا سے دوڑ وغیرہ۔

سوال ۱: درج ذیل الفاظ سے مصادر بنائیے؟

دیکھ، جا، کھا، آ، سو، پی، پڑھ، لکھ، لا، بیٹھ۔

جواب: دیکھنا، جانا، کھانا، آنا، سونا، پینا، پڑھنا، لکھنا، لانا، بیٹھنا۔

سوال ۲: درج ذیل مصادر سے افعال امر بنائیے؟

بیٹھنا، گھومنا، روٹھنا، سوارنا، چمکنا، بولنا، تولنا۔

جواب: بیٹھ، گھوم، روٹھ، سنوار، چمک، بول، تول۔

سوال ۳: دئے گئے الفاظ میں سے واحد کے جمع اور جمع کے واحد لکھئے۔

اسباب، مقصد، فرض، حالات، منظر، معلمین، نقوش، روح۔

جواب: سبب، مقاصد، فرائض، حالت، مناظر، معلم، نقش، ارواح۔

فراق گورکھپوری

اصلی نام رگھو پتی سہائے فراق تخلص اور گورکھپور جائے پیدائش سنِ پیدائش 1896ء اور سنِ وصال 1982ء۔اُن کو 1960ء میں ساہتیہ اکاڈمی ایوارڈ دیا گیا اور 1968 میں پدم بھوشن کا خطاب ملا۔اور اسکے فوراً بعد 1969ء میں ہندوستان کا سب سے بڑا ادبی اعزاز گیان پیٹھ عطا کیا گیا۔اِس مختصر سے تعارف سے اِن کی ادبی دنیا میں اہمیت کا اندازہ ہوتا ہے کہ کس عروج کے شاعر تھے۔

غزل۔۱

۱۔ رُکی رُکی سی شب مرگ ختم پر آئی وہ پو پھٹی، وہ نئی زندگی نظر آئی

رُکی رُکی = ٹھہری ہوئی۔جمود میں شب مرگ = دم توڑتی ہوئی نئی زندگی = نئی صبح، آزادی

شاعر نے یہ شعر انگریزوں کی سامراجی حکومت کے بارے میں لکھا ہے۔یہ شعر 1947ء کے آس پاس کے زمانے کا ہے جب انگریز ہندوستان کو چھوڑنے والے تھے۔اُس شعر کو تلمیح کہتے ہیں یعنی جس میں کسی تواریخی واقعہ کا اشارہ ہو۔فرماتے ہیں کہ دم توڑتی ہوئی انگریزی حکومت دھیمی رفتار سے ختم ہو رہی ہے چونکہ شب کے بعد صبح ہوتی ہے۔تو صبح کی نئی زندگی آزادی کی طرف اشارہ ہے۔

۲۔ ؎ یہ موڑ وہ ہے کہ پرچھائیاں نہ دیں گی ساتھ مسافروں سے کہو اُس کی رہ گزر آئی

موڑ۔ایک مرحلہ جس پر حالات بدلتے ہیں۔

پرچھائیاں۔سائے

ساتھ۔مددگار۔معاون۔ہم سفر

شاعر فرماتے ہیں کہ عشق کے راستے میں یہ ایک ایسا مرحلہ آیا ہے جہاں کسی دوست احباب یا غمخوار کے ہم سفر ہونے کی بات ہی نہیں۔یہاں اپنا سایہ بھی ساتھ چھوڑ دیتا ہے۔اس راستے پر چلنے والوں سے کہدو کہ یہ محبوب کے آنے جانے کا راستہ ہے اور اسکی دشواریاں شدت کی ہوتی ہیں۔کوئی یہاں آگے پیچھے نہیں ہے۔

۳۔ ؎ فضا تبسّم صبح بہار تھی لیکن پہنچ کر منزل جاناں پر آنکھ بھر آئی۔

فضا = موسم، ہوئیاں تبسّم۔مسکرانا صبح بہار۔ خوشگوار صبح منزل جاناں = محبوب کا گھر، ٹھکانا

آن = عزّت آنکھ بھر آنا = رونا، آنسو بہانا

شاعر فرماتے ہیں کہ صبح کی ہوائیں خوشگوار اور مُسکراتی دکھائی دے رہی تھیں۔لیکن جب یہ ہوائیں محبوب کے کوچے کے پاس سے گذرنے والی تھیں تو نا معلوم تاثر سے اچانک بن بادل ہی برسنے لگیں۔یعنی خوشگوار اور مسکراتا ماحول غم اور اندوہ مین بدل گیا۔

۴۔ ؎ کسی کے بزم طرب میں حیات بٹتی تھی امیدواروں میں کل موت بھی نظر آئی

بزم = محفل طرب = خوشی حیات = زندگی بٹتی = تقسیم امیدوار = سائل

طلبگار = ڈھونڈنے والے

شاعر فرماتے ہیں کہ کسی کے (یعنی محبوب کے) محفل شادمانی میں طلبگاروں میں زندگی بانٹی جا رہی تھی۔اس محفل میں سب سے حیران کن بات یہ تھی کہ اُن سائلوں میں موت جو زندگی چھیننے والا ہے وہ بھی زندگی کی خیرات لینے کا طلبگار تھا۔محبوب کی دی ہوئی زندگی کچھ الگ قسم کی زندگی ہوگی جس کو لینے کے لئے موت بھی متلاشی تھی

۵۔ ؎ کہاں ہر ایک سے انسانیت کا بار اُٹھا کہ یہ بلا بھی ترے عاشقوں کے سر آئی۔

بار = وزن، بوجھ بلا = مصیبت سر = ذمے

شاعر فرماتے ہیں کہ اُس کے تصور کے مطابق انسانیت کا بوجھ آسان نہیں۔ نبھانے پر یہ ایک عظیم کارنامہ ہے کہنے میں انسانیت ایک آسان کا لفظ ہے۔ لیکن اُٹھانے پر بھاری بوجھ ہے۔ اور آگے فرماتے ہیں کہ بوجھ اُٹھانا آسان نہیں مشکل ہے یہ بوجھ کسی عام آدمی سے نہیں اٹھتا ہے۔ پر اے میرے محبوب آپکی کی خاطر ہم یہ مصیبت اٹھانیکے لئے آگے ہیں۔

غزل۔۲

۱۔ ؎ سر میں سودا بھی نہیں دل میں تمنا بھی نہیں لیکن اِس ترک محبت کا بھروسہ بھی نہیں

سر = ذہن سودا = دیوانگی تمنا = خواہش ترک = چھوڑنا بھروسہ = یقین، استقلال

شاعر فرماتے ہیں کہ محبت کے آثار میں سودائی یعنی دیوانگی۔ اضطراب معشوق سے ملنے کی خواہش ہوا کرتی ہے لیکن ہم میں ان نشانیوں میں سے اب کچھ نہیں پایا جاتا۔ یعنی شاید ہم نے عاشقی کو چھوڑ دیا ہے۔ لیکن ہوسکتا ہے کہ یہ حالت بھی محبت کا ایک نیا اثر ہو اسلئے وثوق سے کہنا کہ ہم نے عاشقی چھوڑ دی اس کا کوئی بھروسہ نہیں۔

۲۔ ؎ دل کی گنتی یگانوں میں نہ بیگانوں میں لیکن اس جلوہ گہہ ناز سے اُٹھتا بھی نہیں۔

یگانہ = اپنے جان پہچان والے بیگانہ = انجان لوگ جلوہ گہہ = محفل معشوق ناز = ناز کی نکھرے، انداز دلبرانہ

شاعر فرماتے ہیں کہ محبوب کی محفل میں اپنے بھی ہیں اور پرائے بھی ہیں کچھ ایسے ہیں جو معشوق کے منظور نظر ہیں اور کچھ ایسے بھی ہیں جن کی طرف محبوب کی نظر عنایت نہیں جاتا اور میرے دل کا حال یہ ہے کہ میں نہ تو منظور نظر جماعت میں سے ہوں اور نہ ان میں جو بے توجہی کا شکار ہیں۔ لیکن جہاں اُس کا جلوہ ناز و انداز ہوتا ہے یا ہونے والا ہے اس جگہ گو کہ ہمارا کوئی کام نہیں لیکن یہاں سے جانے کو بھی جی نہیں چاہتا۔

۳۔ ؎ مہربانی کو محبت نہیں کہتے اے دوست آہ! اب مجھ سے تری رنجش بے جا بھی نہیں۔

مہربانی = کسی مجبوری کی وجہ سے کسی کے کام آنا تری = تیری رنجش = ناراضگی بے جا = بلا مقصد

شاعر فرماتے ہیں کہ اگر کوئی تم پر ترس کھائے۔ تمہاری محتاجی کو دور کرنے کی کوشش کرے یا تمہاری دل بہلائی کے لئے مسکرائے۔ یہ سب مہربانی کہلاتی ہے محبت نہیں اس غلط تصور میں نہ رہنا کہ کسی کا مسکرانا اُس کا اقرار محبت ہے جب ہم یہ سمجھ ہی گئے ہیں تو آپ کو اے پیکر حسن ہم سے بے وجہ کوئی ناراضگی نہ ہونی چاہیئے ہم کو رقابت میں نہ رکھئے۔

۴۔ ؎ ایک مدت سے تری یاد بھی آئی نہ ہمیں اور ہم بھول گئے ہوں تجھے ایسا بھی نہیں

شاعر فرماتے ہیں کہ زمانہ ہوا جب سے آپ کی یاد ہمیں نہیں آئی لیکن ایسا بھی نہیں کہ ہم آپ کو بالکل بھول گئے ہوں۔ اس کی دو صورتیں ہوسکتی ہیں۔ پہلی صورت یہ ہے کہ نسیاں طاری ہوگیا ہو اور صرف اُن کی کچھ نشانیاں ہیں جن کو دیکھ دیکھ کے کچھ محسوس ہوتا ہے پر یاد نہیں آئی اور دوسری صورت یہ ہے کہ ہم آپ کو بھول ہی کہاں پاتے ہیں کہ یاد آئیں۔ جسن کو بھول نہ سکیں اسکی یاد کس لئے۔ دوسری صورت زیادہ موزون لگتی ہے۔

۵۔ آہ! یہ مجمع احباب یہ بزم خاموش آج محفل میں فراقِ سخن آرا بھی نہیں

مجمع = جماعت احباب = دوست بزم = محفل فراق = (شاعر) جدائی سخن = بات، شعر، ادب

آرا = بولنے والا، کہنے والا

شاعر فرماتے ہیں افسوس دوست واحباب تو جمع ہیں لیکن محفل میں وہ رونق اور چہل پہل نہیں۔ایک عجیب قسم کی خاموشی ہے۔فطری طور ایسا نہیں ہونا چاہیئے۔ جہاں دوست ملیں وہاں خاموشی کیوں۔شاید فراقؔ کے رنج میں ایسا ہے۔شاعر اپنے بعد کی محفلوں کا تصور کر کے یہ نقشہ کھینچ رہا ہے۔کہ اُس کے مرنے کے بعد ایک محفل ایسی بھی ہوگی جہاں سب ملیں گے پر خاموشی ہوگی۔

غزل۔۳

۱۔ ؎ آنکھوں میں جو بات ہوگئی اک شرح حیات ہوگئی

آنکھوں میں بات = گفتگو جس میں زبان کی ضرورت نہیں، اشاروں کی زبان شرح = تفسیر، مکمل بیان حیات = زندگی

شاعر فرماتے ہیں عشق اور حسن کے درمیان زبان کی ضرورت نہیں۔گفتگو اس کے بغیر ہوتی ہے [خاموشی گفتگو ہے بے زبانی ہے زبان میری اور اس بے زبانی میں ایسی باتیں ہوتیں ہیں جن کے اظہار سے زبان بھی قاصر ہے۔احساسات اور جزبات کی کوئی زبان نہیں اور کوئی زبان اسکو بیان نہیں کرسکتی، یہاں پر مقصد زندگی بیان ہو چکا پر زبان نہیں کُھلی

۲۔ ؎ کیا جانئے موت کیا تھی پہلے اب میری حیات ہوگئی ہے

فرماتے ہیں موت کا بیان مر کے کیا جا سکتا ہے اور مر کے کوئی بول سکا ہے کہ معلوم ہو موت کیا ہے۔ہم تو صرف اُسکا ایک اندازہ لگا سکتے ہیں اور حقیقت سے ناواقف تھے۔لیکن زندگی نے ایسا پلٹا کھایا اور عاشقی کے اُس دور میں داخل ہوئے ہیں لگتا ہے اگر موت آئے گی تو نام رہے گا ورنہ پتہ نہیں آگے کیا ہوگا۔یعنی اب موت ہی ہمیں زندہ رکھ سکتی ہے۔

۳۔ ؎ اس دور میں زندگی بشر کی بیمار کی رات ہوگئی ہے۔

دور = زمانہ (دور حاضر) بشر = بے بس انسان بیمار کی رات = شدت کی کشمکش اور کسمپرسی (کس مہ پُرسی)

شاعر دور حاضر کے حالات میں انسانوں کا حالِ بے بسی بیان فرماتے ہیں۔فرماتے ہیں اس دور میں انسان بے بس اور لاچار سا ہوگیا ہے۔غیر یقینیت اور کش مکش میں مبتلا ہے۔انسان کی زندگی کو بیمار کی رات کے ساتھ متشابہ دی ہے ایک تو بیمار ہے سب سوئے ہیں یہ جاگتا ہے۔اندھیرا ہے درد سے کراہتا، کوئی پوچھنے والا نہیں۔کوئی غمخوار، تیماردار نہیں اور بیماری کی غیر یقینیت۔آیا بیماری شدت پکڑے گی یا آسان ہوگی۔کچھ معلوم نہیں۔ یہی صورت آج کے انسان کی ہے۔کب کیا ہوگا معلوم نہیں۔کبھی امید بندھتی ہے اور کبھی ناامیدی گھیراؤ میں لیتی ہے۔

۴۔ ؎ جس چیز کو چھُو دیا ہے تو نے ایک برگِ نبات ہوگئی ہے

برگ = پتا نبات = پودا

فرماتے ہیں اے میرے محبوب آپ کے ہاتھوں میں طلسمی تاثر ہے۔آپکے چُھونے سے بے جان اشیاء میں جان آئے گی۔برگ نبات یعنی پودوں کے پتوں کی طرح تروتازہ ہوجائیں گے۔اگر نیم مردہ شے ہو تو وہ بھی جی اُٹھے گی۔ایسا جادوئی اثر ہے آپ کے ہاتھوں میں۔

۵۔ ؎ ایک ایک صفت فراقؔ اسکی دیکھا ہے ذات ہوگئی ہے

غزل کے مقطع میں شاعر اپنے آپ سے مخاطب ہو کر فرماتے ہیں کہ اے فراقؔ محبوب کے اوصاف مشخص ہوگئے ہیں۔صفت، صفت ہی نہیں رہا بلکہ ذات بن گیا۔جس طرح ایک پھول کی صفت ہے خوشبو اور پھول ذات۔جب خوشبو ہی پھول نظر آئے تو صفت ذات بن گیا اسی طرح جتنے بھی اوصاف میرے محبوب کے ہیں اگر کسی اور میں بھی ان میں سے کوئی صفت پائی جائے تو ہمیں وہاں معشوق ہی نظر آتا ہے۔

فراقؔ کی غزلیات کے سوالات

۱ غزل نمبر ۱ کے دوسرے شعر میں مسافروں سے کہو۔۔۔۔سے مراد کون سے مسافر ہیں؟

ج) غزل نمبر ۱ کے دوسرے شعر میں مسافروں سے کہو۔۔۔۔۔۔۔۔۔سے مراد جنگ آزادی کے مسافر ہیں شاعر اس شعر میں آزادی کے لئے لڑنے والے مجاہدین کی حوصلہ افزائی کر رہے ہیں۔

۲ دوسری غزل کے مقطع میں احباب کا مجمع ہونے کے باوجود خاموشی کی کیا وجہ بیان کی گئی ہے؟

ج) مقطع میں احباب کا مجمع ہونے کے باوجود خاموشی کی یہ وجہ بیان کی گئی ہے کہ اس وقت محفل میں فراقؔ جیسا قادر الکلام شاعر موجود نہیں ہوگا

۳ اشاروں میں ہونیوالی بات کا شرح حیات ہوجانے سے کیا مراد ہے؟

ج) انسان کی جب کسی سے نظریں ملتی ہیں تو اشاوں اشاروں اور نظروں میں ہی ایک دوسرے کو سمجھنے کی کوشش کی جاتی ہے۔عہد و پیمان باندھے جاتے ہیں۔اور اسی سے ان دونوں کی زندگی ایک دوسرے کے سامنے کھل کر آجاتی ہے۔

۴ فراقؔ کا نوٹ کتاب سے یاد کریں

MATHEMATICS

Chapter 6: Lines and Angles

Lines and Angles

Introduction to line and the terms related to it

- A **line** is a breadthless length which has no end point. Here, AB is a line and it is denoted by $\overleftrightarrow{AB}$.

- A **line segment** is a part of a line which has two end points. Here, AB is a line segment and it is denoted by $\overline{AB}$.

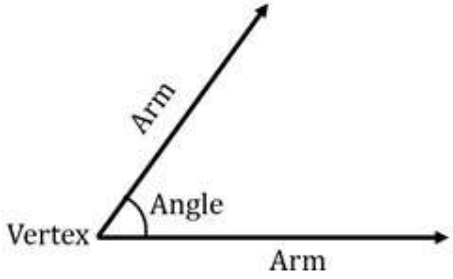
- A **ray** is a part of a line which has only one end point. Here, AB is a ray and it is denoted by $\overrightarrow{AB}$.

Collinear/Non-collinear points

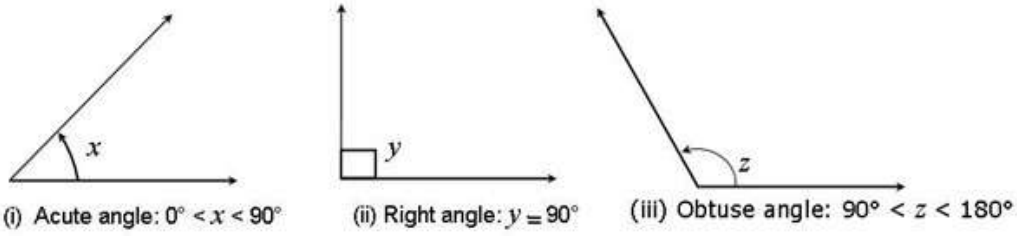
- Three or more points which lie on the same line are called **collinearpoints**.
- Three or more points which do not lie on a straight line are called **non-collinearpoints**.

Introduction to Angle

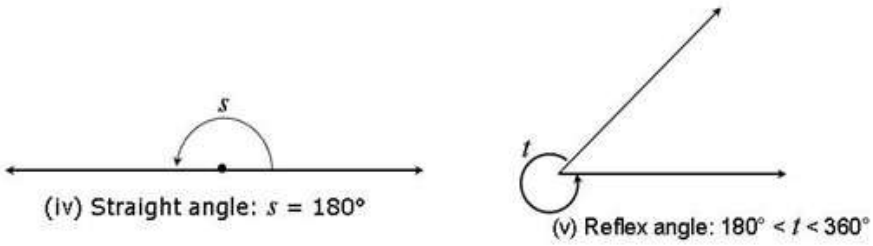
- An **angle** is formed when two rays originate from the same endpoint.
- The rays making an angle are called the **arms** of theangle.
- The end point from where the two rays originate to form an angle is called the **vertex** of theangle.



Types of angles:



(i) Acute angle: $0° < x < 90°$ (ii) Right angle: $y = 90°$ (iii) Obtuse angle: $90° < z < 180°$



(iv) Straight angle: $s = 180°$ (v) Reflex angle: $180° < t < 360°$

Pair of Angles

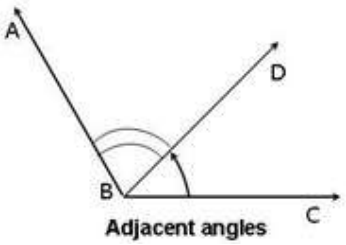
- Two angles whose sum is 90° are called **complementaryangles.**
- Two angles whose sum is 180° are called **supplementaryangles.**

Intersecting and non-intersecting lines

(i) Intersecting lines (ii) Non–intersecting (parallel) lines

Adjacent angles

Two angles are **adjacent**, if they have a common vertex, a common arm and their non–common arms are on different sides of the common arm.

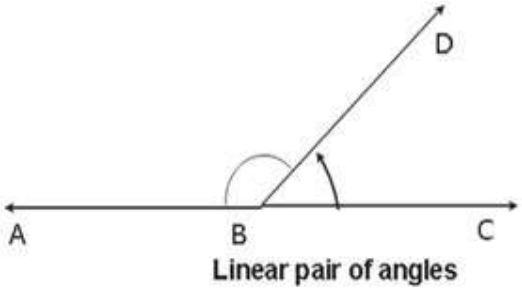


In the figure, $\angle ABD$ and $\angle DBC$ are adjacent angles.

Linear pair of angles

If a ray stands on a line, then the sum of the two adjacent angles so formed is 180° and vice-versa. This property is called as the **linear pair axiom** and the angles are called **linear pair of angles**.

In the figure, $\angle ABD$ and $\angle DBC$ are linear pair of angles i.e.$\angle ABD + \angle DBC = 180°$.

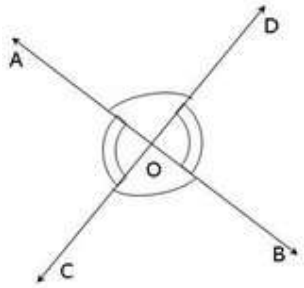


Linear pair of angles

If the sum of two adjacent angles is 180°, then the non-common arms of the angles form a line.

Vertically opposite angles

- The **vertically opposite angles** formed when two lines intersect eachother.
- There are two pairs of vertically opposite angles in the given figure and they are $\angle AOD$and$\angle BOC$, $\angle AOC$ and $\angle BOD$.

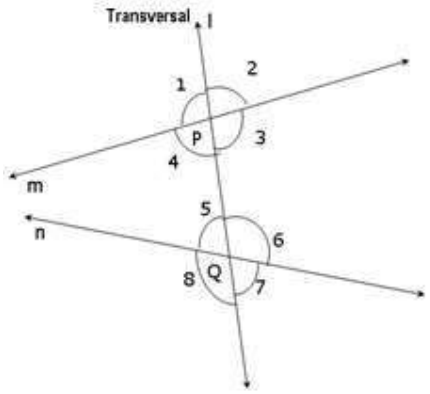


If two lines intersect each other, then the **vertically opposite angles areequal**.

Transversal

A line which intersects two or more lines at distinct points is called a **transversal**.

Pair of angles when a transversal intersects two lines



- **Corresponding angles:**

a) $\angle 1$ and $\angle 5$

b) $\angle 2$ and $\angle 6$

c) $\angle 4$ and $\angle 8$

d) $\angle 3$ and $\angle 7$

- **Alternate interiorangles:**

a) $\angle 4$ and $\angle 6$

b) $\angle 3$ and $\angle 5$

- **Alternate exteriorangles:**

a) $\angle 1$ and $\angle 7$

b) $\angle 2$ and $\angle 8$

- Interior angles on the same side of the transversal are referred as co-interior angles/ allied angles/ consecutive interior angles and theyare:

a) $\angle 4$ and $\angle 5$

b) $\angle 3$ and $\angle 6$

If a transversal intersects two parallel lines,then

- Each pair of **corresponding angles areequal**.
- Each pair of **alternate interior angles areequal**.
- Each pair of interior angles on the same side of the transversal aresupplementary.

If a transversal intersects twolines

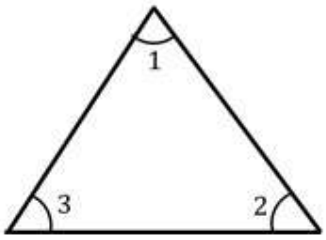
- Such that a pair of **corresponding angles** is equal, then the two **lines areparallel**.
- Such that a pair of **alternate interior angles** is equal, then the two **lines areparallel**.
- Such that a pair of **interior angles** on the same side of the transversal issupplementary, then the two **lines areparallel**.
- Such that the bisectors of a pair of **corresponding angles** are parallel, then the two**lines are parallel**.

Lines parallel to the same line

Two lines which are parallel to the same line are parallel to each other. This holds for more than two lines also i.e. if two or more lines are parallel to the same line then they will be parallel to each other.

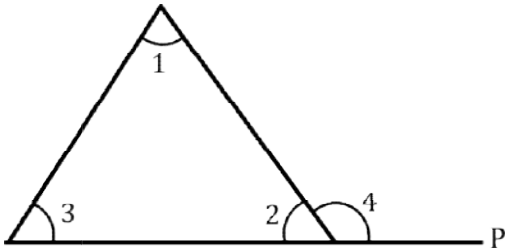
Angle sum property of atriangle

- The sum of the angles of a triangle is 180°. This is known as the **angle sum property of atriangle**.



Here, $\angle 1 + \angle 2 + \angle 3 = 180°$.

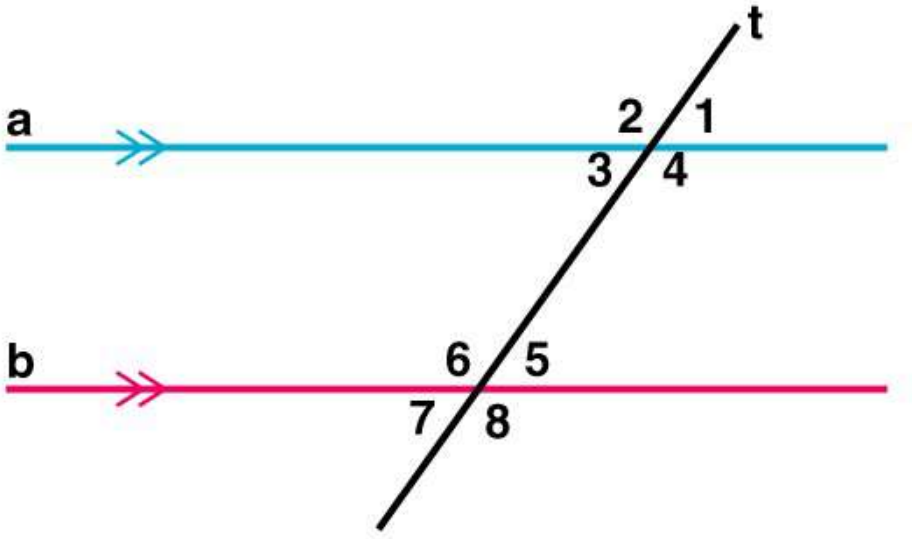
- If a side of a triangle is produced, then the exterior angle so formed is equal to the sum of the two interior opposite angles. This is known as the **exterior angleproperty of atriangle**.



Here, $\angle 4 = \angle 1 + \angle 3$.

- An exterior angle of a triangle is greater than either of its interior opposite angles. Intheabovefigure,$\angle 4 > \angle 1 \; and \; \angle 4 > \angle 3$.

Parallel lines with a transversal



- ∠1 = ∠5, ∠2 = ∠6, ∠4 = ∠8 and ∠3 = ∠7 (Corresponding angles)
- ∠3 = ∠5, ∠4 = ∠6 (Alternate interior angles)
- ∠1 = ∠7, ∠2 = ∠8 (Alternate exterior angles)

Angles and types of angles

When 2 rays originate from the same point at different directions, they form an angle.

The rays are called arms and the common point is called the vertex

Types of angles:

- Acute angle $0^\circ<a<90^\circ$
- Right angle $a=90^\circ$
- Obtuse angle: $90^\circ<a<180^\circ$
- Straight angle $=180^\circ$
- Reflex Angle $180^\circ<a<360^\circ$
- Angles that add up to 90° are complementary angles
- Angles that add up to 180° are called supplementary angles.

Intersecting Lines and Associated Angles

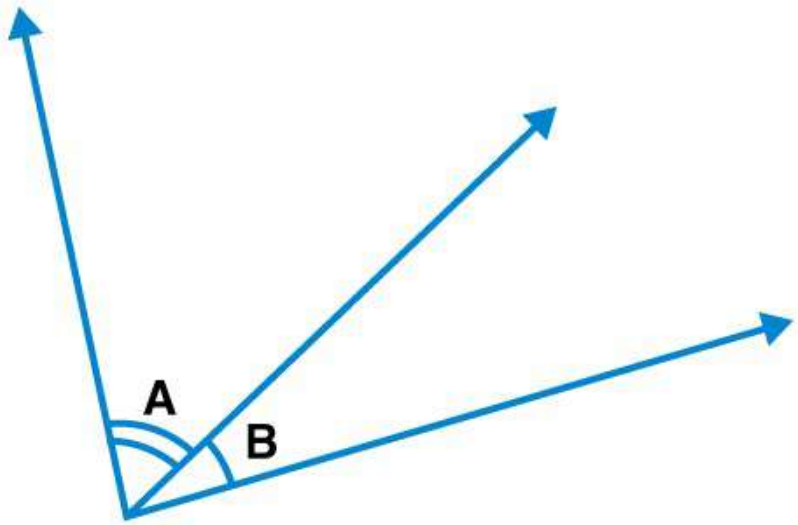
Intersecting and Non-Intersecting lines

When 2 lines meet at a point they are called intersecting

When 2 lines never meet at a point, they are called non-intersecting or parallel lines

Adjacent angles

2 angles are adjacent if they have the same vertex and one common point.



Linear Pair

When 2 adjacent angles are supplementary, i.e they form a straight line (add up to 180∘), they are called a linear pair.

Vertically opposite angles

When two lines intersect at a point, they form equal angles that are vertically opposite to each other.

Basic Properties of a Triangle

All the properties of a triangle are based on its sides and angles. By the definition of triangle, we know that it is a closed polygon that consists of three sides and three vertices. Also, the sum of all three internal angles of a triangle equal to 180°.

Depending upon the length of sides and measure of angles, the triangles are classified into different types of triangles.

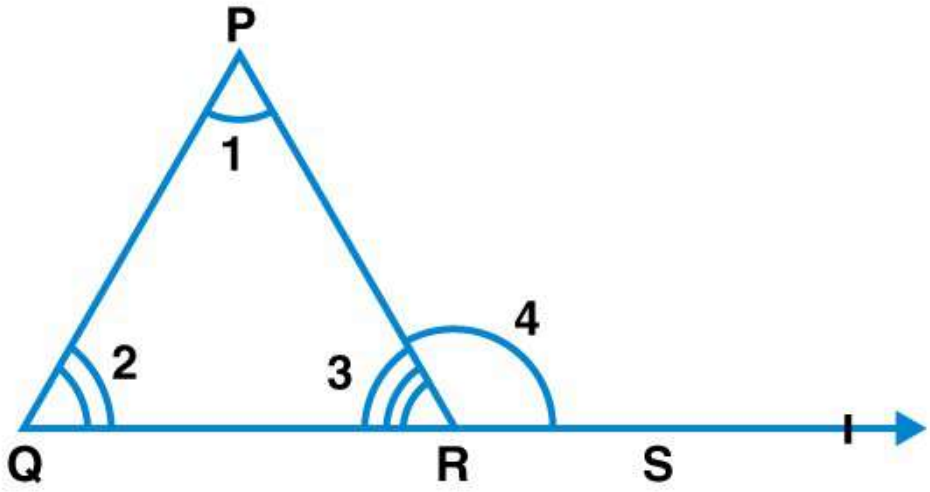
In the beginning, we start from understanding the shape of triangles, its types and properties, theorems based on it such as Pythagoras theorem, etc. In higher classes, we deal with trigonometry, where the right-angled triangle is the base of the concept. Let us learn here some of the fundamentals of the triangle by knowing its properties.

Triangle and sum of its internal angles

Sum of all angles of a triangle add up to 180∘

An exterior angle of a triangle = sum of opposite internal angles

– If a side of a triangle is produced, then the exterior angle so formed is equal to the sum of the two interior opposite angles



– ∠4=∠1+∠2

Types of Triangle

Based on the Sides	Based on the Angles
Scalene Triangle	Acute angled Triangle
Isosceles Triangle	Right angle Triangle
Equilateral Triangle	Obtuse-angled Triangle

So before, discussing the properties of triangles, let us discuss types of triangles given above.

Scalene Triangle: All the sides and angles are unequal.

Isosceles Triangle: It has two equal sides. Also, the angles opposite these equal sides are equal.

Equilateral Triangle: All the sides are equal and all the three angles equal to 60°.

Acute Angled Triangle: A triangle having all its angles less than 90°.

Right Angled Triangle: A triangle having one of the three angles exactly 90°.

Obtuse Angled Triangle: A triangle having one of the three angles more than 90°.

Triangle Formula

- Area of a triangle is the region occupied by a triangle in a two-dimensional plane. The dimension of the area is square units. The formula for area is given by;

  Area = 1/2 x Base x Height

- The perimeter of a triangle is the length of the outer boundary of a triangle. To find the perimeter of a triangle we need to add the length of the sides of the triangle.

  $P = a + b + c$

- Semi-perimeter of a triangle is half of the perimeter of the triangle. It is represented by s.

  $s = (a + b + c)/2$

  where a, b and c are the sides of the triangle.

- By Heron's formula, the area of the triangle is given by:

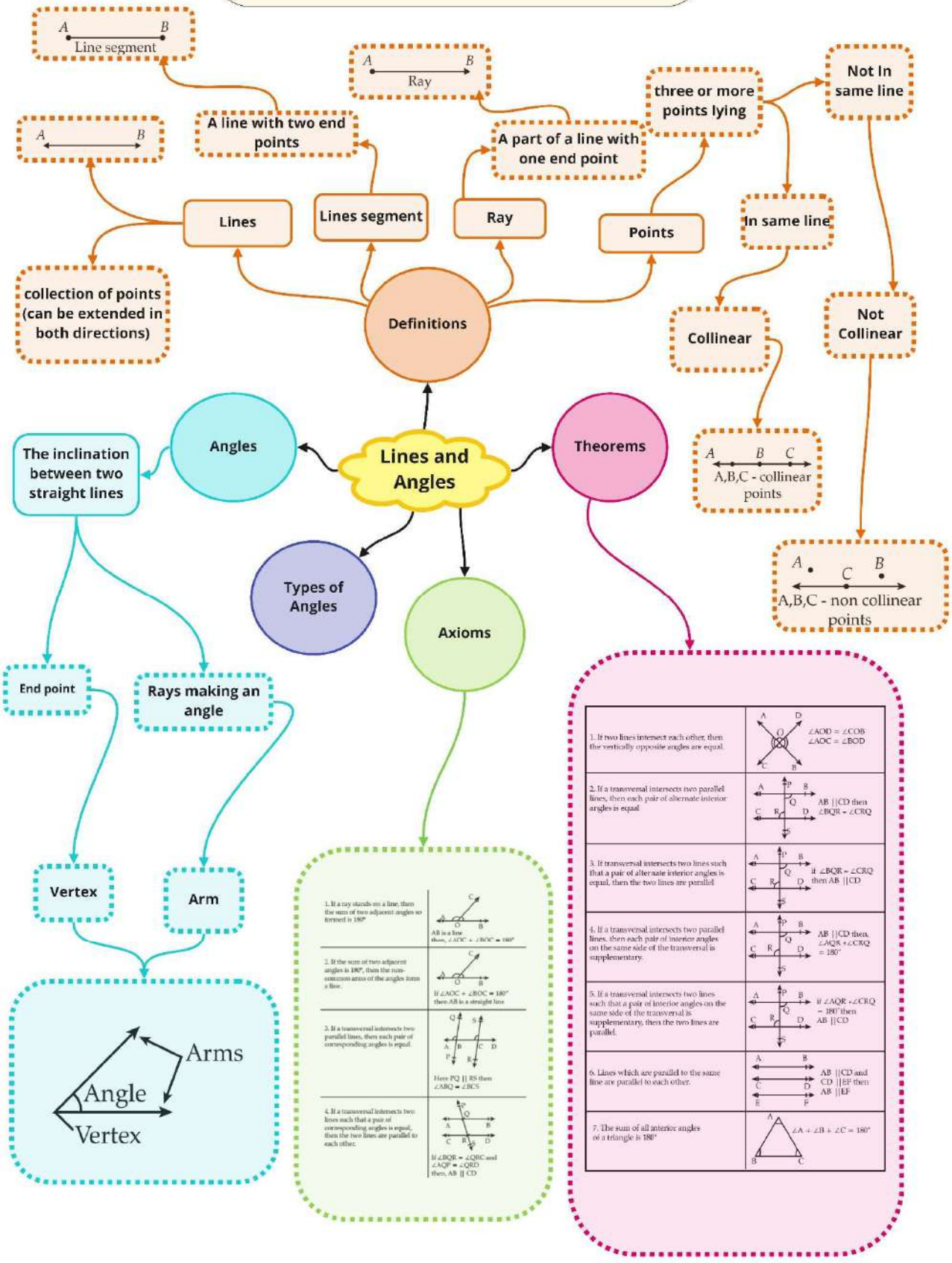
  $A = \sqrt{[s(s – a)(s – b)(s – c)]}$

  where 's' is the semi-perimeter of the triangle.

- By the Pythagorean theorem, the hypotenuse of a right-angled triangle can be calculated by the formula:

  $\text{Hypotenuse}^2 = \text{Base}^2 + \text{Perpendicular}^2$

Class : 9th mathematics
Chapter- 6: Lines and Angles



Important Questions

Multiple Choice Questions-

Question 1. In a right-angled triangle where angle A = 90° and AB = AC. What are the values of angle B?

(a) 45°

(b) 35°

(c) 75°

(d) 65°

Question 2. In a triangle ABC if ∠A = 53° and ∠C = 44° then the value of ∠B is:

(a) 46°

(b) 83°

(c) 93°

(d) 73°

Question 3. Given four points such that no three of them are collinear, then the number of lines that can be drawn through them are:

(a) 4 lines

(b) 8 lines

(c) 6 lines

(d) 2 lines

Question 4. If one angle of triangle is equal to the sum of the other two angles then triangle is:

(a) Acute triangle

(b) Obtuse triangle

(c) Right triangle

(d) None of these

Question 5. How many degrees are there in an angle which equals one-fifth of its supplement?

(a) 15°

(b) 30°

(c) 75°

(d) 150°

Question 6. Sum of the measure of an angle and its vertically opposite angle is always.

(a) Zero

(b) Thrice the measure of the original angle

(c) Double the measure of the original angle

(d) Equal to the measure of the original angle

Question 7. If two parallel lines are cut by a transversal, then the pairs of corresponding angles are congruent.

(a) Equal

(b) Complementary

(c) Supplementary

(d) corresponding

Question 8. The bisectors of the base angles of an isosceles triangle ABC, with AB = AC, meet at O. If ∠B = ∠C = 50Â°. What is the measure of angle O?

(a) 120°

(b) 130°

(c) 80°

(d) 150°

Question 9. The angles of a triangle are in the ratio 2 : 3 : 4. The angles, in order, are :

(a) 80°, 40°, 60°

(b) 20°, 60°, 80°

(c) 40°, 60°, 80°

(d) 60°, 40°, 80°

Question 10. An acute angle is:

(a) More than 90 degrees

(b) Less than 90 degrees

(c) Equal to 90 degrees

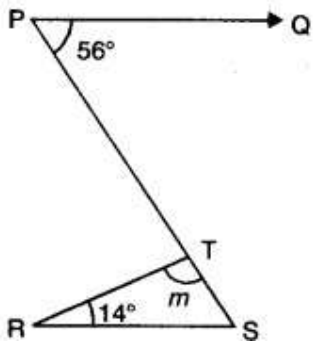
(d) Equal to 180 degrees

Very Short:

1.If an angle is half of its complementary angle, then find its degree measure.

2.The two complementary angles are in the ratio 1 : 5. Find the measures of the angles.

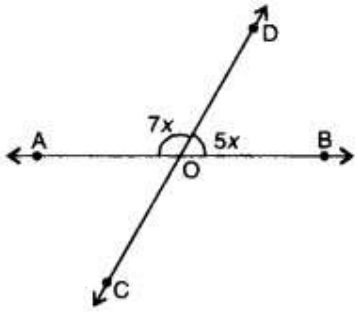
3. In the given figure, if PQ || RS, then find the measure of angle m.



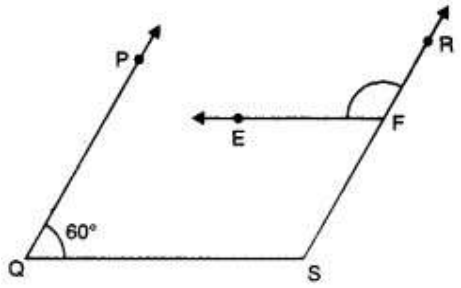
4.If an angle is 14o more than its complement, then find its measure.

5.If AB || EF and EF || CD, then find the value of x.

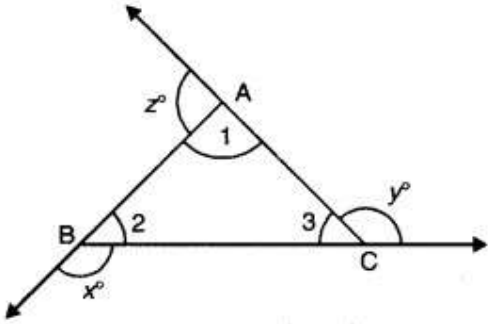
6.In the given figure, lines AB and CD intersect at O. Find the value of x.



7.In the given figure, PQ || RS and EF || QS. If ∠PQS = 60°, then find the measure of ∠RFE.

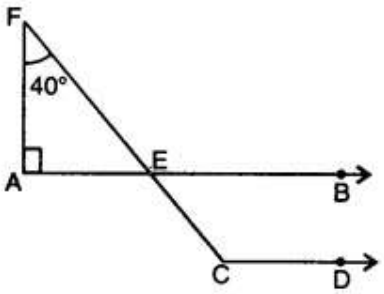


8.In the given figure, if x°, y° and z° are exterior angles of ΔABC, then find the value of x° + y° + z°.

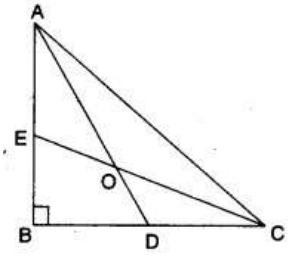


Short Questions:

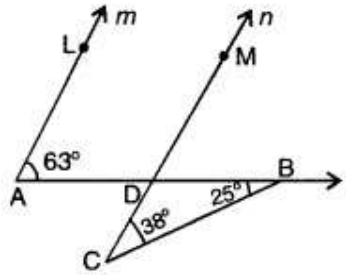
1. In the given figure, AB || CD, ∠FAE = 90°, ∠AFE = 40°, find ∠ECD.



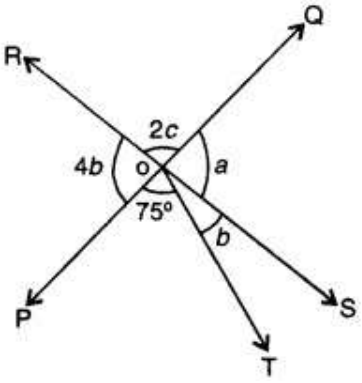
2. In the fig., AD and CE are the angle bisectors of ∠A and ∠C respectively. If ∠ABC = 90°, then find ∠AOC.



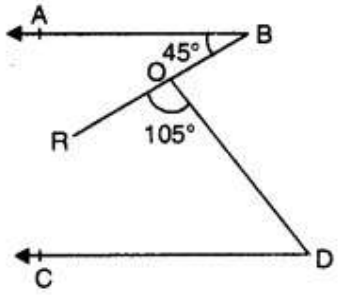
3. In the given figure, prove that m || n.



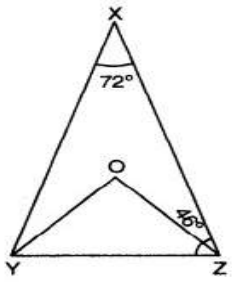
4. In the given figure, two straight lines PQ and RS intersect each other at O. If ∠POT = 75°, find the values of a, b, c.



5. In figure, if AB || CD. If ∠ABR = 45° and ∠ROD = 105°, then find ∠ODC.

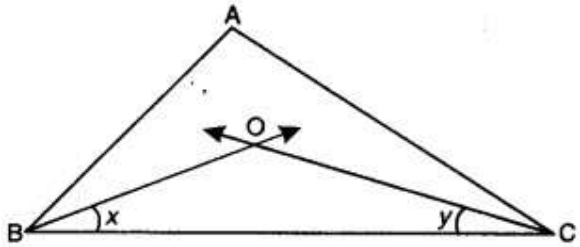


6. In the figure, ∠X = 72°, ∠XZY = 46°. If YO and ZO are bisectors of ∠XYZ and ∠XZY respectively of ΔXYZ, find ∠OYZ and ∠YOZ.

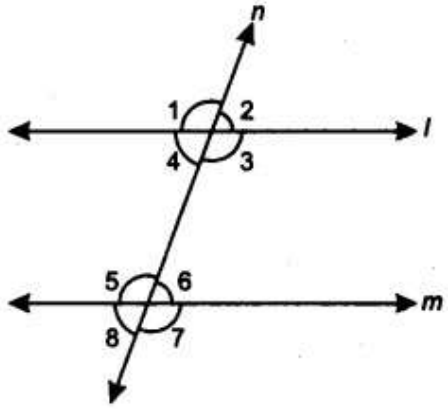


Long Questions:

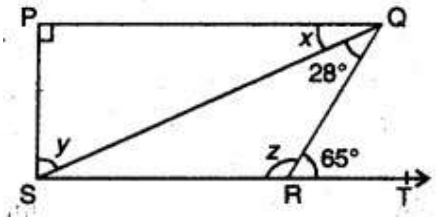
1. If two parallel lines are intersected by a transversal, prove that the bisectors of two pairs of interior angles form a rectangle.
2. If in ΔABC, the bisectors of ∠B and ∠C intersect each other at O. Prove that ∠BOC = $90°\frac{1}{2} < A$



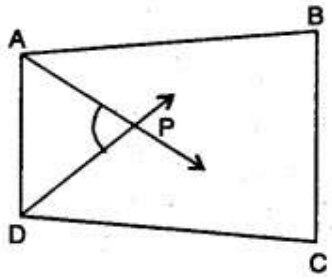
3. In figure, if l || m and ∠1 = (2x + y)°, ∠4 = (x + 2y)° and ∠6 = (3y + 20)°. Find ∠7 and ∠8.



4. In the given figure, if PQ ⊥ PS, PQ || SR, ∠SQR = 28o and ∠QRT = 65°. Find



5. In figure, AP and DP are bisectors of two adjacent angles A and D of a quadrilateral ABCD. Prove that $2\angle APD = \angle B + \angle C$.



Assertion and Reason Questions-

1. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

Assertion: Two adjacent angles always form a linear pair..

Reason: In a linear pair of angles two non-common arms are opposite rays.

2. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

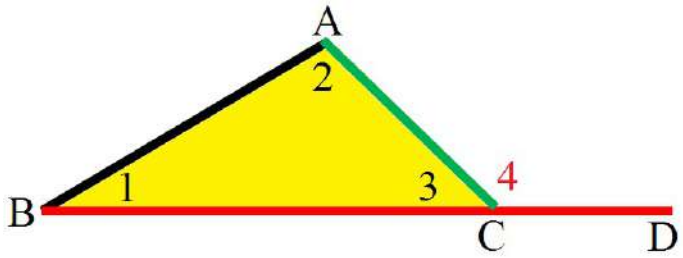
d) Assertion is wrong statement but reason is correct statement.

Assertion: A triangle can have tow obtuse angles.

Reason: Sum of the three angles in a triangle is always 180°.

Case Study Questions-

1. Read the Source/ Text given below and answer these questions:



Ashok is studying in 9th class in Govt School, Chhatarpur. Once he was at his home and was doing his geometry homework. He was trying to measure three angles of a triangle using the Dee, but his dee was old and his Dee's numbers were erased and the lines on the dee were visible. Let us help Ashok to find the angles of the triangle. He found that the second angle of the triangle was three times as large as the first. The measure of the third angle is double of the first angle.

Now answer the following questions:

i. What was the value of the first angle?

a. 30°
b. 45°
c. 60°
d. 90°

ii. What was the value of the third angle?

a. 30°
b. 45°
c. 60°
d. 90°

iii. What was the value of the second angle?

a. 30°
b. 45°
c. 60°
d. 90°

iv. What was the value of ∠4∠4 as shown the figure?

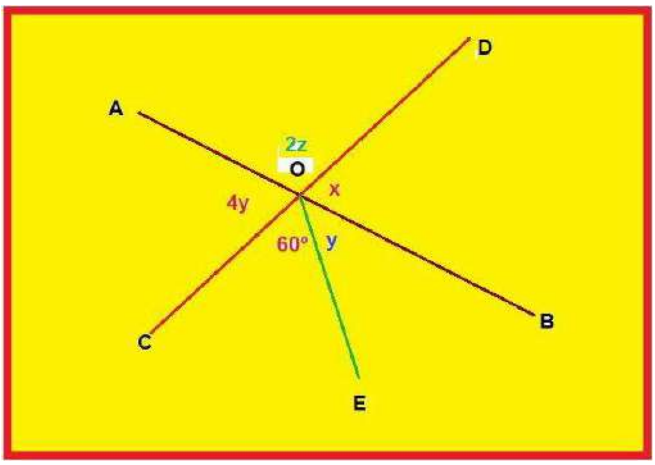
a. 120°
b. 45°
c. 60°
d. 90°

v. What was the sum of all three angles measured by Ashok using Dee?

a. 270°
b. 180°
c. 100°
d. 90°

2. Read the Source/ Text given below and answer any four questions:

Maths teacher draws a straight line AB shown on the blackboard as per the following figure.



i. Now he told Raju to draw another line CD as in the figure.
ii. The teacher told Ajay to mark ∠AOD as 2z.
iii. Suraj was told to mark ∠AOC as 4y.
iv. Clive Made and angle ∠COE=60∘.
v. Peter marked ∠BOE and ∠BOD as y and x respectively.

Now answer the following questions:

i. What is the value of x?

a. 48°
b. 96°
c. 100°
d. 120°

ii. What is the value of y?

a. 48°
b. 96°
c. 100°
d. 24°

iii. What is the value of z?

a. 48°
b. 96°
c. 42°
d. 120°

iv. What should be the value of x + 2z?

a. 148°
b. 360°
c. 180°
d. 120°

v. What is the relation between y and z?

a. $2y + z = 90°$
b. $2y + z = 180°$
c. $4y + 2z = 120°$
d. $y = 2z$

Answer Key:

MCQ:

1. (a) 45°
2. (b) 83°
3. (c)6 lines
4. (c) Right triangle
5. (b) 30°
6. (c) Double the measure of the original angle
7. (d) Corresponding
8. (b) 130°
9. (c) 40°, 60°, 80°
10. (b) Less than 90 degrees

Very Short Answer:

1. Let the required angle be x

   ∴ Its complement = 90°- x

   Now, according to given statement, we obtain

   $x = \frac{1}{2}(90° - x)$

   $\Rightarrow 2x = 90° - x$

   $\Rightarrow 3x = 90°$

   $\Rightarrow x = 30°$

   Hence, the required angle is 30°.

2. Let the two complementary angles be x and 5x.

   $\therefore x + 5x = 90°$

   $\Rightarrow 6x = 90°$

   $\Rightarrow x = 15°$

3. Here, PQ || RS, PS is a transversal.

   $\Rightarrow \angle PSR = \angle SPQ = 56°$

   Also, $\angle TPS + m + \angle TSP = 180°$

$14° + m + 56° = 180°$

$\Rightarrow m = 180° - 14 - 56 = 110°$

4. Let the required angle be x

$\therefore$ Its complement $= 90° - x$

Now, according to given statement, we obtain

$x = 90° - x + 14°$

$\Rightarrow 2x = 104°$

$\Rightarrow x = 52°$

Hence, the required angle is 52o.

5.Since EF || CD $\therefore y + 150° = 180°$

$\Rightarrow y = 180° - 150° = 30°$

Now, $\angle BCD = \angle ABC$

$x + y = 70°$

$x + 30 = 70$

$\Rightarrow x = 70° - 30° = 40°$

Hence, the value of x is 40°

6. Here, lines AB and CD intersect at O.

$\therefore \angle AOD$ and $\angle BOD$ forming a linear pair

$\Rightarrow \angle AOD + \angle BOD = 180°$

$\Rightarrow 7x + 5x = 180°$

$\Rightarrow 12x = 180°$

$\Rightarrow x = 15°$

7.Since PQ || RS

$\therefore \angle PQS + \angle QSR = 180°$

$\Rightarrow 60° + \angle QSR = 180°$

$\Rightarrow \angle QSR = 120°$

Now, EF || QS

$\Rightarrow \angle RFE = \angle QSR$ [corresponding $\angle$s]

$\Rightarrow \angle RFE = 120°$

8.We know that an exterior angle of a triangle is equal to sum of two opposite interior angles.

$\Rightarrow x° = \angle 1 + \angle 3$

$\Rightarrow y° = \angle 2 + \angle 1$

$\Rightarrow z^\circ = \angle 3 + \angle 2$

Adding all these, we have

$x^\circ + y^\circ + z^\circ = 2(\angle 1 + \angle 2 + \angle 3)$

$= 2 \times 180^\circ$

$= 360^\circ$

Short Answer:

Ans: 1. In AFAE,

ext. $\angle FEB = \angle A + F$

$= 90^\circ + 40^\circ = 130^\circ$

Since AB || CD

$\therefore \angle ECD = FEB = 130^\circ$

Hence, $\angle ECD = 130^\circ$.

Ans: 2. ∵ AD and CE are the bisector of ∠A and ∠C

$$\therefore \quad \angle OAC = \frac{1}{2}\angle A \text{ and}$$

$$\angle OCA = \frac{1}{2}\angle C$$

$$\Rightarrow \quad \angle OAC + \angle OCA = \frac{1}{2}(\angle A + \angle C)$$

$$= \frac{1}{2}(180^\circ - \angle B) \quad [\because \angle A + \angle B + \angle C = 180^\circ]$$

$$= \frac{1}{2}(180^\circ - 90^\circ] \qquad [\because \angle ABC = 90^\circ]$$

$$= \frac{1}{2} \times 90^\circ = 45^\circ$$

In ΔAOC,

$\angle AOC + \angle OAC + \angle OCA = 180^\circ$

$\Rightarrow \angle AOC + 45o = 180^\circ$

$\Rightarrow \angle AOC = 180^\circ - 45^\circ = 135^\circ$

Ans: 3. In ΔBCD,

ext. $\angle BDM = \angle C + \angle B$

$= 38^\circ + 25^\circ = 63^\circ$

Now, $\angle LAD = \angle MDB = 63^\circ$

But these are corresponding angles.

Hence, m || n

Ans: 4 Here, $4b + 75^\circ + b = 180^\circ$ [a straight angle]

5b = 180° – 75° = 105°

$b - \frac{105^\circ}{5} = 21^\circ$

∴ a = 4b = 4 × 21° = 84° (vertically opp. ∠s]

Again, 2c + a = 180° [a linear pair]

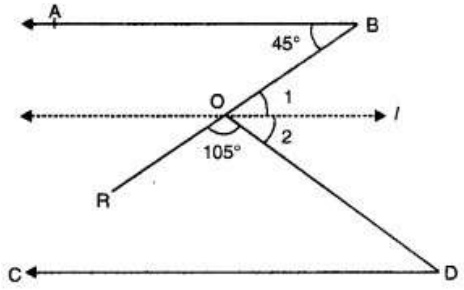
⇒ 2c + 84° = 180°

⇒ 2c = 96°

$\Rightarrow c = \frac{96^\circ}{2} = 48^\circ$

Hence, the values of a, b and c are a = 84°, b = 21° and c = 48°.

Ans: 5.



Through O, draw a line 'l' parallel to AB.

⇒ line I will also parallel to CD, then

∠1 = 45°[alternate int. angles]

∠1 + ∠2 + 105° = 180° [straight angle]

∠2 = 180°– 105°– 45°

⇒∠2 = 30°

Now, ∠ODC = ∠2 [alternate int. angles]

= ∠ODC = 30°

Ans: 6. In ΔXYZ, we have

∠X + XY + ∠Z = 180°

⇒∠Y + ∠Z = 180°–∠X

⇒∠Y + ∠Z = 180° – 72°

⇒ Y + ∠Z = 108°

$\Rightarrow \frac{1}{2}\angle Y + \frac{1}{2}\angle Z = \frac{1}{2} \times 108^\circ$

∠OYZ + ∠OZY = 54°

[∵ YO and ZO are the bisector of ∠XYZ and ∠XZY]

$\Rightarrow \angle OYZ + \frac{1}{2} \times 46^\circ = 54^\circ$

$\angle OYZ + 23° = 54°$

$\Rightarrow \angle OYZ = 549 - 23° = 31°$

In ΔYOZ, we have

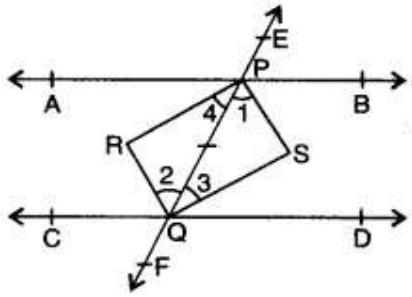
$\angle YOZ = 180° - (\angle OYZ + \angle OZY)$

$= 180° - (31° + 23°)\ 180° - 54° = 126°$

Long Answer:

Ans: 1.Given: AB || CD and transversal EF cut them at P and Q respectively and the bisectors of

pair of interior angles form a quadrilateral PRQS



To Prove: PRQS is a rectangle.

Proof: ∵ PS, QR, QS and PR are the bisectors of angles

$\angle BPQ$, $\angle CQP$, $\angle DQP$ and $\angle APQ$ respectively.

$\therefore \angle 1 = \frac{1}{2}\angle BPQ, \angle 2 = \frac{1}{2}\angle CQP,$

$\angle 3 = \frac{1}{2}\angle DQP$ and $\angle 4 = \frac{1}{2}\angle APQ$

Now, AB || CD and EF is a transversal

$\therefore \angle BPQ = \angle CQP$

$\Rightarrow \angle 1 = \angle 2 \left(\because \angle 1\ \frac{1}{2}\angle BPQ \text{ and } \angle 2 = \frac{1}{2}\angle QP\right)$

But these are pairs of alternate interior angles of PS and QR

$\therefore$ PS || QR

Similarly, we can prove $\angle 3 = \angle 4$ = QS || PR

$\therefore$ PRQS is a parallelogram.

Further $\angle 1 + \angle 3 = \frac{1}{2}\angle BPQ + \frac{1}{2}\angle DQP = \frac{1}{2}(\angle BPQ + \angle DQP)$

$= \frac{1}{2} \times 180° = 90° (\because \angle BPQ + \angle DQP = 180°)$

$\therefore$ In ΔPSQ, we have $\angle PSQ = 180° - (\angle 1 + \angle 3) = 180° - 90° = 90°$

Thus, PRRS is a parallelogram whose one angle $\angle PSQ = 90°$.

Hence, PRQS is a rectangle.

Ans: 2. Let $\angle B = 2x$ and $\angle C = 2v$

∵OB and OC bisect ∠B and ∠C respectively.

$\angle OBC = \frac{1}{2}\angle B = \frac{1}{2} \times 2x = x$

and $\angle OCB = \frac{1}{2}\angle C = \frac{1}{2} \times 2y = y$

Now, in ΔBOC, we have

$\angle BOC + \angle OBC + \angle OCB = 180°$

$\Rightarrow \angle BOC + x + y = 180°$

$\Rightarrow \angle BOC = 180° - (x + y)$

Now, in ΔABC, we have

$\angle A + 2B + C = 180°$

$\Rightarrow \angle A + 2x + 2y = 180°$

$\Rightarrow 2(x + y) = \frac{1}{2}(180° - \angle A)$

$\Rightarrow x + y = 90° - \frac{1}{2}\angle A$ .....(ii)

From (i) and (ii), we have

$\angle BOC = 180° - (90° - \frac{1}{2}\angle A) = 90° + \frac{1}{2}\angle A$

Ans: 3. Here, ∠1 and ∠4 are forming a linear pair

∠1 + ∠4 = 180°

(2x + y)° + (x + 2y)° = 180°

3(x + y)° = 180°

x + y = 60

Since l || m and n is a transversal

∠4 = ∠6

(x + 2y)° = (3y + 20)°

x - y = 20

Adding (i) and (ii), we have

2x = 80 = x = 40

From (i), we have

40 + y = 60 ⇒ y = 20

Now, ∠1 = (2 x 40 + 20)° = 100°

∠4 = (40 + 2 x 20)° = 80°

∠8 = ∠4 = 80° [corresponding ∠s]

∠1 = ∠3 = 100° [vertically opp. ∠s]

∠7 = ∠3 = 100° [corresponding ∠s]

Hence, ∠7 = 100° and ∠8 = 80°

Ans: 4. Here, PQ || SR .

⇒∠PQR = ∠QRT

⇒ x + 28° = 65°

⇒ x = 65°- 28° = 37°

Now, in it. ΔSPQ, ∠P = 90°

∴∠P + x + y = 180° [angle sum property]

∴ 90° + 37° + y = 180°

⇒ y = 180°– 90°- 37° = 53°

Now, ∠SRQ + ∠QRT = 180° [linear pair]

z + 65° = 180°

z = 180° - 65° = 115°

Ans: 5. In quadrilateral ABCD, we have

∠A + ∠B.+ ∠C + ∠D = 360°

$$\Rightarrow \frac{1}{2}\angle A + \frac{1}{2}\angle B + \frac{1}{2}\angle C + \frac{1}{2}\angle D = \frac{1}{2} \times 360^\circ$$

$$\Rightarrow \frac{1}{2}\angle A + \frac{1}{2}\angle D = 180^\circ - \frac{1}{2}(\angle B + \angle C)$$

As, AP and DP are the bisectors of ∠A and ∠D

$$\therefore \quad \angle PAD = \frac{1}{2}\angle A$$

$$\text{and} \quad \angle PDA = \frac{1}{2}\angle D$$

$$\text{Now,} \quad \angle PAD + \angle PDA = 180^\circ - \frac{1}{2}(\angle B + \angle C) \qquad ...(i)$$

In ΔAPD, we have

$$\angle APD + \angle PAD + \angle PDA = 180^\circ$$

$$\Rightarrow \angle APD + 180^\circ - \frac{1}{2}(\angle B + \angle C) = 180^\circ \qquad \text{[using } (i)\text{]}$$

$$\Rightarrow \angle APD = \frac{1}{2}(\angle B + \angle C)$$

$$\Rightarrow 2\angle APD = \angle B + \angle C$$

Assertion and Reason Answers-

1. d) Assertion is wrong statement but reason is correct statement.

Explanation:

Linear pair

Adjacent angles with opposite rays as noncommon arms are called the linear pair.

Hence **Reason is True.**

Two adjacent angles form a linear pair if non common arms are opposite rays.

If non common sides are not opposite rays then adjacent angles does not form a linear pair.

Hence Assertion "Two adjacent angles always form a linear pair" is False

For example two adjacent angles which are complementary forms a right angle not a linear pair.

2. d) Assertion is wrong statement but reason is correct statement.

Explanation:

ASSERTION : A triangle can have two obtuse angles.

Obtuse angle are the angles whos measure are between 90° and 180°

If a triangle has two obtuse angles then sum of those two angles will be

between (90° + 90°) and (180° + 180°) = between 180° and 360°

Hence sum of all the angles of triangle would be greater than 180°

But Sum of all the angles of a triangle is 180°

Hence This is not possible

so Assertion is FALSE

REASON : The sum of all the interior angles of a triangle is 180°

TRUE

Case Study Answers-

1.

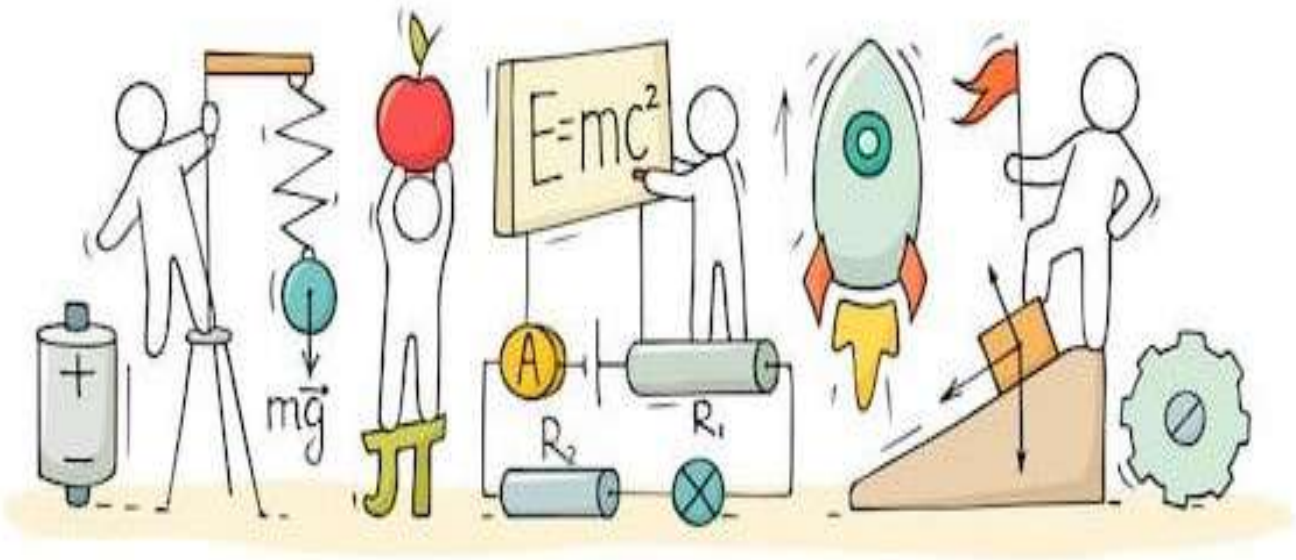
(i)	(a)	30°
(ii)	(c)	60°
(iii)	(d)	90°
(iv)	(a)	120°
(v)	(b)	180°

2.

(i)	(b)	96°
(ii)	(d)	24°
(iii)	(c)	42°
(iv)	(c)	180°
(v)	(a)	2y + z = 90°

PHYSICS

Chapter 7: Motion



Motion

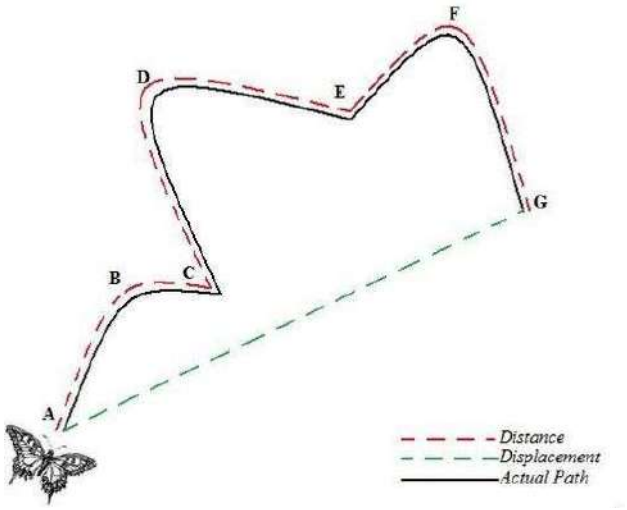
- To describe the position of an object we need a reference point or origin. An object may seem to be moving to one observer and stationary to another.
- Example: A passenger inside a bus sees the other passengers to be at rest, whereas an observer outside the bus sees the passengers to be in motion.
- In order to make observations easy, a convention or a common reference point or frame is needed. All objects must be in the same reference frame.

Rest and Motion

- If the position of an object does not change as time passes, then it is said to be at **rest**. If the position of an object changes as time passes, then it is said to be in**motion**.
- An object can be at rest with respect to one thing and in motion with respect to some other thing at the same time. So, the states of **rest and motion are relative**only.
- Tolocatethepositionofanobject,wehavetochoosesomesuitable**referencepoint**calledthe **origin**.

Distance and Displacement

- The **distance** travelled by an object is the length of the actual path traversed by the object during motion. It is a **scalar**quantity.
- The **displacement** of an object in motion is the shortest distance between the initial position and the final position of the object. It is a **vector**quantity.



- The distance travelled by an object in motion can never be zero ornegative.
- The displacement of an object can be positive, zero or negative. Never can the distance travelled be less than thedisplacement.
- Both distance and displacement have the sameunits.

Magnitude

- Magnitude is the size or extent of a physical quantity. In physics, we have scalar and vector quantities.
- Scalar quantities are only expressed as magnitude. E.g.: time, distance, mass, temperature, area, volume
- Vector quantities are expressed in magnitude as well as the direction of the object. E.g: Velocity, displacement, weight, momentum, force, acceleration, etc.

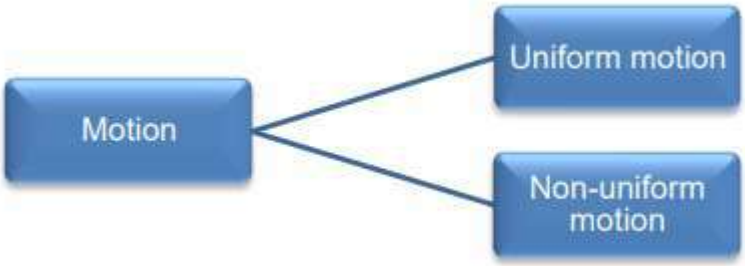
Time and speed

Time is the duration of an event that is expressed in seconds. Most physical phenomena occur with respect to time. It is a scalar quantity.

Speed is the rate of change of distance. If a body covers a certain distance in a certain amount of time, its speed is given by

$$Speed = \frac{Distance}{Time}$$

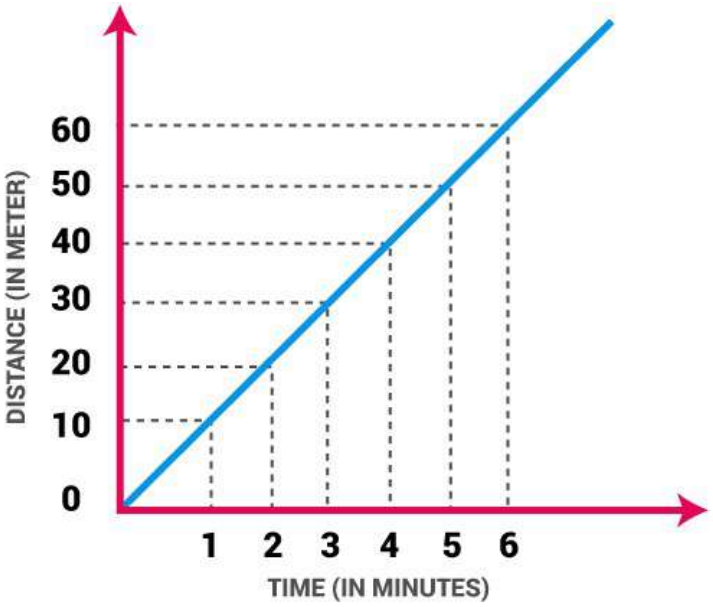
Uniform and Non-uniform Motion



- An object is said to be in **uniform motion** if it travels equal distances in equal intervals of time, howsoever small the intervals maybe.
- An object is said to have **non-uniform motion** if it travels unequal distances in equal intervals oftime.

Uniform Motion:

Definition: This type of motion is defined as the motion of an object in which the object travels in a straight line and its velocity remains constant along that line as it covers equal distances in equal intervals of time, irrespective of the duration of the time.



If a body is involved in rectilinear motion and the motion is consistent, then the acceleration of the body must be zero.

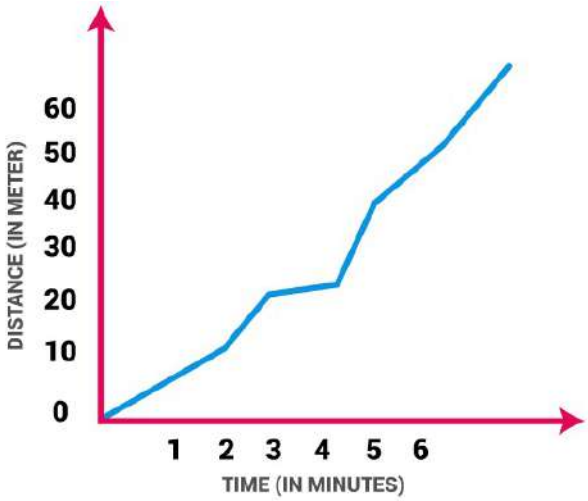
Example of Uniform Motion:

If the speed of a car is 10 m/s, it means that the car covers 10 meters in one second. The speed is constant in every second.

Movement of blades of a ceiling fan.

Non Uniform Motion:

Definition: This type of motion is defined as the motion of an object in which the object travels with varied speed and it does not cover same distance in equal time intervals, irrespective of the time interval duration.



Speed

Speedofabodyisdefinedasthedistancetravelledbythebodyinunittime.TheSIunitofspeedis

metre/second (m/s

$$\text{Speed} = \frac{\text{Distance travelled}}{\text{Time taken}}$$

- If 's' is the distance travelled by a body in time 't', then its speed 'v' ' is given as v = s\t
- Speed of a body is a scalar quantity. It can be zero or positive but can never be negative.
- If a body covers equal distances in equal time intervals, howsoever small the intervals may be, then it is said to have uniform speed (or constant speed).
- If a body covers unequal distances in equal time intervals, however small the intervals may be, then it is said to have non-uniform speed (or variable speed).
- For bodies moving with non-uniform speed, we describe the rate of motion in terms of their average speed.

$$\text{Average speed} = \frac{\text{Total distance travelled}}{\text{Total time taken}}$$

Velocity

- **Velocity** of a body is defined as the distance travelled by the body in unit time in a givendirection.
- The SI unit of velocity is the same as that of speed, i.e. metre/second(m/s).

$$\text{Velocity} = \frac{\text{Distance travelled in a given direction}}{\text{Time taken}}$$

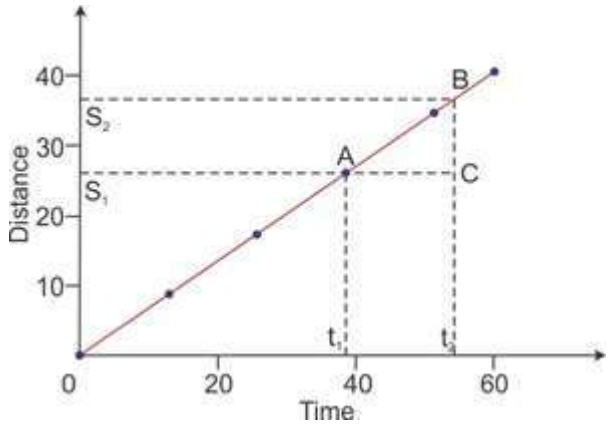
$$\text{or, Velocity} = \frac{\text{Displacement}}{\text{Time taken}}$$

$$\text{i.e. } \vec{v} = \frac{\vec{s}}{t}$$

where $\vec{v}$ is velocity and $\vec{s}$ is displacement of the body in time t.

- Velocity of a body is a **vector** quantity. It can be positive, negative orzero.
- A body is said to be moving with **uniform velocity** (or **constant velocity**) if it travels along a straight line, covering equal distances in equal intervals of time, howsoever small these intervals maybe.
- A body is said to be moving with **non-uniform velocity** (or **variable velocity**) if it covers unequal distances in a particular direction in equal intervals of time or if the direction of motion of the body changes.

- Whenthevelocityofabodyischangingatauniformrateoveraperiodoftime,the**averagevelocity** for that time period is given by the arithmetic mean of the initial and final velocity of the body.



$$\text{Average velocity} = \frac{\text{Initial velocity + Final velocity}}{2}$$

or $$\vec{v}_{av} = \frac{u+v}{2}$$

where 'u' is initial velocity, 'v' is final velocity and $\vec{v}_{av}$ is average velocity.

Acceleration

Acceleration of a body is defined as the rate of change of its velocity withtime.

$$\text{Acceleration} = \frac{\text{Change in velocity}}{\text{Time taken}} = \frac{\text{Final velocity - Initial velocity}}{\text{Time taken}}$$

where 'u' is initial velocity, 'v' is final velocity, 'a' is acceleration of the body and 't' is time taken for change in velocity.

- Acceleration is a **vector** quantity. It can be positive, negative or zero. The SI unit of acceleration is metre per second square(m/s^2).
- If the velocity of a body increases, then the acceleration is positive. If the velocity of a body decreases, then the acceleration is negative. **Negative acceleration** is called**retardation**.
- If acceleration occurs in the direction of velocity, then it is taken as positive and negative when it is opposite to the direction ofvelocity.
- A body is said to possess **uniform acceleration** if it travels in a straight line and its velocity increases or decreases by equal amounts in equal intervals oftime.

- A body is said to possess **non-uniform acceleration** if its velocity changes by unequal amounts in equal intervals oftime.

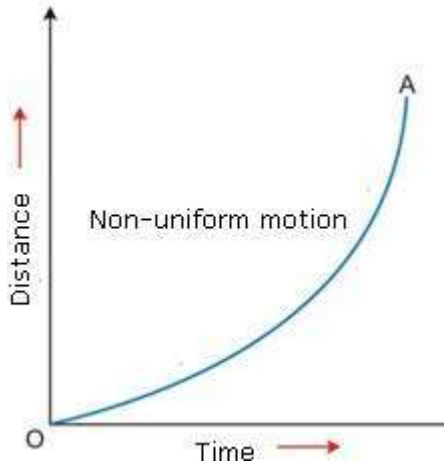
Distance–Time Graph

- Distance-Time graphs show the change in position of an object with respect to time.
- Linear variation = uniform motion and non-linear variations imply non- uniform motion
- The slope gives us speed
- The distance–time graph of a body moving with uniform speed is a straight line.
- Speed of a body can be obtained from the slope of the distance–time graph.
- Let s_1 and s_2 be the distance travelled by the object in time t_1 and t_2, respectively. Here $(s_2 – s_1)$ gives the distance travelled by the body in time interval $(t_2 – t_1)$.

Speed

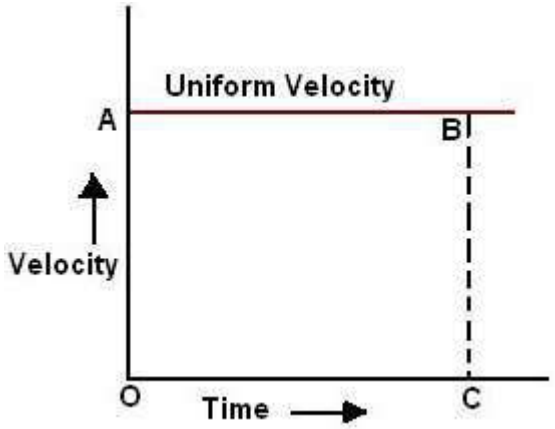
$$v = \frac{s_2 - s_1}{t_2 - t_1}$$

- The distance–time graph of a body moving with non-uniform speed is a curved line with a variable slope indicating variable speed.



Velocity–Time Graph

- The velocity–time graph of a body moving with uniform velocity is a straight line parallel to the time axis.



- The magnitude of displacement or distance travelled by the body is equal to the area enclosed by the velocity–time graph and time axis.

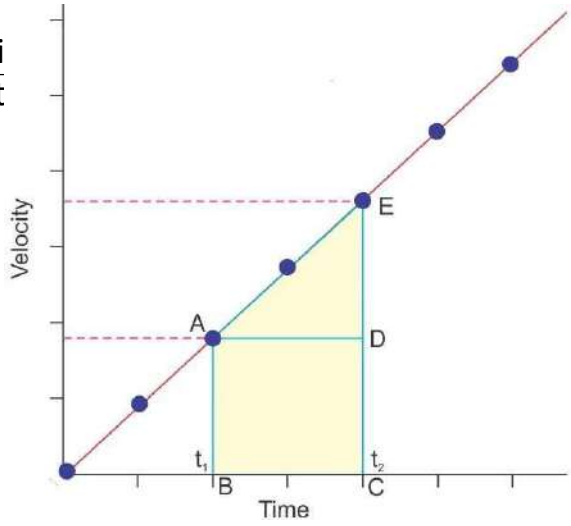
  Distance travelled = Speed × Time taken

  = OA × OC

  = Area of rectangle OABC

- The velocity–time graph of a body moving with uniform acceleration is a straight line inclined to the time axis.

$$= \frac{\text{Changei}}{\text{Timet}}$$



- The slope of the velocity–time graph represents the acceleration of the body.

$$\text{Acceleration} = \frac{\text{Change in speed}}{\text{Time taken}} = \frac{ED}{AD}$$

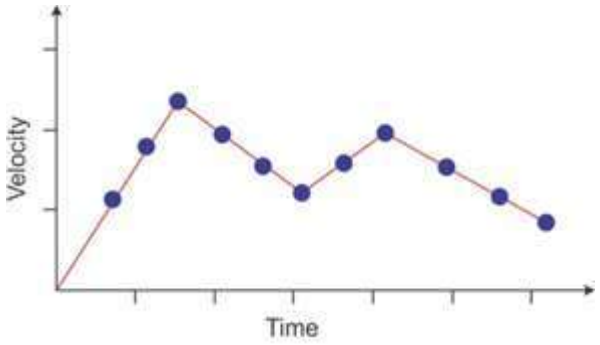
The area enclosed by the velocity–time graph and time axis gives the distance travelled by the body.

Distance travelled = Area of ABCDE

= Area of triangle ADE+ Area of rectangle ABCD

$$= \frac{1}{2} \times AD \times DE + AB \times BC$$

- The velocity–time graph of a body moving with non-uniform acceleration can have any shape, indicating variable speed.



Application Of Distance - Time Graph

What is a Distance-Time Graph

A distance-time graph shows how far an object has travelled in a given time. It is a simple line graph that denotes distance versus time findings on the graph.

Distance is plotted on the Y-axis.

Time is plotted on the X-axis.

Note: Curved lines on a distance-time graph indicate that the speed is changing.

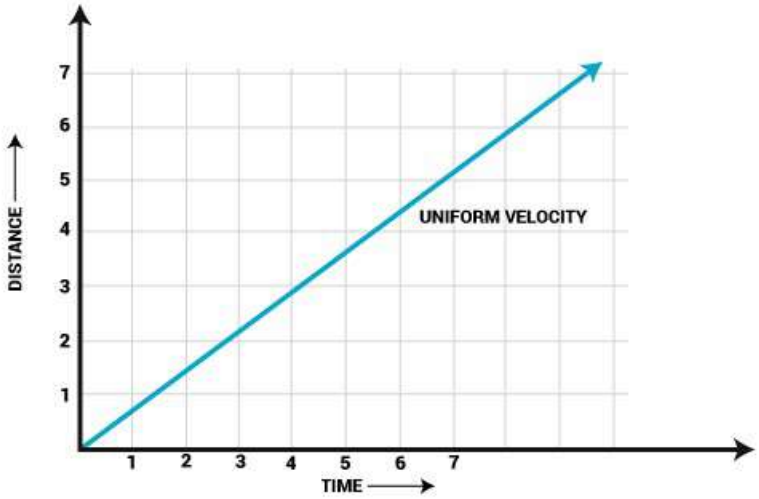
Importance of Distance-Time Graph

We deal with the distance-time graph while studying the motion of bodies. If we record distance and time for the motion of a body and plot the same data on a rectangular graph, we will obtain a distance-time graph corresponding to the motion of that body.

Example:

For better understanding, let us consider an example of uniform motion. A bus driver drives at a constant speed which is indicated by the speedometer and the driver measures the time taken by the bus for every kilometre. The driver notices that the bus travels 1 kilometre in every 2 minutes.

DISTANCE (IN KM)	1	2	3	4	5	6	7
TIME (IN MIN)	2	4	6	8	10	12	14

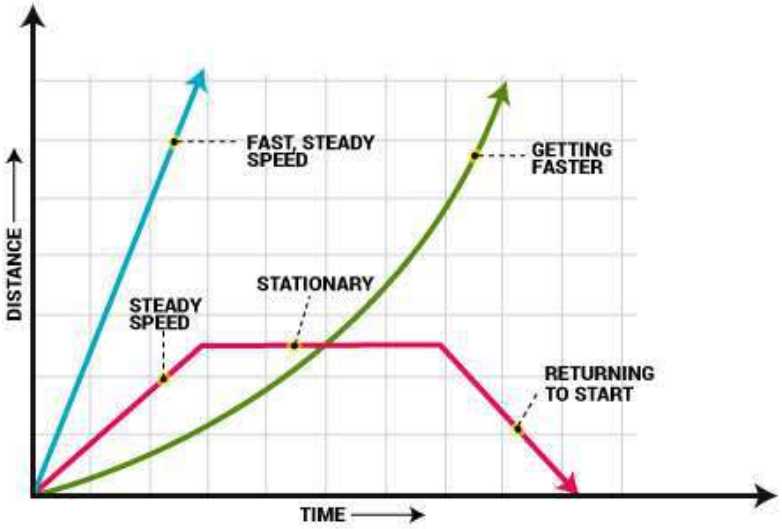


By this table, he had a clear idea about the speed which is: ½ × 60 = 30 km/hr.

The graph is a straight line and the motion of the bus is also uniform. Also, from the graph, we can find the speed of the bus at any instant of time. The initial and final position of the car can be found as the following:

Speed = (Final Position-Initial position)/Time

The slope of the line can be found by drawing a rectangle anywhere near the straight line which determines the speed of the bus. If an object is not moving, the distance-time graph results in a horizontal line which shows that the object is at rest.



The following things can be concluded now:

If the distance-time graph is a straight line then the motion is uniform.

If the distance-time graph of anybody is given, its speed can be calculated using the slope of the graph.

The slope of the straight-line graph is the same irrespective of the interval which is chosen. This

implies that the speed of an object under uniform motion remains constant.

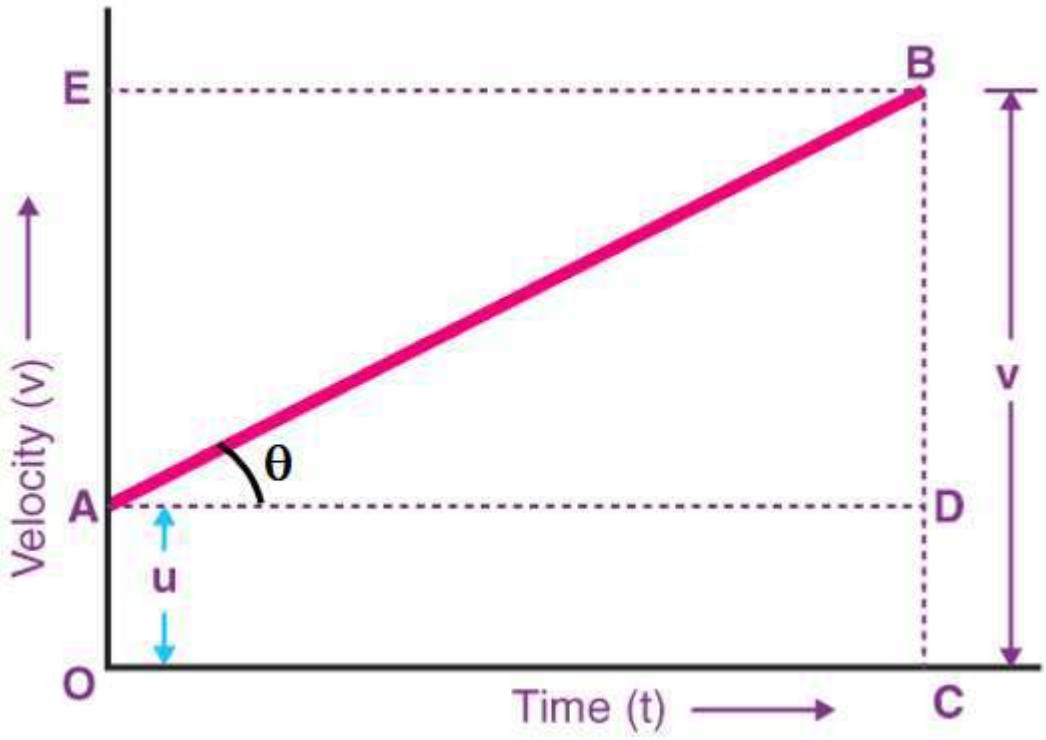
Equations of Motion

- The three equations of motion of a body moving along a straight line with uniform acceleration are

where ‘u’ is initial velocity of the body which moves with uniform acceleration ‘a’ for time t, ‘v’ is final velocity and ‘s’ is distance travelled by the body in time t.

Equation of motion

In this article, we will learn how we can relate quantities like velocity, time, acceleration and displacement provided the acceleration remains constant. These relations are collectively known as the equation of motion. There are three equations of motion. There are three ways to derive the equation of motion and here we are going to derive with the help of graph.



First Equation of Motion

First equation of motion relates velocity, time and acceleration. Now in Δuxy,

$\tan\theta = \frac{xy}{uy}$

$\tan\theta = \frac{v-u}{t}$

We also know that tanθ is nothing but the slope and slope of v – t graph represents acceleration.

⇒ v = u + at ———— (1)

This is the first equation of motion where,

v = final velocity

u = initial velocity

a = acceleration

t = time taken

Second Equation of Motion

Now coming to the second equation of motion, it relates displacement, velocity, acceleration and time. The area under v – t graph represents the displacement of the body.

In this case,

Displacement = Area of the trapezium (OABC)

S = $\frac{1}{2}$

x sum of parallel sides x height

S = $\frac{1}{2}$

x (v + u) x t ———- (2)

We can substitute v in terms of others and get the final equation as:

S = ut + $\frac{1}{2}$ at^2

Where symbols have their usual meaning.

Third Equation of Motion

The third equation of motion relates to velocity, displacement, and acceleration. Using the same equation (2),

S = $\frac{1}{2}$x (v + u) x t

Using equation (1) if we replace t we get,

S = $\frac{1}{2}\times (v+u) \times \frac{(v-u)}{a}$ S = $v^2 - u^2 = 2as$

Uniform Circular Motion

- When a body moves along a circular path with a uniform speed, its motion is called uniform circular motion.
- Examples: Motion of the Moon around the Earth, a cyclist moving in a circular track at constant speed
- In uniform circular motion, although the speed remains constant, the direction of motion and velocity change continuously. Thus, uniform circular motion is an accelerated motion.
- The external force needed to make a body travel in a circular path is known as centripetal force.
- The circumference of a circle of radius ‘r’ is given by $2\pi r$. If a body takes ‘t’ seconds to go once roundthe circular path of radius ‘r’, then its velocity ‘v’ is given by $\frac{2\pi r}{t}$

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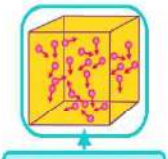
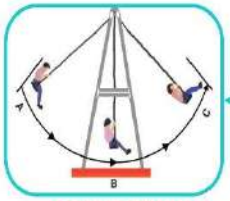


Random Motion

Rotational Motion



Oscillatory Motion

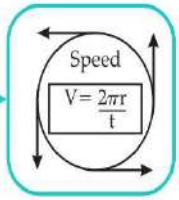
Rectilinear

Curvilinear

Circular

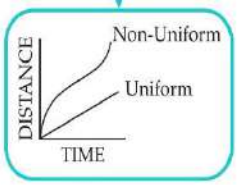
Translation Motion

Uniform Circular Motion



Uniform Motion → Equal distance in equal intervals of time

Non-uniform Motion



Types of Motion

Motion

Equation of Motion

$v^2 - u^2 = 2as$

$s = ut + \frac{1}{2}at^2$

$v = u + at$

Rate of motion

$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

$\text{Velocity} = \frac{\text{Displacement}}{\text{Time}}$

$\text{Acceleration} = \frac{\text{Change in Velocity}}{\text{Time Taken}}$

Important Questions

➢ Multiple Choice Questions:

1. A particle is moving in a circular path of radius r. The displacement after half a circle would be:

(a) Zero

(b) πr

(c) 2r

(d) 2πr

2. A body is thrown vertically upward with velocity u, the greatest height h to which it will rise is,

(a) ulg

(b) u^2l2g

(c) u^2lg

(d) ul2g

3. The numerical ratio of displacement to distance for a moving object is

(a) always less than 1

(b) always equal to 1

(c) always more than 1

(d) equal or less than 1

4. If the displacement of an object is proportional to square of time, then the object moves with

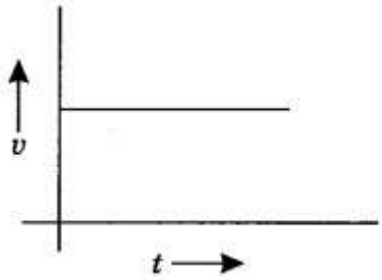
(a) uniform velocity

(b) uniform acceleration

(c) increasing acceleration

(d) decreasing acceleration

5. From the given υ – t graph, it can be inferred that the object is



(a) in uniform motion

(b) at rest

(c) in non-uniform motion

(d) moving with uniform acceleration

6. Suppose a boy is enjoying a ride on a merry-go-round which is moving with a constant speed of 10 ms^{-1} It implies that the boy is

(a) at rest

(b) moving with no acceleration

(c) in accelerated motion

(d) moving with uniform velocity

7. Area under a υ -1 graph represents a physical quantity which has the unit

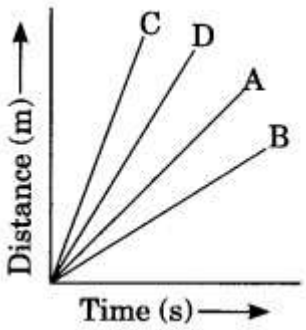
(a) m^2

(b) m

(c) m3

(d) ms^{-1}

8. Four cars A, B, C and D are moving on a levelled road. Their distance versus time graphs are shown in the adjacent figure. Choose the correct statement.



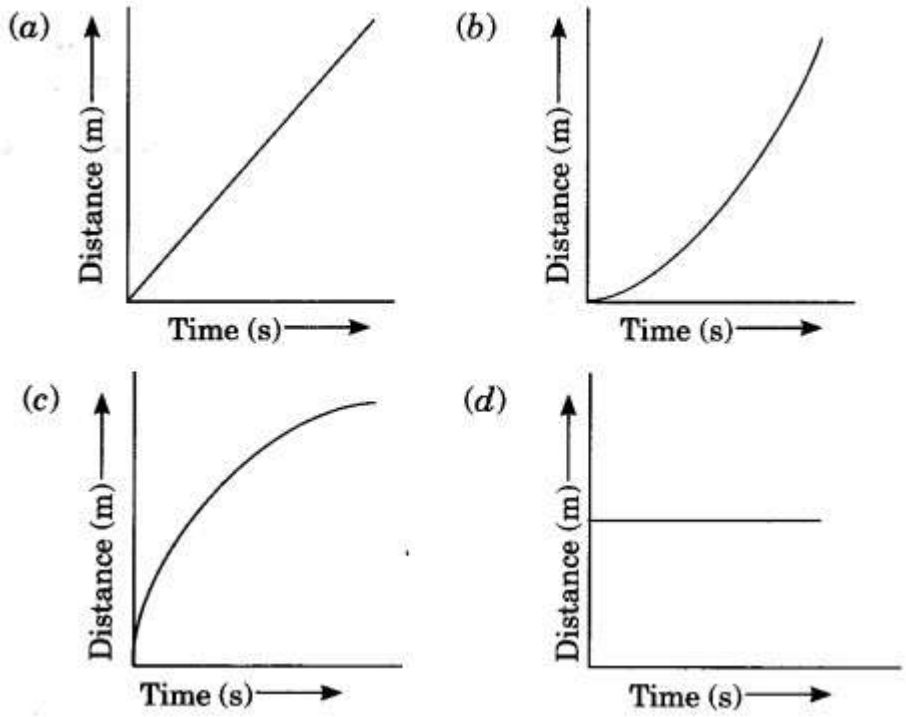
(a) Car A is faster than car D.

(b) Car B is the slowest.

(c) Car D is faster than car C.

(d) Car C is the slowest.

9. Which of the following figures correctly represents uniform motion of a moving object?



10. Slope of a velocity-time graph gives

(a) the distance

(b) the displacement

(c) the acceleration

(d) the speed

11. In which of the following cases of motions, the distance moved and the magnitude of displacement are equal?

(a) If the car is moving on a straight road

(b) If the car is moving in Circular path

(c) The pendulum is moving to and from

(d) The earth is revolving around the sun.

12. A boy goes from A to B with a velocity of 20 m/min and comes back from B to A with a velocity of 30 m/min. The average velocity of the boy during the whole journey is

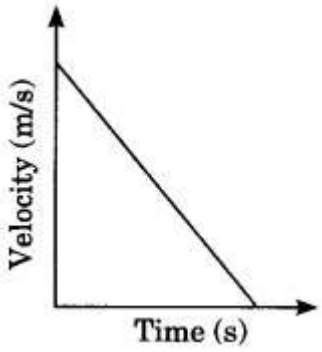
(a) 24 m/min

(b) 25 m/s

(c) Zero

(d) 20 m/min

13. Velocity-time graph of an object is given below. The object has



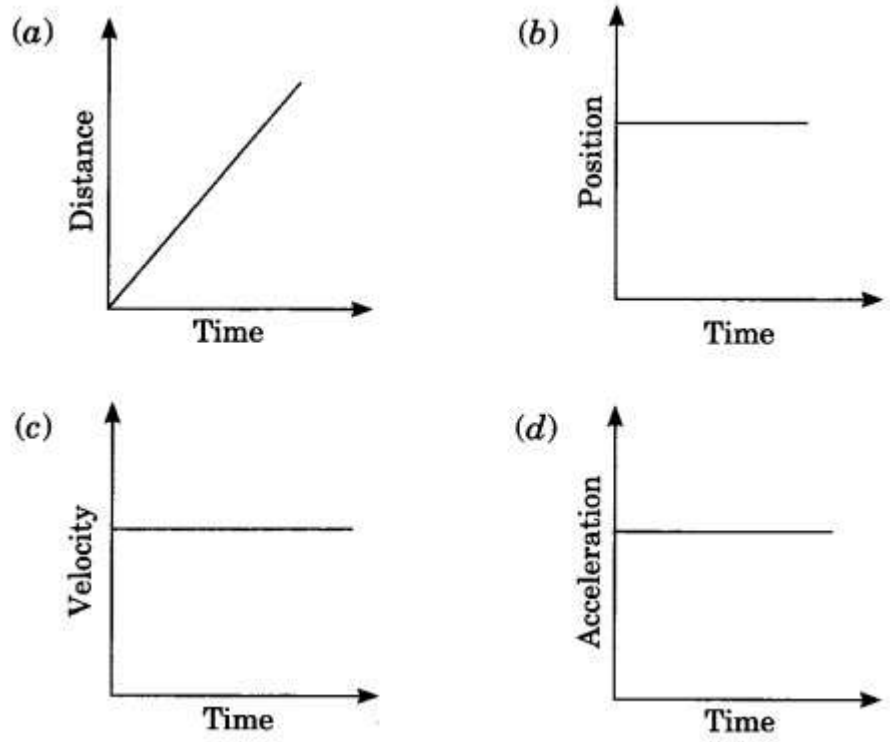
(a) Uniform velocity

(b) Uniform speed

(c) Uniform retardation

(d) Variable acceleration

14. Which one of the following graphs shows the object to be stationary?



15. A body is projected vertically upward from the ground. Taking vertical upward direction as positive and point of projection as origin, the sign of displacement of the body from the origin when it is at height h during upward and downward journey will be

(a) Positive, positive

(b) Positive, negative

(c) Negative, negative

(d) Negative, positive

➢ Very Short Question:

1. An object has moved through a distance. Can it have zero displacement? If yes, support your answer with an example.

2. What do you mean by a body in rest?

3. Are motion and rest absolute or relative? Explain with an example.

4. What is meant by scalars and vectors?

5. A farmer moves along the boundary of a square field of side 10 m in 40 s. What will be the magnitude of displacement of the farmer at the end of 2 minutes 20 seconds?

6.Which of the following is true for displacement?

(a) It cannot be zero.

(b) Its magnitude is greater than the distance travelled by the object.

7. What does the odometer of an automobile measure?

8. Distinguish between speed and velocity.

9. Under what condition(s) is the magnitude of average velocity of an object equal to its average speed?

10. What does the path of an object look like when it is in uniform motion?

➢ Short Questions:

1. Distinguish between distance and displacement.

2. Write down the SI unit of the following quantities:

(a) Displacement

(b) Speed

(c) Velocity

(d) Acceleration

3. Distinguish between uniform motion and non-uniform motion.

4. Distinguish speed at any instant and average speed.

5. Draw a velocity versus time graph of a stone thrown vertically upwards and then

coming downwards after attaining the maximum height.

6. What is uniform circular motion? How is uniform circular motion regarded as an acceleration motion? Explain.

7. A person travels a distance of 4.0 m towards the east, then turns left and travels 3.0 m towards the north.

8. A person travels on a semi-circular track of radius 50 m during a morning walk. If he starts from one end of the track and reaches the other end, calculates the distance traveled and displacement of the person.

➢ LongQuestions:

1. Derive an expression for three equations of motion for uniform accelerated motion graphically.

➢ Assertion Reason Questions:

1. For two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

   a. Both Assertion and Reason are correct, and reason is the correct explanation for assertion.

   b. Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion.

   c. Assertion is true but Reason is false.

   d. Both Assertion and Reason are false.

   Assertion: An object may acquire acceleration even if it is moving at a constant speed.

   Reason: With change in the direction of motion, an object can acquire acceleration.

2. For two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

   a. Both Assertion and Reason are correct, and reason is the correct explanation for assertion.

   b. Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion.

   c. Assertion is true but Reason is false.

   d. Both Assertion and Reason are false.

Assertion: Displacement of an object may be zero even if the distance covered by it is not zero.

Reason: Displacement is the shortest distance between the initial and final position.

➢ Case Study Based Question:

1. Read the following and answer any four questions from (i) to (v)

One day Rahul decided to go his office by his car. He is enjoying the driving along with listening the old songs. His car is moving along a straight road at a steady speed. On a particular moment, he notices that the car travels 150 m in 5 seconds.

(i) What is its average speed?

(a) 20 m/s

(b) 30 m/s

(c) 10 m/s

(d) 40 m/s

(ii) How far does it travel in 1 second?

(a) 20 m

(b) 30 m

(c) 10 m

(d) 40 m

(iii) How far does it travel in 6 seconds?

(a) 120 m

(b) 130 m

(c) 180 m

(d) 140 m

(iv) How long does it take to travel 240 m?

(a) 2s

(b) 4s

(c) 6s

(d) 8s

(v) Which of the following statement is correct regarding velocity and speed of a moving body?

(a) velocity of a moving body is always higher than its speed

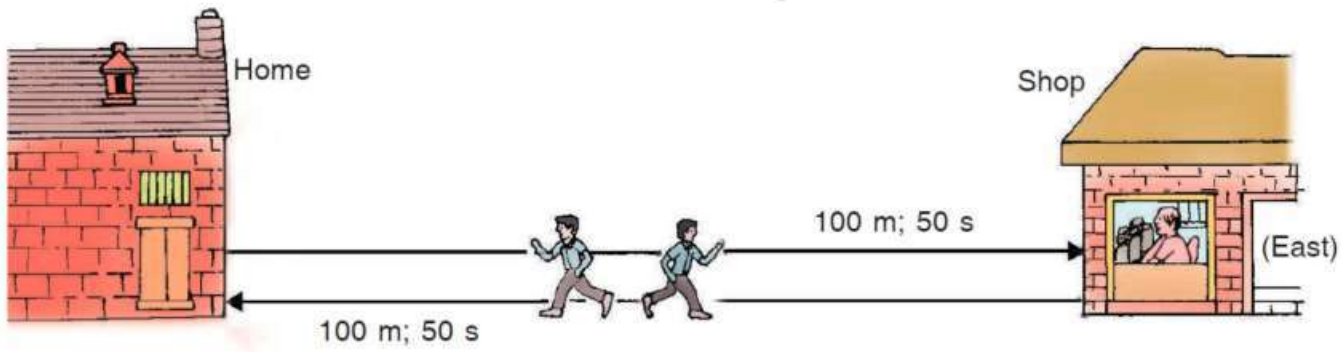
(b) speed of a moving body is always higher than its velocity

(c) speed of a moving body is its velocity in a given direction

(d) velocity of a moving body is its speed in a given direction

2. Read the following and answer any four questions from (i) to (v)

Suppose the boy first runs a distance of 100 metres in 50 seconds in going from his home to the shop in the East direction, and then runs a distance of 100 metres again in 50 seconds in the reverse direction from the shop to reach back home from where he started (see Figure 21).



(i) Find the speed of the boy.

(a) 1 m/s

(b) 2 m/s

(c) 3 m/s

(d) none of these

(ii) Find the Velocity of the boy.

(a) 1 m/s

(b) 2 m/s

(c) 3 m/s

(d) 0 m/s

(iii) A boy is sitting on a merry-go-round which is moving with a constant speed of10m/s. This means that the boy is:

(a) at rest

(b) moving with no acceleration

(c) in accelerated motion

(d) moving with uniform velocity

(iv) In which of the following cases of motion, the distance moved and the magnitudeof displacement are equal?

(a) if the car is moving on straight road

(b) if the car is moving on circular road

(c) if the pendulum is moving to and from

(d) if a planet is moving around the sun

(v) A particle is moving in a circular path of radius r. The displacement after half acircle would be:

(a) 0

(b) πr

(c) 2r

(d) 2πr

✓ Answer Key-

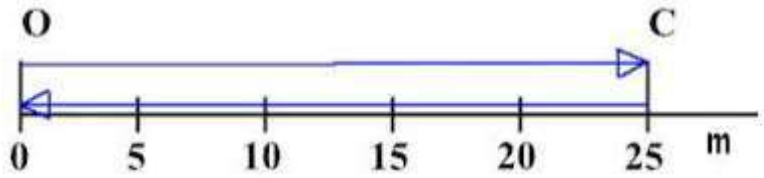
➢ Multiple Choice Answers:

1. (c) 2r
2. (b) u^2l2g
3. (d) equal or less than 1
4. (b) uniform acceleration
5. (a) in uniform motion
6. (c) in accelerated motion
7. (b) m
8. (b) Car B is the slowest.
9. (a)

10. (c) the acceleration
11. (a) If the car is moving on a straight road
12. (a) 24 m/min
13. (c) Uniform retardation
14. (b)
15. (a) Positive, positive

➢ Very Short Answers:

1. Answer: Yes an object can have zero displacement even though it has moved through a distance. It happens when the object moves back to its original position i.e. final position coincides with the starting position.



Example: Suppose an object travels from O to C and then comes back to original position O.

Total distance traveled = actual path covered = OC + CO = 25 + 25 = 50m

Total displacement = shortest distance between final position and initial position = 0m

2. Answer: A body is said to be at rest, if it does not change its position with respect to a fixed point in its surroundings.
3. Answer: No these terms rest and motion are relative. For example, a person inside a car, carrying a ball in his hand will see the ball is at rest. While for another person, outside the car will see the ball is also moving.
4. Answer:

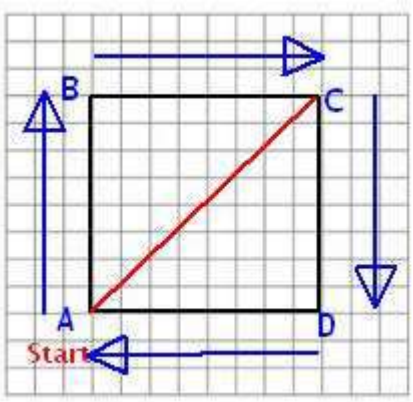
Scalar Quantities: Quantities that require magnitudes only to specify them are called scalar quantities or scalars. Mass, length, time, temperature, angle, area, speed, distance, volume and density are examples of scalar quantities.

Vector Quantities: Quantities that require both magnitudes and direction to specify them are called vector quantities or vectors. Displacement, velocity, force, momentum, weight etc. are the examples of vectors.

5. Answer: As shown in figure, let us assume, the farmer starts from A.

Given, length of each side = 10m

Distance covered in 1 lap = Perimeter of ABCD = 4 x 10 = 40m



Time taken by farmer to cover 1 lap = 40s

Speed of farmer = Distance ÷ Time Taken for one lap = 40/40s = 1m/s

Distance covered by farmer in 2min 20 secs = Speed x Time = 1 x 140s = 140m

Number of laps covered = 140 ÷ 40 = 3.5 laps.

⇒ After 140s, the farmer will be at position C (i.e. 3 and ½ laps).

Displacement = AC = (AB2 + BC2)½

(applying Pythagoras theorem)

= (100+100)½ = 10√2 = 10 x 1.414 = 14.14m

Note: Displacement is a vector quantity that measures the shortest distance (straight line) between the starting point and ending point, not taking the actual path traveled into account.

6. Answer:

   (a) False. Displacement can be zero. (See Q1).

   (b) False. Displacement is less than or equal to the distance travelled by the object.

7. Answer: Odometer is used to measure the distance covered by the automobile. It also tells the instant speed of the vehicle. It can be mechanical or electronic or electro-mechanical.

8. Answer:

Speed	Velocity
It is distance traveled by an object per unit time.	It is the displacement covered by an object per unit of time.
Speed = distance ÷ time	Velocity = displacement ÷ time

Speed	Velocity
It is scalar quantity i.e. it has magnitude only.	It is vector quantity i.e. has both magnitude and direction.

9. Answer: When a body is in rectilinear motion i.e. moves in straight line, the magnitude of average velocity of an object is equal to its average speed.

10. Answer: When an object is in uniform motion, it means its speed is constant. Or it travels equal distance in equal intervals of time. The path may be a straight line or curved or zig-zag. Its direction may also vary but the magnitude is fixed.

➢ Short Answers:

1. Answer:

Distance:

- It is the actual length of the path covered by a moving body.
- It is always positive or zero.
- It is a scalar quantity.

Displacement:

- It is the shortest distance measured between the initial and final positions.
- It may be positive, negative, or zero.
- it is a vector quantity.

2. Answer:

(a) m

(b) m/s

(c) m/s

(d) m/s^2

3. Answer:

Uniform motion:A body moving in a straight line has a uniform motion if it travels the equal distance in equal intervals of time

Non-uniform motion:A body has a non-uniform motion if it travels the unequal distance in equal intervals of time

4. Answer:

1. Instantaneous speed:

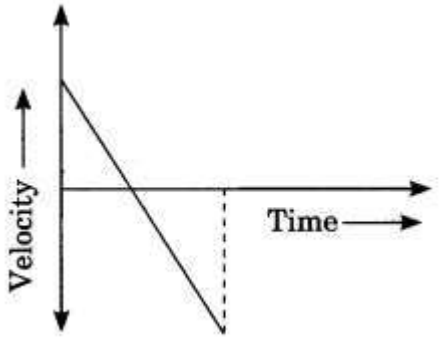
The speed at any particular instant is known as instantaneous speed.

2. Average speed:

Average speed is the ratio of total distance traveled by a body and time taken to travel that distance.

5. Answer:

velocity-time graph



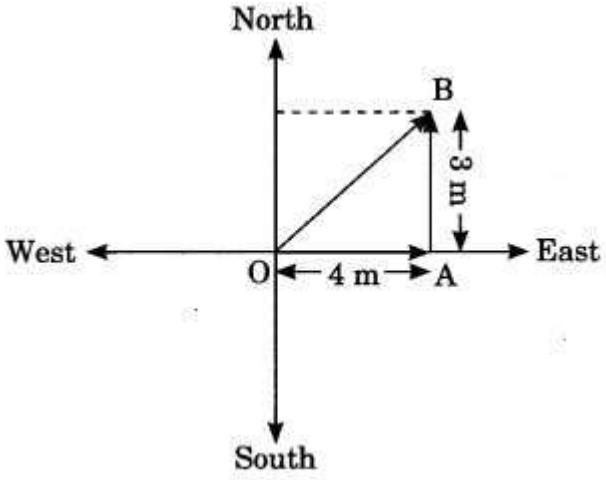
6. Answer:When an object is moving in a circular path with a constant speed, the motion of an object is said to be uniform circular motion. When a body has a uniform circular motion, its velocity changes due to the continuous change in the direction of its motion. Hence, the motion of the body is accelerated motion.

7. Answer:

1. Total distance = OA + AB

= 4m + 3m

Total distance = 7m



2. Total displacement = OB = $\sqrt{(OA)^2 + (AB)^2}$

$= \sqrt{(4)^2 + (3)^2} = \sqrt{25} = 5$

Displacement = 5 m

8. Answer:

Let the person start moving from A and reach B via O.

The distance travelled by the person

= Length of track = πr

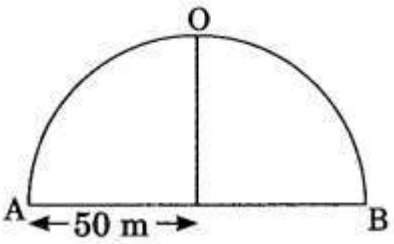
= 227 x 50 m = 157.14m

Distance = 157.14 m

The displacement is equal to the diameter of the semi-circular track joining A to B via O.

= 2r = 2 x 50 m = 100m

∴ Displacement = 100 m

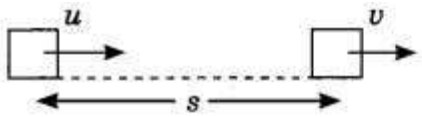


➢ Long Answers:

1. Answer:

Equation of motion by graphical method

Let us consider a body is moving with accelerationwhere u is initial velocity and u is final velocity, s is the displacement of object and t is a time interval.



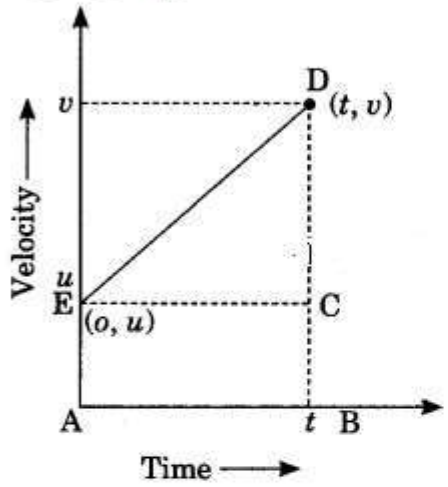
1. $\upsilon = u + at$

We know that slope of $\upsilon - t$ graph gives acceleration so slope

$= a = \frac{v-u}{t-0}$

$a = \frac{v-u}{t}$

$\therefore \upsilon = u + at$



2. $s = ut + \frac{1}{2} at^2$

We know that area under $u - t$ graph gives the displacement.

Area = s = area of triangle CDE + area of rectangle ABCE

$s = ut + \frac{1}{2} \times t \times (\upsilon - u)$ from $(\upsilon - u = at)$

Putting the value of $\upsilon - u$

$s = ut + \frac{1}{2} at^2$

3. $\upsilon^2 - u^2 = 2as$

We know that area under $\upsilon - t$ graph gives displacement

Area = s = area of trapezium ABDE

$s = \frac{1}{2} \times (\upsilon+u) \times t$ From I $(t = \frac{v-u}{a})$

Putting the value of t.

$\upsilon^2 - u^2 = 2as$

➢ Assertion Reason Answer:

1. (a) Both Assertion and Reason are correct, and reason is the correct explanation for

assertion.

2. (a) Both Assertion and Reason are correct, and reason is the correct explanation for assertion.

➢ Case Study Answer:

1. Answer:

(i) (b) 30 m/s

Solution:

Average speed = total distance travelled/total time taken

= 150/5

= 30 m/s

(ii) (b) 30 m

Solution:

Time = 1 s

Distance = (average speed)(time)

= 30 m/s x 1s

= 30 m

(iii) (c) 180 m

Solution:

Time = 6 s

Distance = (average speed)(time)

= 30 m/s x 6s

= 180m

(iv) (d) 8s

Solution:

Distance = 240m

Time = Distance/average speed

= 240/30

= 8s

(v) (d) velocity of a moving body is its speed in a given direction.

2. Answer:

(i) (b) 2 m/s

Solution:

Total distance travelled is 100 m + 100 m = 200 m and

the total time taken is 50 s + 50 s = 100 s.

$$\text{Speed of boy} = \frac{\text{Distance travelled}}{\text{Time taken}} = \frac{200\text{ m}}{100\text{ s}} = 2\text{ m/s}$$

(ii) (d) 0 m/s

Solution:

The boy runs 100 m towards East and then 100 m towards West and reaches at the starting point, his home. So, the displacement will be 100 m – 100 m = 0 m.

The total time taken is 50 s + 50 s = 100 s.

$$\text{Velocity of boy} = \frac{\text{Displacement}}{\text{Time taken}} = \frac{0\text{ m}}{100\text{ s}} = 0\text{ m/s}$$

(iii) (c) in accelerated motion

(iv) (a) if the car is moving on straight road

(v) (c) 2r

Question 1:

An athlete completes one round of a circular track of diameter 200 m in 40 s. What will be the distance covered and the displacement at the end of 2 minutes 20 s?

Answer

Diameter of a circular track, d = 200 m

Radius of the track, $r = \frac{d}{2} = 100\text{ m}$

Circumference = $2\pi r = 2\pi (100) = 200\pi$ m

In 40 s, the given athlete covers a distance of 200π m.

In 1 s, the given athlete covers a distance = $\frac{200\pi}{40}$ m

The athlete runs for 2 minutes 20 s = 140 s

∴Total distance covered in $140\text{ s} = \frac{200 \times 22}{40 \times 7} \times 140 = 2200\text{ m}$

The athlete covers one round of the circular track in 40 s. This means that after every 40 s, the athlete comes back to his original position. Hence, in 140 s he had completed 3 rounds of the circular track and is taking the fourth round.

He takes 3 rounds in 40 × 3 = 120 s. Thus, after 120 s his displacement is zero.

Then, the net displacement of the athlete is in 20 s only. In this interval of time, he moves at the opposite end of the initial position. Since displacement is equal to the shortest distance between the initial and final position of the athlete, displacement of the athlete will be equal to the diameter of the circular track.

∴ Displacement of the athlete = 200 m

Distance covered by the athlete in 2 min 20 s is 2200 m and his displacement is 200 m.

Question 2:

Joseph jogs from one end A to the other end B of a straight 300 m road in 2 minutes 50 seconds and then turns around and jogs 100 m back to point C in another 1 minute. What are Joseph's average speeds and velocities in jogging (a) from A to B and (b) from A to C?

Answer

(a) 1.765 m/s, 1.765 m/s (b) 1.739 m/s, 0.87 m/s

(a) From end A to end B

Distance covered by Joseph while jogging from A to B = 300 m

Time taken to cover that distance = 2 min 50 seconds = 170 s

$$\text{Average speed} = \frac{\text{Total distance covered}}{\text{Total time taken}}$$

Total distance covered = 300 m

Total time taken = 170 s

$$\text{Average speed} = \frac{300}{170} = 1.765\,\text{m/s}$$

$$\text{Average velocity} = \frac{\text{Displacement}}{\text{Time interval}}$$

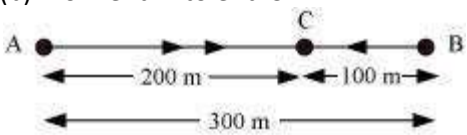
Displacement = shortest distance between A and B = 300 m

Time interval = 170 s

$$\text{Average velocity} = \frac{300}{170} = 1.765\ \text{m/s}$$

The average speed and average velocity of Joseph from A to B are the same and equal to 1.765 m/s.

(b) From end A to end C



$$\text{Average speed} = \frac{\text{Total distance covered}}{\text{Total time taken}}$$

Total distance covered = Distance from A to B + Distance from B to C

= 300 + 100 = 400 m

Total time taken = Time taken to travel from A to B + Time taken to travel from B to C = 170 + 60 = 230 s

$$\text{Average speed} = \frac{400}{230} = 1.739\,\text{m/s}$$

$$\text{Average velocity} = \frac{\text{Displacement}}{\text{Time interval}}$$

Displacement from A to C = AC = AB − BC = 300 − 100 = 200 m

Time interval = time taken to travel from A to B + time taken to travel from B to C

= 170 + 60 = 230 s

$$\text{Average velocity} = \frac{200}{230} = 0.87 \text{ m s}^{-1}$$

The average speed of Joseph from A to C is 1.739 m/s and his average velocity is 0.87 m/s.

Question 3:

Abdul, while driving to school, computes the average speed for his trip to be 20 km h^{-1}. On his return trip along the same route, there is less traffic and the average speed is 40 km h^{-1}. What is the average speed for Abdul's trip?

Answer

Case I: While driving to school

Average speed of Abdul's trip = 20 km/h

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time taken}}$$

Total distance = Distance travelled to reach school = *d*

Let total time taken = t_1

$$\therefore 20 = \frac{d}{t_1}$$

$$t_1 = \frac{d}{20} \quad ...(i)$$

Case II: While returning from school

Total distance = Distance travelled while returning from school = *d*

Now,total time taken = t_2

$$\therefore 40 = \frac{d}{t_2}$$

$$t_2 = \frac{d}{40} \quad ...(ii)$$

$$\text{Average speed for Abdul's trip} = \frac{\text{Total distance covered in the trip}}{\text{Total time taken}}$$

Where,

Total distance covered in the trip = *d* + *d* = 2*d*

Total time taken, *t* = Time taken to go to school + Time taken to return to school

= $t_1 + t_2$

$$\therefore \text{Average speed} = \frac{2d}{t_1 + t_2}$$

From equations (*i*) and (*ii*),

$$\text{Average speed} = \frac{2d}{\frac{d}{20} + \frac{d}{40}} = \frac{2}{\frac{2+1}{40}} = \frac{80}{3} = 26.67 \text{ m/s}$$

Hence, the average speed for Abdul's trip is 26.67 m/s.

Question 4:

A motorboat starting from rest on a lake accelerates in a straight line at a constant rate of 3.0 m s^{-2} for 8.0 s. How far does the boat travel during this time?

Answer

Initial velocity, *u* = 0 (since the motor boat is initially at rest)

Acceleration of the motorboat, *a* = 3 m/s^2

Time taken, *t* = 8 s

According to the second equation of motion:

$$s = ut + \frac{1}{2}at^2$$

Distance covered by the motorboat, s

$$s = 0 + \frac{1}{2}3 \times (8)^2 = 96\,\text{m}$$

Hence, the boat travels a distance of 96 m.

Question 5:

A driver of a car travelling at 52 km h^{-1} applies the brakes and accelerates uniformly in the opposite direction. The car stops in 5 s. Another driver going at 3 km h^{-1} in another car applies his brakes slowly and stops in 10 s. On the same graph paper, plot the speed versus time graphs for the two cars. Which of the two cars travelled farther after the brakes were applied?

Answer

Case A:

Initial speed of the car, u_1 = 52 km/h = 14.4 m/s

Time taken to stop the car, t_1 = 5 s

Final speed of the car becomes zero after 5 s of application of brakes.

Case B:

Initial speed of the car, u_2 = 3 km/h = 0.833 m/s ≅ 0.83 m/s

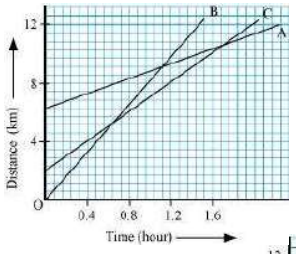
Time taken to stop the car, t_1 = 10 s

Final speed of the car becomes zero after 10 s of application of brakes.

Plot of the two cars on a speed–time graph is shown in the following figure:

Question 6:

Fig 8.11 shows the distance-time graph of three objects A, B and C. Study the graph and answer the following questions:



(a) Which of the three is travelling the fastest?

(b) Are all three ever at the same point on the road?

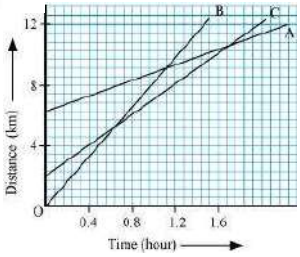
(c) How far has C travelled when B passes A?

(d)How far has B travelled by the time it passes C?

Answer

(Obje (N (5.714 (5.143

a) ct B b) o c) km d) km



(a) $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

$$\text{Slope of graph} = \frac{y-\text{axis}}{x-\text{axis}} = \frac{\text{Distance}}{\text{Time}}$$

∴Speed = slope of the graph

Since slope of object B is greater than objects A and C, it is travelling the fastest.

(b) All three objects A, B and C never meet at a single point.

Thus, they were never at the same point on road.

(c)

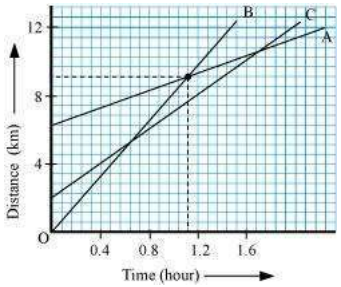
On the distance axis:

7 small boxes = 4 km

$$= \frac{4}{7}\text{km}$$

∴1 small box

Initially, object C is 4 blocks away from the origin.

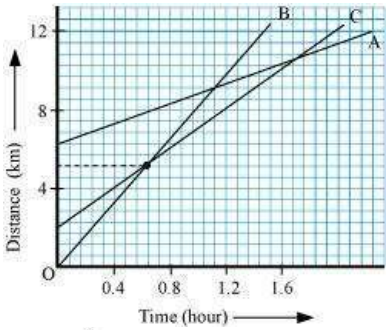


∴Initial distance of object C from origin= $\frac{16}{7}$ km

Distance of object C from origin when B passes A = 8 km

Distance covered by C $= 8 - \frac{16}{7} = \frac{56-16}{7} = \frac{40}{7} = 5.714 \text{ km}$

Hence, C has travelled a distance of 5.714 km when B passes A.



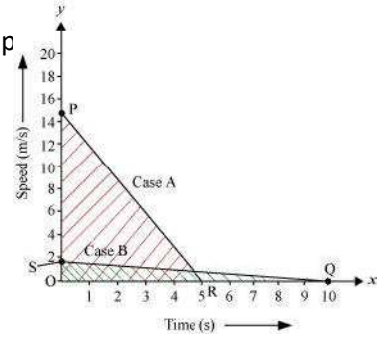
(d)

Distance covered by B at the time it passes C = 9 boxes

$= \frac{4}{7} \times 9 = \frac{36}{7} = 5.143 \text{ km}$

Hence, B has travelled a distance of 5.143 km when B passes A.

Distance covered by each car is equal to the area under the speed−time grap



Distance covered in case A,

$s_1 = \frac{1}{2} \times OP \times OR = \frac{1}{2} \times 14.4 \times 5 = 36 \text{ m}$

Distance covered in case B,

$s_2 = \frac{1}{2} \times OS \times OQ = \frac{1}{2} \times 0.83 \times 10 = 4.15 \text{ m}$

Area of ΔOPR > Area of ΔOSQ

Thus, the distance covered in case A is greater than the distance covered in case B.

Hence, the car travelling with a speed of 52 km/h travels farther after brakes were applied.

Question 7:

A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at the rate of 10 m s^{-2}, with what velocity will it strike the ground? After what time will it strike the ground?

Answer

Distance covered by the ball, s = 20 m

Acceleration, a = 10 m/s^2

Initially, velocity, u = 0 (since the ball was initially at rest)

Final velocity of the ball with which it strikes the ground, v

According to the third equation of motion:

$v^2 = u^2 + 2as$

$v^2 = 0 + 2\ (10)\ (20)$

v = 20 m/s

According to the first equation of motion:

$v = u + at$

Where,

Time, t taken by the ball to strike the ground is,

$20 = 0 + 10\ (t)$

t = 2 s

Hence, the ball strikes the ground after 2 s with a velocity of 20 m/s.

Question 8:

The speed-time graph for a car is shown is Fig. 8.12.

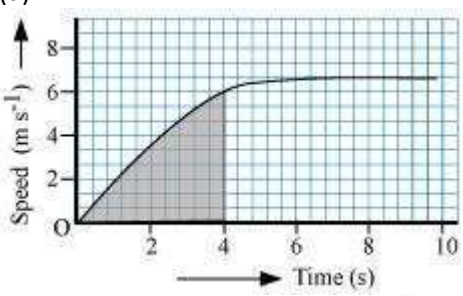
Fig. 8.12

(a) Find out how far the car travels in the first 4 seconds. Shade the area on the graph that represents the distance travelled by the car during the period.

(b) Which part of the graph represents uniform motion of the car?

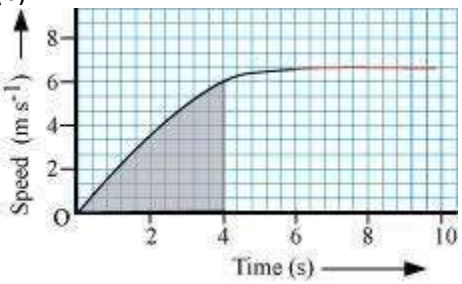
Answer

(a)



The shaded area which is equal to $\frac{1}{2}\times 4\times 6 = 12 \text{ m}$ represents the distance travelled by the car in the first 4 s.

(b)



The part of the graph in red colour between time 6 s to 10 s represents uniform motion of the car.

Question 9:

State which of the following situations are possible and give an example for each of these:

(a) an object with a constant acceleration but with zero velocity.

(b) an object moving in a certain direction with an acceleration in the perpendicular direction.

Answer

(a) Possible

When a ball is thrown up at maximum height, it has zero velocity, although it will have constant acceleration due to gravity, which is equal to 9.8 m/s^2.

(b) Possible

When a car is moving in a circular track, its acceleration is perpendicular to its direction.

Question 10.

An artificial satellite is moving in a circular orbit of radius 42250 km. Calculate its speed if it takes 24 hours to revolve around the earth?

Answer

Radius of the circular orbit, r = 42250 km

Time taken to revolve around the earth, t = 24 h

Speed of a circular moving object, $v = \frac{2\pi r}{t}$

$$= \frac{2\times 3.14\times 42250}{24} = 1.105\times 10^4 \text{ km/h} = 3.069 \text{ km/s}$$

Hence, the speed of the artificial satellite is 3.069 km/s.

MATHEMATICS

Chapter 1: Number Systems

Number Systems

1. Numbers 1, 2, 3…….∞, which are used for counting are called **natural numbers**. The collectionof natural numbers is denoted by **N.** Therefore, N = {1, 2, 3,4,5, ……}.

2. When 0 is included with the natural numbers, then the new collection of numbers called is called **whole number**. The collection of whole numbers is denoted by **W**. Therefore, W = {0, 1, 2, 3,4,5, ……}.

3. The negative of natural numbers, 0 and the natural number together constitutes **integers**. The collection of integers is denoted by **I**. Therefore, I = {..., -3, -2, -1, 0, 1, 2, 3, ……}.

4. The numbers which can be represented in the form of p/q, where q ≠ 0 and p and q are integersarecalled **rational numbers**. Rational numbers are denoted by **Q.** If p and q are co-prime, then the rational number is in its simplest form.

5. All-natural numbers, whole numbers and integer are rationalnumber.

6. **Equivalent rational numbers** (or fractions) have same (equal) values when written in thesimplest form.

7. Rational number between two numbersx and y$= \frac{x+y}{2}$.

8. There are infinitely many rational numbers between any two given rationalnumbers.

9. The numbers which are not of the form of p/ q, where q ≠0and p and q are integers are called irrationalnumbers.Forexample: $\sqrt{2}, \sqrt{7}, \pi$, etc.

10. Rational and irrational numbers together constitute are called **real numbers**. The collection of real numbers is denoted by **R.**

11. Irrational number between two numbers x and y

$$= \begin{cases} \sqrt{xy}, \text{if x and y both are irrational numbers} \\ \sqrt{xy}, \text{if x is rational number and y is irrational number} \\ \sqrt{xy}, \text{if x } \times \text{ y is not a perfect square and x, y both are rational numbers} \end{cases}$$

12. **Terminating fractions** are the fractions which leaves remainder 0 ondivision.

13. **Recurring fractions** are the fractions which never leave a remainder 0 ondivision.

14. The decimal expansion of **rational** number is **either terminating or non-terminating recurring**. Also, a number whose decimal expansion is terminatingor non-terminating recurring isrational.

a number whose decimal expansion is non-terminating non-recurring isirrational.

16. Every real number is represented by a unique point on the number line. Also, every point onthe number line represents a unique realnumber.

17. The process of visualization of numbers on the number line through a magnifying glass is knownas the process of **successive magnification.** This technique is used to represent a real number with non-terminating recurring decimalexpansion.

18. Irrationalnumberslike$\sqrt{2}, \sqrt{3}, \sqrt{5} \ldots \sqrt{n}$,for any positive integer n can be represented on number line by using Pythagorastheorem.

19. If a > 0 is a real number,then $\sqrt{a} = b$means b^2= a and b > 0.

20. For any positive real number x, wehave:

$$x = \left(\frac{x+1}{2}\right)^2 - \left(\frac{x+1}{2}\right)^2$$

21. For every positive real number x,$\sqrt{x}$can be represented by a point on the number line using the followingsteps:

    i. Obtain the positive real number, sayx.

    ii. Draw a line and mark a point A onit.

    iii. Mark a point B on the line such that AB = xunits.

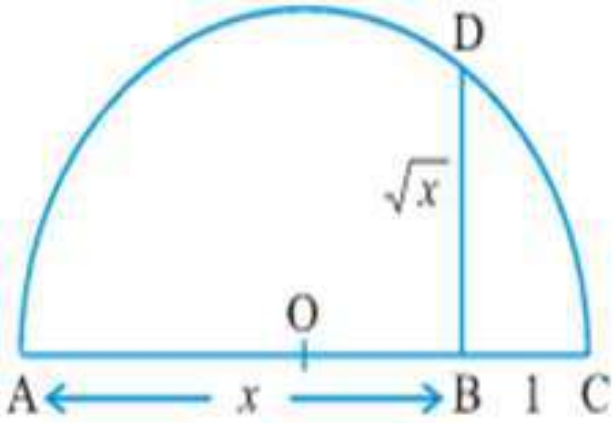
    iv. From B, mark a distance of 1 unit on extended AB and name the new point asC.

    v. Find the mid-point of AC and name that point asO.

    vi. Draw a semi-circle with centre O and radiusOC.

    vii. Draw a line perpendicular to AC passing through B and intersecting the semi-circle atD.

    viii. Length BD isequalto$\sqrt{x}$.



22. Properties of irrationalnumbers:

    i. The sum, difference, product and quotient of two irrational numbers need not always bean irrationalnumber.

    ii. Negative of an irrational number is an irrationalnumber.

    iii. Sum of a rational and an irrational number isirrational.

    iv. Product and quotient of a non-zero rational and irrational number is alwaysirrational.

23. Let a > 0 be a real number and n be a positive integer.Then $\sqrt[n]{a} = b$, if $b^n = a$ and b> 0.

    The symbol '$\sqrt{\ }$' is called the **radicalsign**.

24. For real numbers a > 0 and b >0:

    i. $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$

    ii. $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

    iii. $(\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b}) = a - b$

    iv. $(\sqrt{a} + \sqrt{b})(\sqrt{c} + \sqrt{d}) = \sqrt{ac} + \sqrt{bc} + \sqrt{ad} - \sqrt{bd}$

    v. $(a + \sqrt{b})(a - \sqrt{b}) = a^2 - b$

    vi. $(\sqrt{a} + \sqrt{b})^2 = a + b + 2\sqrt{ab}$

25. The process of removing the radical sign from the denominator of an expression to convert it toan equivalent expression whose denominator is a rational number is called **rationalising the denominator**.

26. The multiplicating factor used for rationalising the denominator is called

therationalisingfactor.

27. If a and b are positive real numbers,then

    Rationalisingfactorof$\frac{1}{\sqrt{a}}$ is $\sqrt{a}$

    Rationalising factorof$\frac{1}{a\pm\sqrt{b}}$ is $a \neq \sqrt{b}$

    Rationalising factorof$\frac{1}{\sqrt{a}\pm\sqrt{b}}$ is $\sqrt{a} \neq \sqrt{b}$

28. The **exponent** is the number of times the base is multiplied byitself.

29. In the exponential representation a^m, a is called the **base** and m is called the **exponent orpower**.

30. **Laws of exponents**: If a, b are positive real numbers and m, n are rational numbers,then

    i. $a^m \times a^n = a^{m+n}$
    ii. $a^m \div a^n = a^{m-n}$
    iii. $(a^m)^n = a^{mn}$
    iv. $a^{-n} = \frac{1}{a^n}$
    v. $(ab)^n = a^n b^n$
    vi. $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$
    vii. $a^{m/n} = (a^m)^{1/n} = (a^{1/n})^m$ or $a^{m/n} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$
    viii. $a^0 = 1$

Numbers

Number: Arithmetical value representing a particular quantity. The various types of numbers are Natural Numbers, Whole Numbers, Integers, Rational Numbers, Irrational Numbers, Real Numbers etc.

Natural Numbers

Natural numbers(N) are positive numbers i.e. 1, 2, 3 ..and so on.

Whole Numbers

Whole numbers (W) are 0, 1, 2,..and so on. Whole numbers are all Natural Numbers including '0'. Whole numbers do not include any fractions, negative numbers or decimals.

Integers

Integers are the numbers that includes whole numbers along with the negative numbers.

Rational Numbers

A number 'r' is called a rational number if it can be written in the form p/q, where p and q are integers and q ≠ 0.

Irrational Numbers

Any number that cannot be expressed in the form of p/q, where p and q are integers and q≠0, is an irrational number. Examples: √2, 1.010024563…, e, π

Real Numbers

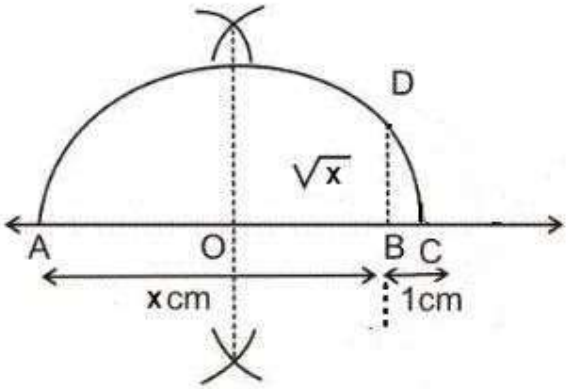
Any number which can be represented on the number line is a Real Number(R). It includes both rational and irrational numbers. Every point on the number line represents a unique real number.

Irrational Numbers

Representation of Irrational numbers on the Number line

Let √x be an irrational number. To represent it on the number line we will follow the following steps:

- Take any point A. Draw a line AB = x units.
- Extend AB to point C such that BC = 1 unit.
- Find out the mid-point of AC and name it 'O'. With 'O' as the centre draw a semi-circle with radius OC.
- Draw a straight line from B which is perpendicular to AC, such that it intersects the semi-circle at point D.
- Length of BD = √x.



Constructions to Find the root of x.

With BD as the radius and origin as the centre, cut the positive side of the number line to get √x.

Identities for Irrational Numbers

Arithmetic operations between:

- rational and irrational will give an irrational number.
- irrational and irrational will give a rational or irrational number.

Example: 2 × √3 = 2√3 i.e. irrational. √3 × √3 = 3 which is rational.

Identities for irrational numbers

Rationalisation

Rationalisation is converting an irrational number into a rational number. Suppose if we have torationalise 1/√a.

1/√a × 1/√a = 1/a

Rationalisation of 1/√a+b:

(1/√a+b) × (1/√a−b) = (1/a−b²)

Laws of Exponents for Real Numbers

If a, b, m and n are real numbers then:

$a^m \times a^n = a^{m+n}$

$(a^m)^n = a^{mn}$

$a^m/a^n = a^{m-n}$

$a^m b^m = (ab)^m$

Here, a and b are the bases and m and n are exponents.

Exponential representation of irrational numbers

If a > 0 and n is a positive integer, then: n√a=a1n Let a > 0 be a real number and p and q be rational numbers, then:

$a^p \times a^q = a^{p+q}$

$(a^p)^q = a^{pq}$

$a^p / a^q = a^{p-q}$

$a^p b^p = (ab)^p$

Decimal Representation of Rational Numbers

Decimal expansion of Rational and Irrational Numbers

The decimal expansion of a rational number is either terminating or non- terminating and recurring.

Example: 1/2 = 0.5 , 1/3 = 3.33…….

The decimal expansion of an irrational number is non terminating and non-recurring.

Examples: √2 = 1.41421356..

Expressing Decimals as rational numbers

Case 1 – Terminating Decimals

Example – 0.625

Let x=0.625

If the number of digits after the decimal point is y, then multiply and divide the number by 10y.

So, x = 0.625 × 1000/1000 = 625/1000 Then, reduce the obtained fraction to its simplest form.

Hence, x = 5/8

Case 2: Recurring Decimals

If the number is non-terminating and recurring, then we will follow the following steps to convert it into a rational number:

Example = $1.0\overline{42}$

Step 1. Let x = $1.0\overline{42}$ ……..(1)

Step 2. Multiply the first equation with 10y, where y is the number of digits that are recurring.

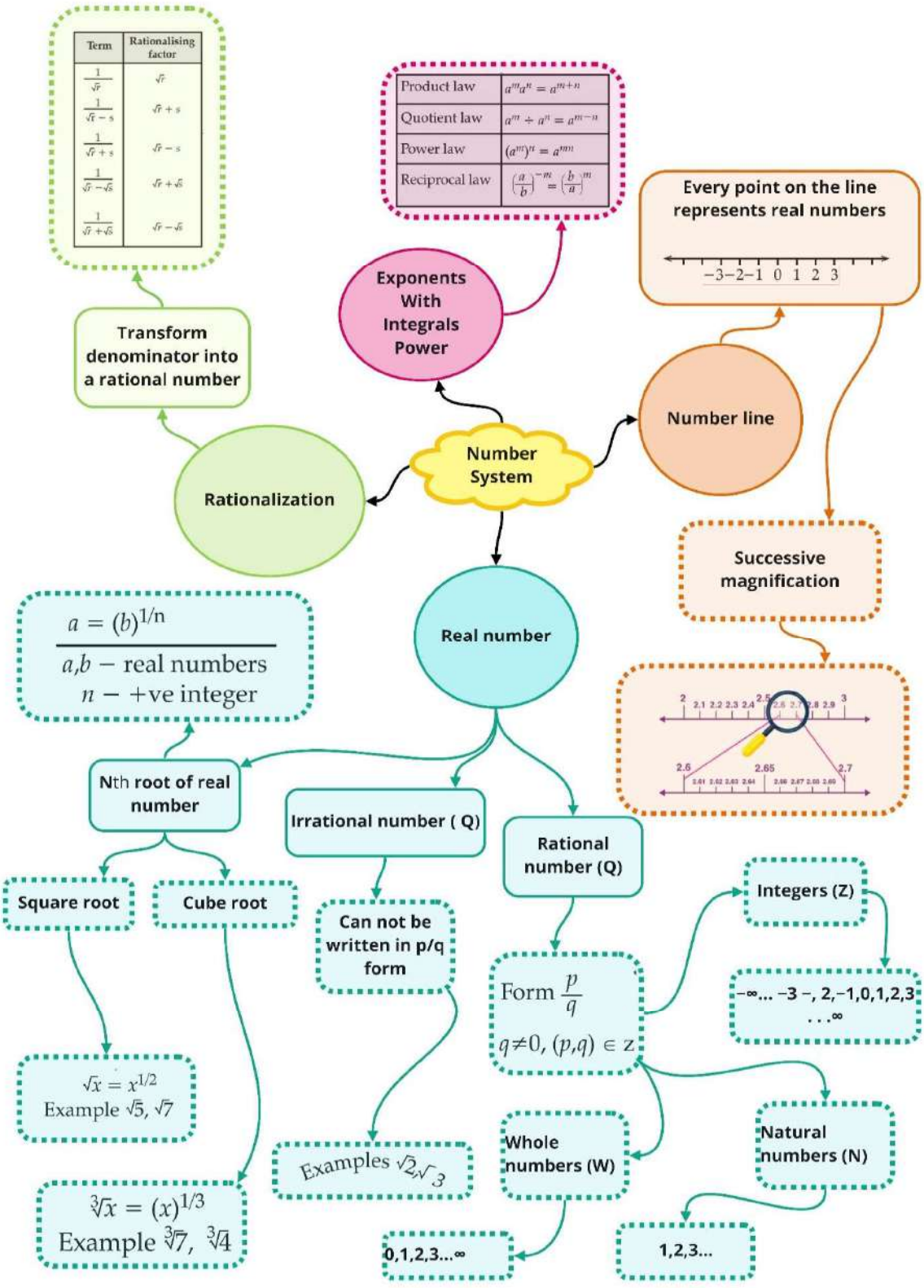
Thus, 100x = $104.\overline{242}$ ……(2)

Steps 3. Subtract equation 1 from equation 2.On subtracting equation 1 from 2, we get99x = 103.2x=103.2/99 = 1032/990

Which is the required rational number.

Reduce the obtained rational number to its simplest form Thus,X=172/165

Class : 9th mathematics
Chapter- 1: Number System



Important Questions

Multiple Choice Questions-

Question 1. Can we write 0 in the form of p/q?

a. Yes

b. No

c. Cannot be explained

d. None of the above

Question 2. The three rational numbers between 3 and 4 are:

a. 5/2,6/2,7/2

b. 13/4,14/4,15/4

c. 12/7,13/7,14/7

d.11/4,12/4,13/4

Question 3. In between any two numbers there are:

a. Only one rational number

b. Many rational numbers

c. Infinite rational numbers

d. No rational number

Question 4. Every rational number is:

a. Whole number

b. Natural number

c. Integer

d. Real number

Question 5. √9 is a _____ number.

a. Rational

b. Irrational

c. Neither rational or irrational

d. None of the above

Question 6. Which of the following is an irrational number?

a. √16

b. √(12/3)

c. √12

d. √100

Question 7. 3√6 + 4√6 is equal to:

a. 6√6

b. 7√6

c. 4√12

d. 7√12

Question 8. √6 x √27 is equal to:

a. 9√2

b. 3√3

c. 2√2

d. 9√3

Question 9. Which of the following is equal to x3?

a. x^6-x^3

b. $x^6.x^3$

c. x^6/x^3

d. $(x^6)^3$

Question 10. Which of the following are irrational numbers?

a. √23

b. √225

c. 0.3796

d. 7.478478

Very Short:

1.Simplify: $(\sqrt{5} + \sqrt{2})^2$.

2. Find the value of $\sqrt{(3)^{-2}}$.

3.Identify a rational number among the following numbers:

4.Express 1.8181… in the form $\frac{P}{q}$ where p and q are integers and q ≠ 0.

5.Simplify: √45 – 3√20 + 4√5

6.Find the value of'

$$\frac{(0.6)^0 - (0.1)^{-1}}{\left(\frac{3}{8}\right)^{-1}\left(\frac{3}{2}\right)^3 + \left(-\frac{1}{3}\right)^{-1}}$$

7.Find the value of.

$$\frac{4}{(216)^{\frac{-2}{3}}} - \frac{1}{(256)^{\frac{-3}{4}}}$$

Short Questions:

1. Evaluate: $(\sqrt{5} + \sqrt{2})^2 + (\sqrt{8} - \sqrt{5})^2$
2. Express 23.43 in $\frac{P}{q}$ Form, where p, q are integers and $q \neq 0$.
3. Let 'a' be a non-zero rational number and 'b' be an irrational number. Is 'ab' necessarily an irrational? Justify your answer with example.
4. Let x and y be a rational and irrational numbers. Is x + y necessarily an irrational number? Give an example in support of your answer.
5. Represent $\sqrt{3}$ on the number line.
6. Represent $\sqrt{3.2}$ on the number line.
7. Express 1.32 + 0.35 as a fraction in the simplest form.

Long Questions:

1. If $x = \frac{\sqrt{p+q}+\sqrt{p-q}}{\sqrt{p+q}-\sqrt{p-q}}$, then prove that $q^2 - 2px + 9 = 0$.
2. If $a = \frac{1}{3-\sqrt{11}}$ and $b = \frac{1}{a}$, then find $a^2 - b^2$
3. Simplify

$$\frac{3\sqrt{2}}{\sqrt{6}-\sqrt{3}} - \frac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}} + \frac{2\sqrt{3}}{\sqrt{6}+2}.$$

4. Prove that:

$$\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \ldots + \frac{1}{\sqrt{8}+3} = 2.$$

5. Find a and b, if

$$\frac{2\sqrt{5}+\sqrt{3}}{2\sqrt{5}-\sqrt{3}} + \frac{2\sqrt{5}-\sqrt{3}}{2\sqrt{5}+\sqrt{3}} = a + \sqrt{15}b$$

Assertion and Reason Questions-

1. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

Assertion: 0.271 is a terminating decimal and we can express this number as 271/1000 which is of the form p/q , where p and q are integers and q ≠ 0.

Reason: A terminating or non-terminating decimal expansion can be expressed as rational number.

2. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

Assertion: Every integer is a rational number.

Reason: Every integer 'm' can be expressed in the form m/1 .

Answer Key:

MCQ:

1. (a) Yes
2. (b) 13/4,14/4,15/4
3. (c)Infinite rational numbers
4. (d) Real number
5. (a) Rational
6. (c) √12
7. (b) 7√6
8. (a) 9√2
9. (c) x6/x3
10. (a) √23

Very Short Answer:

1. Here, (√5 + √22 = (√52 + 2√5√2 + (√2)2

   = 5 + 2√10 + 2 = 7 + 2√10

2. $\sqrt{(3)^{-2}} = (3^{-2})^{\frac{1}{2}} = 3^{-2\times\frac{1}{2}} = 3^{-1} = \frac{1}{3}.$

3.O is a rational number.

4.Let x =1.8181… …(i)

100x = 181.8181… …(ii) [multiplying eqn. (i) by 100]

99x = 180 [subtracting (i) from (ii)]

$X = \frac{180}{99}$

Hence, 1.8181 … $= \frac{180}{99} = \frac{20}{11}$

5.√45 – 3√20 + 4√5 = 3√5 – 6√5 + 4√5 = √5.

6. $\frac{(0.6)^0-(0.1)^{-1}}{\left(\frac{3}{8}\right)^{-1}\left(\frac{3}{2}\right)^3+\left(-\frac{1}{3}\right)^{-1}} = \frac{1-\frac{1}{0.1}}{\frac{8}{3}\times\frac{27}{8}+(-3)} = \frac{1-10}{9-3} = \frac{-9}{6} = -\frac{3}{2}$

7.

$$\frac{4}{(216)^{\frac{-2}{3}}} - \frac{1}{(256)^{\frac{-3}{4}}} = 4\times(216)^{\frac{2}{3}} - (256)^{\frac{3}{4}} = 4\times(6\times6\times6)^{\frac{2}{3}} - (4\times4\times4\times4)^{\frac{3}{4}}$$

$$= 4\times6^{3\times\frac{2}{3}} - 4^{4\times\frac{3}{4}} = 4\times6^2 - 4^3$$

$$= 4\times36 - 64 = 144 - 64 = 80$$

Short Answer:

Ans: 1. (√5 + √2)2 + (√8 – √52 = 5 + 2 + 2√10 + 8 + 5 – 2√40
= 20 + 2√10 – 4√10 = 20 – 2√10

Ans: 2. Let x = $23.\overline{43}$

or x = 23.4343… ….(i)

100x = 2343.4343… …(ii) [Multiplying eqn. (i) by 100]

99x = 2320 [Subtracting (i) from (ii)

⇒ x = $\frac{2320}{99}$

Hence, $23.\overline{43} = \frac{2320}{99}$

Ans: 3. Yes, 'ab' is necessarily an irrational.

For example, let a = 2 (a rational number) and b = √2 (an irrational number)

If possible let ab = 2√2 is a rational number.

Now $\frac{ab}{a} = \frac{2\sqrt{2}}{2} = \sqrt{2}$ is a rational number.

[∵ The quotient of two non-zero rational number is a rational]

But this contradicts the fact that √2 is an irrational number.

Thus, our supposition is wrong.

Hence, ab is an irrational number.

Ans: 4. Yes, x + y is necessarily an irrational number.

For example, let x = 3 (a rational number) and y = √5 (an irrational number)

If possible, let x + y = 3 + √5 be a rational number.

Consider $\frac{p}{q}$ = 3 + √5, where p, q ∈ Z and q ≠ 0.

Squaring both sides, we have

$$\frac{p^2}{q^2} = 9 + 5 + 6\sqrt{5} \Rightarrow \frac{p^2}{q^2} = 14 + 6\sqrt{5}$$

$$\Rightarrow \frac{p^2}{q^2} - 14 = 6\sqrt{5} \Rightarrow \frac{p^2 - 14q^2}{6q^2} = \sqrt{5}$$

$$\because \frac{p}{q} \text{ is a rational} \Rightarrow \frac{p^2 - 14q^2}{6q^2} \text{ is a rational}$$

∵ $\frac{p}{q}$ is a rational

⇒√5 is a rational

But this contradicts the fact that √5 is an irrational number.

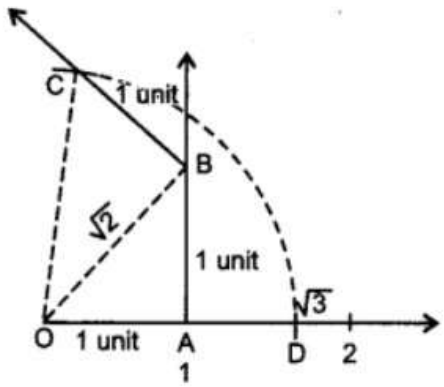
Thus, our supposition is wrong.

Hence, x + y is an irrational number.

Ans: 5.

$$\text{Here, } \sqrt{3} = \sqrt{1+2} = \sqrt{(1)^2 + (\sqrt{2})^2}$$

$$\text{And, } \sqrt{2} = \sqrt{1+1} = \sqrt{(1)^2 + (1)^2}$$



On the number line, take OA = 1 unit. Draw AB = 1 unit perpendicular to OA. Join OB.

Again, on OB, draw BC = 1 unit perpendicular to OB. Join OC.

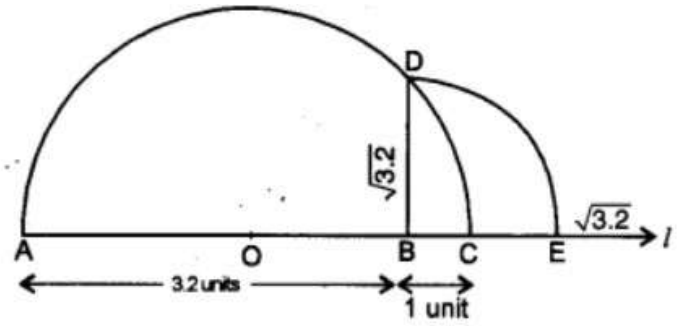
By Pythagoras Theorem, we obtain OC = √3. Using

compasses, with Centre O and radius OC, draw an arc, which intersects the number line at point

D. Thus, OD = √3 and D corresponds to √3.

Ans: 6. First of all draw a line of length 3.2 units such that AB = 3.2 units. Now, from point B, mark a distance of 1 unit. Let this point be 'C'. Let 'O' be the mid-point of the distance AC. Now, draw a semicircle with Centre 'O' and radius OC. Let us draw a line perpendicular to AC passing through the point 'B' and intersecting the semicircle at point 'D'.

∴ The distance BD = √3.2



Now, to represent √3.2 on the number line. Let us take the line BC as number line and point 'B' as zero, point 'C' as '1' and so on. Draw an arc with Centre B and radius BD, which intersects the number line at point 'E'.

Then, the point 'E' represents √3.2.

Ans: 7. Let. x = 1.32 = 1.3222…. (i)

Multiplying eq. (i) by 10, we have

10x = 13.222…

Again, multiplying eq. (i) by 100, we have

100x = 132.222… …(iii)

Subtracting eq. (ii) from (iii), we have

100x – 10x = (132.222…) – (13.222…)

90x = 119

$\Rightarrow x = \frac{119}{90}$

Again, y = 0.35 = 0.353535……

Multiply (iv) by 100, we have …(iv)

100y = 35.353535… (v)

Subtracting (iv) from (u), we have

100y – y = (35.353535…) – (0.353535…)

99y = 35

$y = \frac{35}{99}$

Now, $1.3\overline{2} + 0.\overline{35} = x + y = \frac{119}{90} + \frac{35}{99} = \frac{1309+350}{990} = \frac{1659}{990} = \frac{553}{330}$

Long Answer:

Ans: 1.

$$x = \frac{\sqrt{p+q}+\sqrt{p-q}}{\sqrt{p+q}-\sqrt{p-q}} = \frac{\sqrt{p+q}+\sqrt{p-q}}{\sqrt{p+q}-\sqrt{p-q}} \times \frac{\sqrt{p+q}+\sqrt{p-q}}{\sqrt{p+q}+\sqrt{p-q}}$$

$$= \frac{\left(\sqrt{p+q}+\sqrt{p-q}\right)^2}{\left(\sqrt{p+q}\right)^2-\left(\sqrt{p-q}\right)^2} = \frac{p+q+p-q+2\times\sqrt{p+q}\times\sqrt{p-q}}{(p+q)-(p-q)}$$

$$= \frac{2p+2\sqrt{p^2-q^2}}{2q} = \frac{p+\sqrt{p^2-q^2}}{q}$$

$$\Rightarrow \quad qx = p+\sqrt{p^2-q^2}$$

$$\Rightarrow \quad qx-p = \sqrt{p^2-q^2}$$

Squaring both sides, we have

$\Rightarrow q^2x^2 + p^2 – 2pqx = p^2 – q^2$

$\Rightarrow q^2x^2 – 2pqx + q^2 = 0$

$\Rightarrow q(q^2 – 2px + q) = 0$

$\Rightarrow qx^2 – 2px + q = 0 \ (\because q \neq 0)$

Ans: 2

Here, $a = \frac{1}{3-\sqrt{11}} \times \frac{3+\sqrt{11}}{3+\sqrt{11}} = \frac{3+\sqrt{11}}{9-11} = \frac{3+\sqrt{11}}{-2}$

$b = \frac{1}{a} = 3-\sqrt{11}$

Now, $a^2 - b^2 = (a + b)(a - b)$

$= \left(\frac{3+\sqrt{11}}{-2} + 3 - \sqrt{11}\right)\left(\frac{3+\sqrt{11}}{-2} - 3 + \sqrt{11}\right)$

$= \left(\frac{-3-\sqrt{11}+6-2\sqrt{11}}{2}\right)\left(\frac{-3-\sqrt{11}-6+2\sqrt{11}}{2}\right)$

$= \left(\frac{3-3\sqrt{11}}{2}\right)\left(\frac{-9+\sqrt{11}}{2}\right) = \frac{-27+3\sqrt{11}+27\sqrt{11}-33}{4}$

$= \frac{-60+30\sqrt{11}}{4} = \frac{-30+15\sqrt{11}}{2} = \frac{1}{2}(15\sqrt{11}-30)$

Ans: 3

$$\frac{3\sqrt{2}}{\sqrt{6}-\sqrt{3}} - \frac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}} + \frac{2\sqrt{3}}{\sqrt{6}+2}$$

$$= \frac{3\sqrt{2}}{\sqrt{6}-\sqrt{3}} \times \frac{\sqrt{6}+\sqrt{3}}{\sqrt{6}+\sqrt{3}} - \frac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}} \times \frac{\sqrt{6}+\sqrt{2}}{\sqrt{6}+\sqrt{2}} + \frac{2\sqrt{3}}{\sqrt{6}+2} \times \frac{\sqrt{6}-2}{\sqrt{6}-2}$$

$$= \frac{3\sqrt{12}+3\sqrt{6}}{(\sqrt{6})^2-(\sqrt{3})^2} - \frac{4\sqrt{18}+4\sqrt{6}}{(\sqrt{6})^2-(\sqrt{2})^2} + \frac{2\sqrt{18}-4\sqrt{3}}{(\sqrt{6})^2-(2)^2}$$

$$= \frac{6\sqrt{3}+3\sqrt{6}}{6-3} - \frac{12\sqrt{2}+4\sqrt{6}}{6-2} + \frac{6\sqrt{2}-4\sqrt{3}}{6-4}$$

$$= \frac{6\sqrt{3}+3\sqrt{6}}{3} - \frac{12\sqrt{2}+4\sqrt{6}}{4} + \frac{6\sqrt{2}-4\sqrt{3}}{2}$$

$$= \frac{24\sqrt{3}+12\sqrt{6}-36\sqrt{2}-12\sqrt{6}+36\sqrt{2}-24\sqrt{3}}{12} = \frac{0}{12} = 0.$$

Ans: 4.

$$\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \ldots + \frac{1}{\sqrt{8}+3}$$

$$= \frac{1}{1+\sqrt{2}} \times \frac{1-\sqrt{2}}{1-\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} \times \frac{\sqrt{2}-\sqrt{3}}{\sqrt{2}-\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} \times \frac{\sqrt{3}-\sqrt{4}}{\sqrt{3}-\sqrt{4}} + \ldots + \frac{1}{\sqrt{8}+3} \times \frac{\sqrt{8}-3}{\sqrt{8}-3}$$

$$= \frac{1-\sqrt{2}}{-1} + \frac{\sqrt{2}-\sqrt{3}}{-1} + \frac{\sqrt{3}-\sqrt{4}}{-1} + \ldots + \frac{\sqrt{8}-3}{-1}$$

$$= -1+\sqrt{2}-\sqrt{2}+\sqrt{3}-\sqrt{3}+\sqrt{4}-\ldots-\sqrt{8}+3$$

$$= -1 + 3 = 2$$

Ans: 5.

Here, $\frac{2\sqrt{5}+\sqrt{3}}{2\sqrt{5}-\sqrt{3}}+\frac{2\sqrt{5}-\sqrt{3}}{2\sqrt{5}+\sqrt{3}}=a+\sqrt{15}b$

$$\frac{(2\sqrt{5}+\sqrt{3})^2+(2\sqrt{5}-\sqrt{3})^2}{(2\sqrt{5}-\sqrt{3})(2\sqrt{5}+\sqrt{3})}=a+\sqrt{15}b$$

$$\frac{20+3+4\sqrt{15}+20+3-4\sqrt{15}}{20-3}=a+\sqrt{15}b$$

$$\frac{46}{17}=a+\sqrt{15}b$$

Comparing rational and irrational parts, we have

$$a=\frac{46}{17} \text{ and } b=0$$

Assertion and Reason Answers-

1. c) Assertion is correct statement but reason is wrong statement.

2. a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

Lesson No: 1
Packing

Jerome K. Jerome

Summary

The writer and his two friends, George and Harris, decided to go on a holiday. The writer said that he would do the packing. He thought nobody was good at packing as he was. He told his friends to leave the whole job to him. They readily agreed. George spread himself on an easy chair. He started smoking a pipe. Harris put his legs on the table and lit a cigar. The writer has not intended this. He had meat to boss about and make his friends do the work. He enjoyed giving directions while others worked. However, he did not say anything and started to pack. It took him a long time to do the packing. But finally, he was able to finish it, he then strapped the bag.

Harris asked the writer whether he had put the boots in. the writer looked around. He realized that he had forgotten to put the boots in. George laughed in his usual way. It irritated the writer. He opened the bag to put the boots in. Then it came to his mind whether he had packed his toothbrush or not. This was a thing which always troubled him while travelling. So he wanted to be sure in this matter. He took out everything from the bag. He wasn't able to find his brush. He put the things back one by one. He shook each of the things while putting them back one by one. Then he found the brush inside a boot. Now he had to repack the things once more.

When the repacking was finished, George asked him if he had put the soap in. Now the writer was getting very irritated. He said that he did not care about the soap. Then he found that he had put his tobacco-pouch inside the bag. So he had to reopen it. He shut it up finally at 10:05 p.m only the articles of food remained to be packed. Harris and George offered to do the rest of the work. The writer agreed at once. He sat down at one side.

The two started in a light mood. There were piles of plates, cups, bottles, tomatoes etc. to be packed. They started with breaking a cup. Then Harris put the strawberry jam on top of tomatoes. They got squashed. They had to pick out the squeezed tomatoes with a teaspoon. Then George put his foot on the butter. The writer kept sitting at the edge of the table and watch them. It made them more nervous. They put the pastries at the bottom and the heavy things on top. Thus the pastries got squashed. The butter got stuck to George's slipper. He got if off from there and tried to put it in the kettle. It wouldn't come out. They managed to get it out at last. They put it on a chair. Now, Harris sat on it and it stuck to him. They looked or the butter all over the room. Finally, they found it stuck to harris's back. They got it off and put it in the teapot.

Now, their dog Montmorency added to their confusion. He came and sat down on the things they were going to pack, adding to the problems they were already facing. Whenever they reached out for anything, the dog would put his nose in their way. He put his leg inside the jam. He spoilt the lemons that had been put in as basket.

The packing was completed by 12:50. They were all ready to go to bed. Aftersome argument, they decided to get up at 6:30 in the morning.

George was already asleep. They placed a bathtub near his bed so that he could trumble into it as soon as he got out of the bed in the morning. Then both of them went to bed.

<u>Glossary</u>

1. **Packing:** **The act of putting things into bags or boxes.**
2. **Haunt:** **frequently occur.**
3. **pretend:** **to act as if something is true when it is not true.**

Q1. **There are four characters in the narrative viz:**
(i) Harris **(ii) George**
(iii) Montmorency – the dog **(iv) and the narrator himself.**

Q2. **The narrator i.e., Jerome volunteered to do packing himself as he, thought himself an expect packer and wanted to supervise the whole job of packing.**

Q3. **George and Harris mistook him and left the entire task of packing to him (narrator). George put on a pipe and spread himself on an easy chair while as Harris cocked his legs on the table and lit a cigar. Jerome didn't like this reaction of George and Harris.**

Q4. **His real intention was to impress the fact upon his friends that he was an expert packer and only wanted to supervise the whole job, directing them every now and then how to do packing.**

Q5. **After the narrator had strapped and shut the bag, Harris reminded him of packing his boots. Although he had been watching him all the time he packed, he didn't reminded him before strapping the bag. This shows that Harris liked to annoy others and was rather a scornful person.**

Q6. **The "horrible idea" which came to Jerome a little later was that he had forgotten to pack his tooth brush. This idea was horrible because narrator often forgot his toothbrush while packing and had to unpack several times.**

Q7. **He had to reopen his bag three times. First to pack his boots, secondly to find his tooth brush and finally to pack his tobacco pouch.**

Q8. **According to Jerome Montmorency's only ambition was to annoy people and come in their way while they are working. He feels his day not wasted unless he is Scolded or cursed by someone. He finds great fun in doing, such things that would annoy others.**

Q9. **In my opinion none of the three was best in packing as they couldn't pack in a dignified manner. Jerome had to repack thrice and after applying a lot of effort while as Harris and George were the worsiest as they created a lot of fuss and mismanaged the things. However in comparison to them Jerrome was good but not best. The instances from text which can be put forward in support of the answer are:-**

1. **"Rummaged the things----------I repacked once more"**
2. **"George trod on butter"**
3. **"They (George and Harris) upset salt over everything"**

Q10. Montmorency's contribution to packing was creating confusion among George and Harris. He came and sat down on things which were to be packed. He put his leg into the jam and worried teaspoons pretending them as rats, got into hampers and killed three of them.

Q11. Certainly, this story is full of humour. There is humour from start to end, of the story. However the three instances which I liked most are:-

1. Troddling of George on butter and keeping that in teapot, which didn't come out later.

2. Searching for the butter all around the room by George and Harris, when it was stuck at the back of Harris.

3. Nonsense acts performed by Montmorency.

II. Use the following phrases in your own sentences.

1. Toss for: There is only one ticket left. I'll toss for it.
2. Toss about: I kept tossing about in bed all night.
3. Fall into: He felt into bad company and loss all his money.
4. Fall out: He has fallen out with his elder brother and doesn't speak to him.
5. Search for: He is searching for his lost purse.
6. Scrape out: Scrape out the flesh of the melon with a spoon.
7. Mess bout: He messed about with the radio and now it is not working.

I. Match the following:

1	Slaving	Working hard
2	Chaos	Complete confusion and disorder
3	Rummage	Search for something
4	Scrape out	Remove something
5	Stumble over	Fall, or step
6	Accomplish	Finish successfully
7	Uncanny	Strange
8	To have or get into (a row)	A quarrel or an argument

Q: Suppose you are going on a trip, how will you pack your bag. Write a paragraph on it. Mention all the important things to pack.

NO MEN ARE FOREIGN

Central Idea:

The poem "No men are foreign" is a poem of sense of love and deep respect towards one's own country. It is a poem which stresses on unity and togetherness. The natural provisions are all common for the whole humanity so the poet whises a nation without discrimination.

SUMMARY

The poem is jotted down by James Kirkup a prolific English poet. The poet is laying emphasis on the oneness of humanity. He says everyman belongs to this one world and no country is foreign for others. All the people across the world possess same body with a common colour of blood though varying complexions. All of them breathe same air, share the same sun and water and walk on the same earth in which they have to rest eternally. Aware of being benefited during peace but also become victims by the consequences of war. All labourers work with their two hands all over the world. All possess same eyes that awake and make us sleep. Also it is common, recognized and understood by all that strength can be attained with love among masses across the world.

The poet concludes with message that whenever we are raised against each other its only humanity which suffer and the Earth which is defiled. If we wage war against one another, ultimately its we who get harmed in the long run.

Task to do :- Do summarise the verses of poem according to Reference to Context.

Solved textual questions:

Ans1: By 'uniforms' the poet means the different dresses that the people wear in different pats of the world.

Ans2: According to the poet all the people that tread on the earth are distinct in their culture etc. but there are countless threads that bind them together. All the people have the same body, they walk, sleep, eat in the same way and they also breathe in the same air. All these things make all the people alike on the earth.

Ans3: The earth is an embodiment of innocence and beauty. The fire of vile and diabolic emotions such as hated, envy and jealousy outrages the frail innocence and beauty of this earth.

Ans4: All though the poem Emerson has tried to highlight the essentials of love and brotherhood. He has set out in an amazing manner to explain the numerous things that bring all the people of the world together, that make them alike. The poet has laid ample stress in saying that all men are the same with the same king of body and

same necessities to sustain them. The poet also has gushed the fact that hatred is like wild fire which brings about complete destruction. Thus love has been keenly glorified in the poem.

Ans5: The poem is inn free verse with no rhyme scheme.

Ans6: The poet has used the technique o repetition and lain logic to bring home his point.

MATHEMATICS

Chapter 2: Polynomials

Polynomials

1. A **polynomial** p(x) in one variable x is an algebraic expression in x of the form $p(x) = a_nx^n + a_{n-1}x^{n-1} + a_{n-2}x^{n-2} + \ldots\ldots + a_2x^2 + a_1x + a_0$, where.
   i. $a_0, a_1, a_2 \ldots a_n$ are constants
   ii. x is a variable
   iii. $a_0, a_1, a_2, \ldots a_n$ are respectively the **coefficients** of x^i
   iv. Each of $a_nx^n, a_{n-1}x^{n-1}, a_{n-2}x^{n-2}, \ldots a_2x^2, a_1x, a, 0$ with $a_n \neq 0$, is called a **term** of a polynomial.
2. The highest power of the variable in a polynomial is called the **degree** of the polynomial.
3. A polynomial with one term is called a **monomial**.
4. A polynomial with two terms is called a **binomial**.
5. A polynomial with three terms is called a **trinomial**.
6. A polynomial with degree zero is called a **constant polynomial**. For example: 1, -3. The degree of non-zero constant polynomial is zero
7. A polynomial of degree one is called a **linear polynomial**. It is of the form ax + b. For example: x - 2, 4y + 89, 3x - z.
8. A polynomial of degree two is called a **quadratic polynomial**. It is of the form $ax^2 + bx + c$. where a, b, c are real numbers and $a \neq 0$ For example: $x^2 - 2x + 5$ etc.
9. A polynomial of degree three is called a **cubic polynomial** and has the general form $ax^3 + bx^2 + cx + d$. For example: $x^2 + 2x^2 - 2x + 5$ etc.
10. A **bi-quadratic polynomial** p(x) is a polynomial of degree four which can be reduced to quadratic polynomial in the variable $z = x^2$ by substitution.
11. The constant polynomial 0 is called the **zero polynomial**. Degree of zero polynomial is not defined.
12. The **value of a polynomial** f(x) at x = p is obtained by substituting x = p in the given polynomial and is denoted by f(p).
13. A real number 'a' is a **zero** or root of a polynomial p(x) if p (a) = 0.
14. The number of real zeroes of a polynomial is less than or equal to the degree of polynomial.

15. Finding a zero or root of a polynomial f(x) means solving the polynomial equation f(x) = 0.

16. A non-zero constant polynomial has no zero.

17. Every real number is a zero of a zero polynomial.

18. **Division algorithm**

    If p(x) and g(x) are the two polynomials such that degree of p(x) ≥ degree of g(x) and g(x) ≠ 0, then we can find polynomials q(x) and r(x) such that:

    p(x) = g(x) q(x) + r(x)

    where, r(x) =0 or degree of r(x) < degree of g(x).

19. **Remainder theorem**

    Let p(x) be any polynomial of degree greater than or equal to one and let a be any real number. If p(x) is divided by the linear polynomial (x – a), then remainder is p(a).

    If the polynomial p(x) is divided by (x + a), the remainder is given by the value of p (-a).

    If p(x) is divided by ax + b = 0; a ≠ 0, the remainder is given by

    $$P\left(\frac{|-b|}{a}\right); a \neq 0$$

    If p (x) is divided by ax - b = 0, a ≠ 0, the remainder is given by

    $$P\left(\frac{b}{a}\right); a \neq 0$$

20. **Factor theorem**

    Let p(x) is a polynomial of degree n ≥ 1 and a is any real number such that p(a) = 0, then (x - a) is a factor of p(x).

21. **Converse of factor theorem**

    Let p(x) is a polynomial of degree n ≥ 1 and a is any real number. If (x - a) is a factor of p(x), then p(a) = 0.

    i. (x + a) is a factor of a polynomial p(x) iff p(-a) = 0.

    ii. (ax - b) is a factor of a polynomial p(x) iff p(b/a) = 0.

    iii. (ax + b) is a factor of a polynomial p(x) iff p(-b/a) = 0.

    iv. (x - a)(x - b) is a factor of a polynomial p(x) iff p(a) = 0 and p(b) = 0.

22. For applying factor theorem, the divisor should be either a linear polynomial of the form (ax + b) or it should be reducible to a linear polynomial.

23. A quadratic polynomial $ax^2 + bx + c$ is **factorised by splitting the middle term** by writing b as ps + qr such that (ps) (qr) = ac.

    Then, $ax^2 + bx + c = (px + q)(rx + s)$

24. An **algebraic identity** is an algebraic equation which is true for all values of the variables occurring in it.

25. Some useful **quadratic identities**:

    i. $(x + y)^2 = x^2 + 2xy + y^2$

    ii. $(x - y)^2 = x^2 - 2xy + y^2$

    iii. $(x - y)(x - y) = x^2 - y^2$

    iv. $(x + a)(x + b) = x^2 + (a + b)x + ab$

    v. $(x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$

    Here x, y, z are variables and a, b are constants.

26. Some useful **cubic identities**:

    i. $(x + y)^3 = x^3 + y^3 + 3xy(x + y)$

    ii. $(x - y)^3 = x^3 - y^3 - 3xy(x - y)$

    iii. $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

    iv. $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

    v. $x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$

    vi. if $x + y + z = 0$ then $x^3 + y^3 + z^3 = 3xyz$

    Here, x, y and z are variables.

Polynomial

Polynomials are expressions with one or more terms with a non-zero coefficient. A polynomial can have more than one term. In the polynomial, each expression in it is called a term. Suppose $x^2 + 5x + 2$ is polynomial, then the expressions x^2, 5x, and 2 are the terms of the polynomial. Each term of the polynomial has a coefficient. For example, if 2x + 1 is the polynomial, then the coefficient of x is 2.

The real numbers can also be expressed as polynomials. Like 3, 6, 7, are also polynomials

without any variables. These are called constant polynomials. The constant polynomial 0 is called zero polynomial. The exponent of the polynomial should be a whole number. For example, $x^{-2} + 5x + 2$, cannot be considered as a polynomial, since the exponent of x is -2, which is not a whole number.

The highest power of the polynomial is called the degree of the polynomial. For example, in $x^3 + y^3 + 3xy\ (x + y)$, the degree of the polynomial is 3. For a non-zero constant polynomial, the degree is zero. Apart from these, there are other types of polynomials such as:

Polynomials in One Variable

The formulas with only one variable are known as polynomials in one variable. A polynomial is a mathematical statement made up of variables and coefficients that involves the operations of addition, subtraction, multiplication, and exponentiation.

Below are Some Instances of Polynomials in One Variable:

$x^2 + 3x - 2$

$3y^3 + 2y^2 - y + 1$

$m^4 - 5m^2 + 8m - 3$

Coefficient of Polynomials.

A coefficient is a number or quantity that is associated with a variable. It's generally an integer multiplied by the variable immediately adjacent to it.

For example, in the expression 3x,3 is the coefficient but in the expression $x^2 + 3$, 1 is the coefficient of x^2.

Terms of Polynomial.

Polynomial terms are the portions of the equation that are usually separated by "+" or "-" marks. As a result, each term in a polynomial equation is a component of the polynomial. The number of terms in a polynomial like $2^2 + 5 + 4$ is 3.

Types of Polynomials:

Types of Polynomials.	Meaning	Example
Zero or constant polynomial	A constant polynomial has its coefficients equal to 0. Whereas a zero polynomial is the additive identity of the additive groups of polynomials such as f (x) = 0. In a constant polynomial, the degree is 0 whereas in a zero polynomial, the degree is undefined or written as -1.	3 or $3x^0$
Linear polynomial	Linear polynomials are polynomials having a degree of 1 as the degree of the polynomial. The greatest exponent of the variable(s) in linear polynomials is 1.	$x + y4$ $5m + 7n$ $2p$
Quadratic polynomial	Quadratic polynomials are polynomials having a degree of 2 as the degree of the polynomial.	$8x^2 + 7y - 9$ $m^2 + mn - 6$
Cubic polynomial	Cubic polynomials are polynomials having a degree of 3 as the degree of the polynomial.	$3x^3$ $p^3 + pq + 7$

Degree of Polynomial

The largest exponential power in a polynomial equation is called its degree. Only variables are taken into account when determining the degree of any polynomial; coefficients are ignored.

$4x^5 + 2x^3 – 20$

In the above polynomial degree will be 5.

Zeros of Polynomials

The polynomial zeros are the x values that fulfil the equation y = f(x). The zeros of the polynomial are the values of x for which the y value is equal to zero, and f(x) is a function of x. The degree of the equation y = f(x), determines the number of zeros in a polynomial.

Factorization of Polynomials

You know that any polynomial of the form p(a) can also be written as p(a) = g(a) × h(a) + R(a)

Dividend = Quotient × Divisor + Remainder

If the remainder is zero, then p(a) = g(a) x h(a). That is, the polynomial p(a) is a product of two other polynomials g (a) and h(a). For example, $3a + 6a^2 = 3a \times (1 + 2a)$.

A polynomial may be expressed in more than one way as the product of two or more polynomials.

Study the polynomial $3a + 6a^2 = 3a \times (1 + 2a)$.

This can also be factorised as $3a + 6a^2 = 6a \times \left(\frac{1}{2} + a\right)$.

Methods of Factorizing Polynomials

A polynomial can be factorised in a number of ways.

- Factorization, which is done by dividing the expression by the HCF of the words in the provided expression.
- Factorization by grouping the terms of the expression.
- Factorization using identities.

Factorization is achieved by dividing the expression by the HCF of the given expression's terms.

The biggest monomial in a polynomial is the HCF, which is a factor of each term in the polynomial. We can factorise a polynomial by determining the expression's Highest Common Factor (HCF) and then dividing each term by its HCF. The factors of the above equation are HCF and the quotient achieved.

Steps for Factorization

- Determine the HCF of the supplied expression's terms.
- Find the quotient by dividing each term of the provided equation by the HCF.
- As a product of HCF and quotient, write the given expression.

Factorization by Grouping the Expression's Terms

We come encounter polynomials in a variety of circumstances, and they may or may not contain common factors among their components. In such instances, we arrange the expression's terms so that common factors exist among the terms of the resulting groups.

Steps for Factorization by Grouping

- If required, rearrange the terms.
- Assemble the provided phrase into groups, each with its own common component.
- Determine each group's HCF.
- Find out what the other component is.
- Convert the phrase to a product of the common and additional factors.

Factorization Using Identities

To Locate the Products, Recall the Following Identities:

1. $(a+b)^2 = a^2 + 2ab + b^2$

2. $(a-b)^2 = a^2 - 2ab + b^2$

3. $(a+b)(a-b) = a^2 - b^2$

4. $(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

5. $(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$

6. $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

Observe that the LHS in the identities are all factors and the RHS are their products. Thus, we can write the factors as follows:

Factors of $a^2 - 2ab + b^2$ are $(a-b)$ and $(a-b)$ Factors of $a^2 + 2ab + b^2$ are $(a+b)$ and $(a+b)$ Factors of $a^2 - b^2$ are $(a+b)$ and $(a-b)$ Factors of $a^3 + 3a^2b + 3ab^2 + b^3$ are $(a+b), (a+b)$ and $(a + b)

Factors of $a^3 - 3a^2b + 3ab^2 - b^3$ are $(a-b), (a-b)$ and $(a-b)$ Factors of $a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$ are $(a+b+c)$ and $(a+b+c)$

identity can be expressed in terms of its components.

Steps for Factorization Using Identities

Recognize the correct persona.

In the form of the identity, rewrite the provided statement.

Using the identity, write the factors of the given equation.

$$a^3 \pm b^3 \pm 3ab(a \pm b) = (a \pm b)^3$$

$$(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$$

$$x^3 \pm y^3 = (x \pm y)\left(x^2 \pm xy + y^2\right)$$

Factorization of Trinomials of the Form $x^2 + bx + c$

Trinomials are expressions with three terms. For example, $x^2 + 14x + 49$ is a trinomial. All trinomials cannot be factorised using a single approach. We must investigate the pattern in trinomials and select the best approach for factorising the given trinomial.

Factorizing a Trinomial by Splitting the Middle Term

The product of two binomials of the type (x + a) and (x + b) is (x + a) × (x + b) x^2 + x(a + b) + ab [a trinomial]

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$(x+y)^2$	$x^2+2xy+y^2$
$(x-y)^2$	$x^2-2xy+y^2$
x^2-y^2	$(x-y)(x+y)$
$(x+a)(x+b)$	$x^2+(a+b)x+ab$
$(x+y+z)^2$	$x^2+y^2+z^2+2xy+2yz+2zx$ $=x^2+y^2+z^2+2(xy+yz+zx)$
$(x+y)^3$	$x^3+y^3+3xy(x+y)$
$(x-y)^3$	$x^3-y^3-3xy(x-y)$
$x^3+y^3+z^3-3xyz$	$(x+y+z)(x^2+y^2+z^2-xy-yz-zx)$
If $x+y+z=0$	(i) $x^3+y^3+z^3=3xyz$ (ii) $\frac{x^2}{yz}+\frac{y^2}{zx}+\frac{z^2}{xy}=3$
x^3+y^3	$(x+y)(x^2-xy+y^2)$
x^3-y^3	$(x-y)(x^2+xy+y^2)$

Algebraic Identities

An algebraic expression of the form: $f(x)=a_nx^n+a_{n-1}x^{n-1}+\ldots a_1x^1+a_0x^0$

Polynomial

Polynomial in one variable: ax^3-bx^2-cx+d

Theorems

Polynomials

Zeroes of polynomial

Types

Degree

Factor Theorem

Remainder Theorem

Number that satisfies the equation

Terms

if p(x) polynomial of degree n>1, is divided by x−a, p(a) is the remainder

if p(x) is a polynomial of degree n>1, a: any real number

Example
P(x) = 2x + 1 find zeroes of the polynomial
P(x) = 0 2x + 1 = 0 x = −1/2

Divident = (Divisor × Quotient) + Remainder

(i) if (x−a) is a factor of p(x), then p(a) = 0

(ii) if p(a) = 0, then (x−a) is a factor of p(x).

−1/2 is the zeros of the polynomial

Polynomial	Example	Degree
Linear	$3x+2$	1
Quadratic	$2x^2+3x+1$	2
Cubic	$7y^3+6y^2+2y+2$	3

Polynomial	Example
Constant (or independent)	4, − 7/5
Zero	Degree not defined (constant polynomial 0)
Monomial	$4x$
Binomial	$2x+3$
Trinomial	$3x^2+7x+2$

Important Questions

Multiple Choice Questions-

Question. 1 x^2-2x +1 is a polynomial in:

a. One Variable

b. Two Variables

c. Three variable

d. None of the above

Question. 2 The coefficient of x^2 in $3x^3+2x^2-x+1$ is:

a. 1

b. 2

c. 3

d. -1

Question. 3 A binomial of degree 20 in the following is:

a. 20x + 1

b. x/20 + 1

c. x20 +1

d. x2+20

Question. 4 The degree of $4x^3-12x^2+3x+9$ is

a. 0

b. 1

c. 2

d. 3

Question. 5 $x^2 – x$ is _____ polynomial.

a. Linear

b. Quadratic

c. Cubic

d. None of the above

Question. 6 $x – x^3$ is a _____ polynomial.

a. Linear

b. Quadratic

c. Cubic

d. None of the above

Question. 7 1 + 3x is a _____ polynomial.

a. Linear

b. Quadratic

c. Cubic

d. None of the above

Question. 8 The value of $f(x) = 5x-4x^2+3$ when x = -1, is:

a. 3

b. -12

c. -6

d. 6

Question. 9 The value of $p(t) = 2+t+2t^2-t^3$ when t=0 is

a. 2

b. 1

c. 4

d. 0

Question. 10 The zero of the polynomial f(x) = 2x+7 is

a. 2/7

b. -2/7

c. 7/2

d. -7/2

Very Short:

1.Factorise: $125x^3 - 64y^3$

2.Find the value of $(x + y)^2 + (x - y)^2$.

3. If $p(x)= x^2 - 2\sqrt{2}x+1$, then find the value of $p(2\sqrt{2})$

4.Find the value of m, if x + 4 is a factor of the polynomial $x^2 + 3x + m$.

5.Find the remainder when $x^3+ x^2 + x + 1$ is divided by $x - \frac{1}{2}$ using remainder theorem.

6.Find the common factor in the quadratic polynomials $x^2 + 8x + 15$ and $x^2 + 3x - 10$.

Short Questions:

1. Expand:

   (i) $(y - \sqrt{3})^2$

(ii) $(x - 2y - 3z)^2$

2. If, $x + = \frac{1}{x} . = 7$
3. then find the value of $x^3 + \frac{1}{x^3}$
4. Show that $p - 1$ is a factor of $p^{10} + p^8 + p^6 - p^4 - p^2 - 1$.
5. If $3x + 2y = 12$ and $xy = 6$, find the value of $27x^3 + 8y^3$
6. Factorise: $4x^2 + 9y^2 + 16z^2 2 + 12xy - 24\ yz - 16xz$.
7. Factorise: $1 - 2ab - (a^2 + b^2)$.
8. Factories:

$$27a^3 + \frac{1}{64b^3} + \frac{27a^2}{4b} + \frac{9a}{16b^2}.$$

Long Questions:

1. Prove that $(a + b + c)^3 - a^3 - b^3 - c^3 = 3(a + b)\ (b + c)\ (c + a)$.
2. Factorise: $(m + 2n)^2\ x^2 - 22x\ (m + 2n) + 72$.
3. If $x - 3$ is a factor of $x^2 - 6x + 12$, then find the value of k. Also, find the other factor of the – polynomial for this value of k.
4. Find a and b so that the polynomial $x^3 - 10x^2 + ax + b$ is exactly divisible by the polynomials $(x - 1)$ and $(x - 2)$.
5. Factorise: $x^2 - 6x^2 + 11x - 6$.

Assertion and Reason Questions:

1. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

Assertion: If $f(x) = 3x^7 - 4x^6 + x + 9$ is a polynomial, then its degree is 7.

Reason: Aromatic aldehydes are almost as reactive as formaldehyde.

2. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

Assertion: The expression $3x^4 – 4x^{3/2} + x^2 = 2$ is not a polynomial because the term $– 4x^{3/2}$

contains a rational power of x.

Reason: The highest exponent in various terms of an algebraic expression in one variable is called its degree.

Answer Key:

MCQ:

1. (a) One Variable
2. (b) 2
3. (c)x^{20} +1
4. (d) 3
5. (b) Quadratic
6. (c) Cubic
7. (a) Linear
8. (c) -6
9. (a) 2
10. (d) -7/2

Very Short Answer:

1. $125x^3 – 6443 = (5x)^3 – (4y)^3$

   By using a3 – b3 = (a – b) ($a^2 + a^b + b^2$), we obtain

   $125x^3 – 64y3 = (5x – 4y) (25x2 + 20xy + 16y^2)$

2. $(x + y)^2 + (x – y)^2 = x^2 + y^2 + 2xy + x^2 + y^2 – 2xy$

$= 2x^2 + 2y^2 = 21x^2 + y^2)$

3. Put x = 2√2 in p(x), we obtain

$p(2√2) = (2√2)^2 – 2√2(2√2) + 1 = (2√2)^2 – (2√2)^2 + 1 = 1$

4. Let $p(x) = x^2 + 3x + m$

   Since (x + 4) or (x – (-4)} is a factor of p(x).

   ∴ p (-4) = 0

$\Rightarrow (-4)^2 + 3(-4) + m = 0$

$\Rightarrow 16 - 12 + m = 0$

$\Rightarrow m = -4$

5. Let p(x) = x3+ x2 + x + 1 and q(x) = $x - \frac{1}{2}$

Here, p(x) is divided by q(x)

∴ By using remainder theorem, we have

$$\text{Remainder} = p\left(\frac{1}{2}\right) = \left(\frac{1}{2}\right)^3 + \left(\frac{1}{2}\right)^2 + \frac{1}{2} + 1$$

$$= \frac{1}{8} + \frac{1}{4} + \frac{1}{2} + 1 = \frac{1+2+4+8}{8} = \frac{15}{8}.$$

6. $x^2 + 8x + 15 = x^2 + 5x + 3x + 15 = (x + 3)(x + 5)$

$x^2 + 3x - 10 = x^2 + 5x - 2x - 10 = (x - 2)(x + 5)$

Clearly, the common factor is x + 5.

Short Answer:

Ans: 1. $(y - \sqrt{3})^2 = y2 - 2 \times y \times \sqrt{3} + (\sqrt{3})^2 = y^2 - 2\sqrt{3}\, y + 3$ $(x - 2y - 3z)^2$

$= x^2 + 1 - 2y)^2 + (-3z)^2 + 2 \times x \times (-2y) + 2 \times (-2y) \times (-3z) + 2 \times (-3z) \times x$

$= x^2 + 4y^2 + 9z^2 - 4xy + 12yz - 6zx$

Ans: 2. We have $x + \frac{1}{x} = 7$

Cubing both sides, we have

$$\left(x + \frac{1}{x}\right)^3 = 7^3$$

$$\Rightarrow x^3 + \frac{1}{x^3} + 3 \times x \times \frac{1}{x}\left(x + \frac{1}{x}\right) = 343$$

$$\Rightarrow x^3 + \frac{1}{x^3} + 3 \times 7 = 343$$

$$\Rightarrow x^3 + \frac{1}{x^3} = 343 - 21 = 322$$

Ans: 3. Let $f(p) = p^{10} + p^8 + p^6 - p^4 - p^2 - 1$

Put p = 1, we obtain

$f(1) = 1^{10} + 1^8 + 1^6 - 1^4 - 1^2 - 1$

$= 1 + 1 + 1 - 1 - 1 - 1 = 0$

Hence, $p - 1$ is a factor of $p^{10} + p^8 + p^6 - p^4 - p^2 - 1$

Ans: 4. We have $3x + 2y = 12$

On cubing both sides, we have

$\Rightarrow (3x + 2y)^3 = 12^3$

$\Rightarrow (3x)^3 + (2y)^3 + 3 \times 3x \times 2y(3x + 2y) = \sqrt{728}$

$\Rightarrow 27x^3 + 8y^3 + 18xy(3x + 2y) = \sqrt{728}$

$\Rightarrow 27x^3 + 8y^3 + 18 \times 6 \times 12 = \sqrt{728}$

$\Rightarrow 27x^3 + 8y^3 + 1296 = \sqrt{728}$

$\Rightarrow 27x^3 + 8y^3 = \sqrt{728} - 1296$

$\Rightarrow 27x^3 + 8y^3 = 432$

Ans: 5. $4x^2 + 9y^2 + 16z22 + 12xy - 24yz - 16xz$

$= (2x)^2 + (3y)^2 + (-4z)^2 + 2(2x)(3y) + 2(3y)(= 42) + 2(- 42)(2x)$

By using $a^2 + b^2 + 2ab + 2bc + 2ca = (a + b + c)^2$, we obtain

$= (2x + 3y - 4z)^2 = (2x + 3y - 4z)\ (2x + 3y - 4z)$

Ans: 6. $1 - 2ab - (a^2 + b^2) = 1 - (a^2 + b^2 + 2ab)$

$= 1^2 - (a + b)^2$

$= (1 + a + b)\ (1 - a - b)$

$[\because x^2 - y^2 = (x + y)\ (x - y)]$

Ans: 7.

$$27a^3 + \frac{1}{64b^3} + \frac{27a^2}{4b} + \frac{9a}{16b^2} = (3a)^3 + \frac{1}{(4b)^3} + 3.(3a).\left(\frac{1}{4b}\right)\left(3a + \frac{1}{4b}\right)$$

By using $x^3 + y^3 + 3xy\ (x + y) = (x + y)^3$, we have

$$= \left(3a + \frac{1}{4b}\right)^3.$$

Long Answer:

Ans: 1. L.H.S. $= (a + b + c)^3 - a^3 - b^3 - c^3$

$= \{(a + b + c)^3 - 3\} - \{b^3 + c^3\}$

$= (a + b + c - a)\ \{(a + b + c)^2 + a^2 + a(a + b + c)\} - (b + c)\ (b^2 + c^2 - bc)$

$= (b + c)\ \{a^2 + b^2 + 2 + 2ab + 2bc + 2ca + a^2 + a^2 + ab + ac - b^2 - a^2 + bc)$

$= (b + c)\ (3a2 + 3ab + 3bc + 3ca\}$

$= 3(b + c)\ \{a^2 + ab + bc + ca\}$

$= 31b + c)\ \{\{a^2 + ca) + (ab + bc)\}$

$= 3(b + c)\ \{a(a + c) + b(a + c)\}$

$= 3(b + c)(a + c)(a + b)$

$= 3(a + b)(b + c)(c + a)$ = R.H.S.

Ans: 2. Let $m + 2n = a$

$\therefore (m + 2n)^2 x^2 - 22x(m + 2n) + 72 = a^2x^2 - 22ax + 72$

$= a^2x^2 - 18ax - 4ax + 72$

$= ax(ax - 18) - 4(ax - 18)$

$= (ax - 4)(ax - 18)$

$= \{(m + 2n)x - 4)\}\{(m + 2n)x - 18)\}$

$= (mx + 2nx - 4)(mx + 2nx - 18)$.

Ans: 3. Here, $x - 3$ is a factor of $x^2 - kx + 12$

$\therefore$ By factor theorem, putting $x = 3$, we have remainder 0.

$\Rightarrow (3)^2 - k(3) + 12 = 0$

$\Rightarrow 9 - 3k + 12 = 0$

$\Rightarrow 3k = 21$

$\Rightarrow k = 7$

Now, $x^2 - 7x + 12 = x^2 - 3x - 4x + 12$

$= x(x - 3) - 4(x - 3)$

$= (x - 3)(x - 4)$

Hence, the value of k is 7 and other factor is $x - 4$.

Ans: 4. Let $p(x) = x^3 - 10x^2 + ax + b$

Since p(x) is exactly divisible by the polynomials $(x - 1)$ and $(x - 2)$.

$\therefore$ By putting $x = 1$, we obtain

$(1)^3 - 10(1)^2 + a(1) + b = 0$

$\Rightarrow a + b = 9$

And by putting $x = 2$, we obtain

$(2)^3 - 10(2)^2 + a(2) + b = 0$

$8 - 40 + 2a + b = 0$

$\Rightarrow 2a + b = 32$

Subtracting (i) from (ii), we have

$a = 23$

From (i), we have $23 + b = 9 = b = -14$

Hence, the values of a and b are $a = 23$ and $b = -14$

Here, constant term of p(x) is -6 and factors of -6 are ± 1, ± 2, ± 3 and ± 6

By putting x = 1, we have

$p(1) = (1)^3 - 6(1)^2 + 11(1) - 6 = 1 - 6 + 11 - 6 = 0$

∴ (x – 1) is a factor of p(x)

By putting x = 2, we have

$p(2) = (2)^3 - 6(2)^2 + 11(2) - 6 = 8 - 24 + 22 - 6 = 0$

∴ (x – 2) is a factor of p(x)

By putting x = 3, we have

$p(3) = (3)^3 - 6(3)^2 + 11(3) - 6 = 27 - 54 + 33 - 6 = 0$

∴ (x – 3) is a factor of p(x) Since p(x) is a polynomial of degree 3, so it cannot have more than three linear factors.

$\therefore x^3 - 6x^2 + 11x - 6 = k\,(x - 1)\,(x - 2)\,(x - 3)$

By putting x = 0, we obtain

$0 - 0 + 0 - 6 = k\,(-1)\,(-2)\,(3)$

$-6 = -6k$

$k = 1$

Hence, $x^3 - 6x^2 + 11x - 6 = (x - 1)\,(x - 2)(x - 3)$.

Assertion and Reason Answers:

1. a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

2. b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

اُردو کہاں پیدا ہوئی

س : اردو اور کشمیری میں شامل چند مشترکہ الفاظ اپنی کاپی پر لکھئے:

ج : چائے، قلم، سڑک، چشمہ، تھوڑا، بہت، کم، زیادہ، گرم، سرد، کتاب، کاپی

س : سوچ کر بتائیے کہ درجِ ذیل زبانیں کہاں بولی جاتی ہیں؟

ج : کشمیری کشمیر میں، ڈوگری جموں میں تمل تامل ناڈو میں، پنجابی پنجاب میں، سندھی سندھ میں ملیالم کیرلا میں بولی جاتی ہے۔

س : برّصغیر ہندو پاک کو زبانوں کا عجائب خانہ کیوں کہا گیا ہے؟

ج : برصغیر ہندو پاک کو زبانوں کا عجائب خانہ اس لئے کہا جاتا ہے کیوں کہ یہاں بہت سی چھوٹی بڑی بولیاں بولی جاتی ہیں جو زبانوں کے کئی خاندانوں سے تعلق رکھتی ہیں جن میں پرانی اور نئی زبانیں شامل ہیں۔

(نوٹ: ڈاکٹر نذیر احمد ملک کا نوٹ کتاب سے یاد کریں۔)

گرائمر

کلمہ کی اقسام میں سے ایک قسم اسم ضمیر ہے۔

ضمیر وہ کلمہ ہے ج و کسی اسم کے بدلے استعمال کیا جاتا ہے۔ مثلاً راشد نے کہا میں نے کتاب خریدی ہے۔

نوٹ: جس اسم کے بدلے ضمیر استعمال ہو اس اسم کو مرجع کہتے ہیں۔

اسم ضمیر کی چند قسمیں ہیں۔ ان میں سے ایک قسم ضمیر شخصی ہے۔

ضمیر شخصی وہ ضمیر ہے جو کسی شخص کے لئے استعمال کی جاتی ہے۔

ضمیر شخصی کی تین حالتیں ہیں۔ غائب، حاضر، متکلم

۱ ضمیر غائب وہ ضمیر ہے جو کسی ایسے شخص کے لئے استعمال ہو جو موجود نہ ہو۔ جیسے راشد ذہین لڑکا ہے۔ وہ ہر کام وقت پر کرتا ہے۔

۲ ضمیر حاضر وہ ضمیر ہے جو مخاطب کے لئے استعمال ہو۔ جیسے۔ تو نے کا مکیا ہے۔۔ یا تم جاؤ۔

۳ ضمیر متکلم وہ ضمیر ہے جو بولنے والا خود اپنے لئے استعمال کرے جیسے۔ میرا نام راشد ہے۔ میں پڑھتا ہوں۔

(نوٹ) ضمیر کبھی فاعل ہوتی ہے کبھی مفعول اور کبھی مضاف الیہ ہوتی ہے۔

جیسے: اس نے کام کیا، اس کا کام عمدہ ہے۔ میں نے اسکو دیکھا۔

مندرجہ بالا مثالوں میں "اس نے" ضمیر فاعل کی حالت میں ہے۔ "اُس کا" ضمیر مضاف الیہ کی حالت میں ہے۔ "اس کو" ضمیر مفعول کی حالت میں ہے۔

س : درج ذیل الفاظ کے متضاد:

تنزل = ترقی آسان = مشکل خاص = عام قدیم = جدید

تعجیل = تاخیر دُور = نزدیک پوشیدہ = ظاہر

گرائمر

س: مندرجہ ذیل اقتباس میں سے ضمائر شخصی تلاش کر کے نوٹ بک پر لکھئے؟

حضرت شاہ ہمدان ایک بلند پایہ ادیب بھی ہیں۔ وہ سو سے زائد کتابوں کے مصنف ہیں۔ اُنہوں نے ساری کتابیں عربی یا فارسی میں لکھیں۔ ان کی کتاب اوراد فتحیہ بہت مشہور ہے۔ اس میں وہ وظائف درج ہیں جو حضرت شاہ ہمدانؒ نے مختلف اولیاء سے جمع کئے۔

جواب: وہ، انہون، اُن، اُس ضمائر شخصی ہیں۔

س: 'اردو کہاں پیدا ہوئی' کے زیر عنوان میں مندرجہ ذیل الفاظ کے متضاد تلاش کیجئے۔

جواب:

الفاظ	متضاد
تنزّل	ارتقا
آسان	مشکل
خاص	عام
قدیم	جدید
تعجیل	تاخیر
دور	نزدیک
پوشیدہ	ظاہر

نوٹ (اسم ضمیر کی تعریف مکمل کتاب سے یاد کریں)

CIVICS

Chapter 1: What is Democracy? Why Democracy?

9th

What is Democracy? Why Democracy?

What is Democracy?

Definition of Democracy

Democracy is a form of government in which the rulers are elected by the people. One chief factor common to all democracies is that the government is chosen by the people. It also helps students to demarcate between democratic and non-democratic governments. From the non-democratic government, take the example of Myanmar, where rulers were not elected by the people. Those who were in charge of the army of the country took over as rulers and people had no say in this decision. Dictators like Pinochet (Chile) are not elected by the people. This also applies to monarchies.

It is not possible to give only one definition of democracy. Democracy has many features. Some features of a democracy are

Democracy is a form of Government in which the rulers are elected by the people.

- Chile under Pinochet was not a democratic country because Pinochet was not elected by the people. Saudi Arabia is also not a democracy as it is a monarchy.

Features of Democracy

The simple definition of democracy gives rise to various questions, which are given below:

- Who are the rulers in this definition?
- What kind of election constitutes a democratic election?
- Who are the people who can elect the rulers or get elected as rulers?
- Finally, what form of government is a democracy?

In a democracy, all major decisions are made by the elected leaders.

- General Pervez Musharraf led a military coup in Pakistan in October 1999. He later changed his designation to President. He also amended the Constitution of Pakistan according to which the President could dismiss the national or provincial assemblies. Moreover, although the people elect representatives to the provincial and national assemblies, the elected representatives were not authorized to make final decisions.
- The final decisions could only be taken by Musharraf and other senior military officers who were not actually elected representatives of the people.
- Pakistan, under such circumstances cannot be called a democracy as the elected representatives of the people have the power to make major decisions in a democracy.

In a democracy, free and fair elections should be held regularly.

- In China, elections are held regularly after every five years. People elect the members of the Parliament called National People's Congress. The Parliament has the power to elect the President of the country.

- In China, only the members of the Chinese Communist party or its eight allied parties can contest elections, and thus, only the Communist party can form the Government.
- In Mexico, elections are held after every six years, but until 2000, every election was won by the Institutional Revolutionary Party (IRP). The IRP used every legal and illegal method to win the elections. Teachers in schools were forced to influence parents to vote for the IRP, media ignored all activities of the ruling party but only focused itself on criticizing the opposing parties and large sums were spent on campaigning for IRP candidates.
- Thus, democracy must be based on free and fair elections where those currently in power have a fair chance of losing the elections.

Democracy should be based on the principle of one person, one vote and one value.

- In Saudi Arabia, women do not have the right to vote.
- In Fiji, the vote of a local Fiji has more value than that of an Indian Fijian.
- In Estonia, the citizenship rules are such that the people belonging to the Russian minority find it difficult to vote.
- Therefore, we find that each adult citizen must have one vote and each vote must have one value.

Rules of Law and Respect for Rights

- In Zimbabwe, President Robert Mugabe has been ruling since independence. Although Mugabe is popular, he uses unfair practices during elections.
- He has amended the Constitution multiple times in order to increase the powers of the President and to make him less accountable.
- The members of opposition parties are jailed if they raise their voice against the Government and protests against the Government and its policies are declared illegal.
- It is important for a democratic government to grant basic rights and freedoms to its citizens and the government should be accountable to its citizens.
- Therefore, a democratic government rules within the limits set by constitutional law and citizens' rights. The government must function within basic rules of the Constitution and citizens' rights.

One person, one vote, one value one value

Democracy is based on a fundamental principle of political equality. However, there are many instances of denial of the equal right to vote. Until 2015, in Saudi Arabia, women did not have the right to vote. Estonia has made its citizenship rules in such a way that people belonging to the Russian minority found it difficult to get the right to vote. In Fiji, the electoral system is such that the vote of an indigenous Fiji has more value than that of an Indian Fijian. Definitely not a democratic government. The feature of democracy this highlight is that in a democracy, each adult citizen must have one vote and in turn, each vote must have one value.

Why Democracy?

Some arguments against a democratic government are

- Democracy leads to instability as leaders keep on changing in a democratic setup.
- The decision-making process is delayed in a democracy because several people have to be consulted in a democratic setup.
- Sometimes even elected people do not know about the best interests of the people. Thus, at times, it leads to bad decisions.
- There are several cases of corruption as democracy is based on electoral competition.
- Most people do not know what democracy is. Thus, they should not decide anything.

According to these arguments, democracy does not seem to be an ideal form of government. But it is not so. The following arguments prove that democracy is the best form of government.

Cons of Democracy

- Leaders keep changing in a democracy leading to instability
- Democracy is all about political competition and power play, leaving no scope for morality
- Many people have to be consulted in a democracy that leads to delays
- Elected leaders do not know the best interest of the people, resulting in bad decisions
- Democracy leads to corruption since it is based on electoral competition
- Ordinary people don't know what is good for them; they should not decide anything

From these arguments, we can see that democracy of the kind we see, may not be the ideal form of government. However, we will see if democracy is better than other forms of government that are there for us to choose from.

A democratic government is a better government because it is a more accountable form of government.

- China suffered from one of the worst famines in 1958–1961. Nearly three crore people died in the famine. No major famine occurred in India at this time. According to economists, it was perhaps because India is a democratic country.
- Democracy in India made the Government respond to food scarcity in a way in which the Chinese Government did not. It was because India has a multi-party system and free press. The Government may be criticized and even lose the next elections.
- This is not the case with the Chinese. Because China is ruled by the Communist party and no one can criticize the Government, the Chinese Government took the famine very casually.

Arguments in Favours of Democracy

A democratic government is a better government because it is a more accountable form of government: Take the example of India and China famines in 1958-1961. While China was hit badly, India did not fare as badly, despite its economic condition. Reason for this could be that India responded to the food scarcity in a way that the Chinese government did not. Here, we see

that democracy is better than any other form of government in responding to the needs of the people.

Democracy improves the quality of decision-making: Democracy is based on consultation and discussion. A democratic decision always involves many people, discussions and meetings and they are able to point out possible mistakes in any decision. This may take time. However, the advantage of taking time over important decisions is that it reduces the chances of rash or irresponsible decisions.

Democracy provides a method to deal with differences and conflicts: In any society, people are bound to have differences of opinions and interests. These differences are particularly more in a country like ours with amazing social diversity. People belong to different regions, speak different languages, practice different religions and have different castes. The preferences of one group can clash with those of other groups. How do we resolve such a conflict? Democracy provides the only peaceful solution to this problem. In a democracy, no one is a permanent winner or loser. Different groups can live with one another peacefully.

Democracy enhances the dignity of citizens: Democracy is based on the principle of political equality. It recognizes that the poorest and the least educated have the same status as the rich and the educated.

Democracy is better than other forms of government because it allows us to correct our own mistakes: Even if no government can guarantee that no mistakes will be made, in a democracy one can be sure that it will not be hidden for too long. It makes space for public discussion on these mistakes. There is also room for correction. Rulers have to change their decisions, or they could themselves be changed.

Thus, we can correctly infer that while democracy may not be the solution to all problems, it is still clearly better than any other alternatives.

Democracy improves the quality of Decision Making

- Democracy is based on consultations and discussions. People collectively discuss and take decisions.
- This reduces the possibility of taking any irresponsible decision.

Democracy provides a method to deal with differences and conflicts

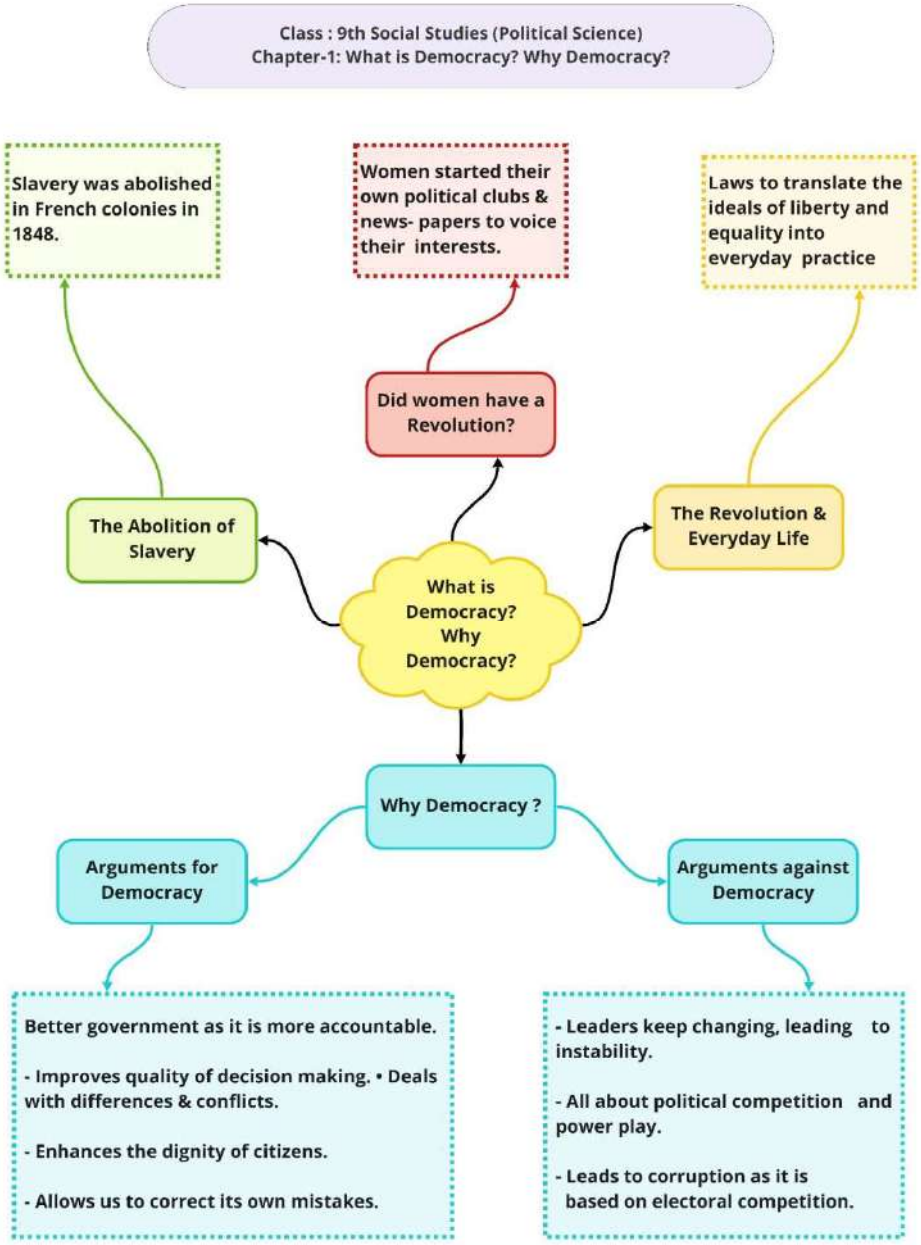
- Differences are bound to take place in a society where people belonging to various castes, religion and classes live together.
- People belonging to different religions and castes have their own preferences and interests of one group may clash with the other.
- If a powerful group begins to dictate its terms and forces its decisions over the other groups, it may lead to discontentment and resentment among the other people.
- Democracy provides peaceful solution to this problem because decisions which are taken by mutual consent are followed and respected by all.

Democracy allows people to correct their own mistakes

- There are possibilities of taking wrong decisions in a democracy. However, as there is a space for public discussions, such mistakes cannot remain hidden from the people for long.
- If the representatives of the people do not change their incorrect decisions, they may not get elected by the people in the next elections.

Currently most of the countries practice a form of democracy in which representatives of the people make laws and take decisions on behalf of the people who voted for them. This is called representative democracy.

We find that no country in the world is a perfect democracy but certainly it is the best form of government.



Important Questions

Multiple Choice questions-

Question 1.A democracy must be based on a free and fair election where those currently in power:

(a) Have a fair chance of wining

(b) Have a fair chance of losing

(c) Cannot be removed from their seats

(d) None of the above

Question 2.In Saudi Arabia:

(a) Men do not have the right to vote

(b) Women do not have the right to vote

(c) Both men and women have the right to vote

(d) Both men and women do not have the right to vote

Question 3.Estonia has made its citizenship rules in such a way that people beloging to:

(a) African minority find it difficult to get the right to vote

(b) American minority find it difficult to get the right to vote

(c) Russian minority find it difficult to get the right to vote

(d) All the above

Question 4.In Fiji, the electoral system is such that the vote of an indigenous Fiji has more value than that of:

(a) An African Fijian (b) A Chinese Fijian (c) An Indian Fijian (d) Pakistani-Fijian

Question 5.

In a democracy, each adult citizen must:

(a) Have one vote and each vote must have two values

(b) Have two votes and each vote must have one value

(c) Have one vote and each vote must have one value

(d) All the above

Question 6.Zimbabwe attained inde-pendence from white minority rule in:

(a) 1960 (b) 1970 (c) 1980 (d) 1990

Question 7.A democratic government rules within limits set by:

(a) The ruling government

(b) The constitutional law

(c) Citizens right

(d) Constitutional law and citizens' rights

Question 8.Democracy is a form of government in which:

(a) Rulers elected by the government take all the major decisions

(b) Elections offer a choice and fair opportunity to the people to change the current rulers

(c) The exercise of this choice leads to a government limited by basic rules of the constitution and citizen's rights

(d) All the above

Question 9.The correct argument/s of democracy is/are:

(a) Leaders keep changing in a democracy. This leads to instability

(b) Democracy is all about political competition and power play. There is no scope for morality

(c) So many people have to be consulted in a democracy that it leads to delays

(d) All the above

Question 10.The worst recorded famine in world history is:

(a) Bengal famine (b) Japanese famine (c) China's famine (d) American famine

Question 11.A democratic government is a better government because it is a more:

(a) Effective form of government (b) Accountable form of government

(c) Powerful form of government (d) None of the above

Question 12.Democracy improves the:

(a) Dignity of the people (b) Economy of the country

(c) The quality of decision-making (d) All the above

Question 13.Democracy provides a method:

(a) To build buildings (b) To fight poverty

(c) To deal with differences and conflict (d) All the above

Question 14.Democracy is the form of government in which:

(a) People are elected by the rulers (b) Rulers are not elected by the people

(c) People themselves become rulers (d) Rulers are elected by the people

Question 15.In Pakistan, General Parvez Musharraf led a military coup in October:

(a) 1997 (b) 1998 (c) 1999 (d) 2000

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1. (b)Have a fair chance of losing
2. (b) Women do not have the right to vote
3. (c)Russian minority find it difficult to get the right to vote
4. (c)An Indian-Fijian
5. (c) Have one vote and each vote must have one value
6. (c)1980
7. (d)Constitutional law and citizens' rights
8. (d) All the above
9. (d) All the above
10. (c) China's famine
11. (b)Accountable form of government
12. (c) The quality of decision-making
13. (c)To deal with differences and conflict
14. (d)Rulers are elected by the people
15. (c) 1999

Very Short Questions:

1. To what was Allende's government committed in Chile?
2. To what was Walesa's government committed in Poland?
3. Why do we need a definition?
4. What form of government democracy is?
5. State any one necessary condition of democracy.
6. Do we have election in a monarchy where the king is all-powerful?
7. Does the army regime permit elections where it rules through the gun?
8. From which language the word democracy has come up?
9. How did Abrahan Lincoln define democracy?
10. Does holding of the elections ensure democracy in a country?

Very Short Answer:

1. Allende's government was committed to greater role in economic activities.
2. Walesa's government was committed to as little role as was possible.
3. We need a definition when we counter a difficulty in everyday use.
4. Democracy is a form of government in which the rulers are elected by the people.
5. Election is the necessary condition of democracy.
6. There can be no election in a monarchy headed by a real powerful king.
7. Normally not. The army general may allow election only to legitimate his rule.
8. Etymologically, democracy is derived from two Greek words 'demos' and 'Kratia'. 'Demos' means people and 'Kratia' means rule. Thus, etymologically, democracy means the rule of the people.

9.Democracy, Lincoln had said, is government of the people, by the people and for the people.
10.Certainly not. Salazar allowed elections in Portugal once for a while. But there was never a time when the opposition parties won a single seat.

Short Questions:

1. Why if is more likely that decisions are wrong in dictatorship than under a democracy?
2. Why perfect equality does not exist in a society?
3. Why are the governments responsive in democracies?
4. Give any one definition of democracy.
5. Why do we need a definition of any concept?
6. Democracy involves people in the formation of the government. How do the people form government?
7. What do you mean by political freedom? How does it help the functioning of democracy?

Short Answer:

Ans: 1. Under dictatorship (monarchy or military rule), the rulers do not involve people at all in decision-making. That is why that the decisions there are likely to be wrong.

Ans: 2.Perfect equality does riot exist in any society because of inequalities, among people, in wealth, social status, and position. In fact, perfect inequality is neve? possible.

Ans: 3.As the elected representatives, in a democracy, has to secure the support of the people, they cannot afford to be insensitive to the aspirations of the people.

Ans: 4.Abraham Lincoln defines democracy as the government of the people (i.e, through participation people constitute the government) by the people (i.e. the people, through the use of their rights, control, their rulers), for the people, (i.e. the government rules for the welfare of the people.

Ans: 5. We need a definition of a concept so as to understand the meaning of the concept. Definition clarifies the meaning. For example, the definition of democracy, etymologically, means, that it is the rule of the people.

Ans: 6. Democracy, indeed, means government of the people. People form government through elections. Periodic elections are conditions of democracy.

Elections have to be

- frequent (i.e. after definite periods),
- free and, fair
- In the absence of elections, democracy is impossible; it can not function successfully.

Ans: 7. Political freedom means freedom given to the people in matter relating to democratic functioning of the government. Political freedom implies right of the people to have their opinions, their right to express those, opinions, and demonstrate their political actions in the form of procession. When people are not permitted to express their opinion, this weakens democratic trends/tendencies, The house arrest of Aung San Suu Kyi does not fit in democratic functioning.

Long Questions:

1. Explain the following:
   (i) Freedom of expression
   (ii) Freedom of information
   (iii) Freedom to form association?
2. Write on the following:
   (a) Freedom of culture and religion.
   (b) Individual freedoms.
3. What do you mean by 'Rule of law'?
4. Can you identify some features necessary for any country to be called democratic?
5. Are elections necessary conditions in a democracy? Give arguments.

Long Answer:

Ans: 1.(i) Freedom of expression: Citizens have freedom of opinion, expression ad discussion. They can criticize officials, government or the socio-economic order. They can also organize meetings, campaign on public issues or demonstrate against government.

(ii) Freedom of information: Citizens have access to information about candidates in elections. They can seek information from different sources. Government cannot have monopoly on sources of information. Laws shall protect alternative sources of information.

(iii) Right to form associations: Citizens have a right to form, join or quit associations. It includes a right to form or join a political party that opposes government or to contest elections in opposition to the ruling party. Opposition shall have art equal opportunity to increase popular support or gain power through elections.

Ans: 2.(a) Freedom of culture and religion: People have freedom of faith, belief and religion. Those who belong to ethnic minorities have the right to follow their cultural practices. Linguistic minorities can speak their language. Religious minorities can freely follow and profess their religion. Persons who belong to minorities enjoy rights available to any other citizen of the country.

(b) Individual freedoms: State does not impose restrictions on travel, choice of residence, and choice of employment. Citizens have an equal right to seek admission in colleges or recruitment to jobs. They can acquire or sell property. They can establish private businesses. They can read any book of their choice. Government does not impose ban on the discussion of ideas.

Ans: 3. All citizens are treated as equal under the law. Law protects citizens from unjustified detention. Military and police are under the control of elected representatives. Military and police cannot terrorize or torture those who oppose government. Independent courts effectively protect individual and group rights. Decisions of courts are respected and enforced by those in government.

Ans: 4. There are, indeed, certain features which are necessary for any country to be called as democratic. Some of these are:

- There should be rights for the citizens, riot nominal but actually available.

- The Constitution of the country should not only provide these rights, it should also ensure them.
- The Constitution should also provide democratic institutions and procedures as well.

Ans: 5. Elections, indeed, are necessary conditions for any democracy. In fact, elections alone distinguish between a democracy and non-democracy. In a non-democracy, such as in military rule or in a nonparty, there are no elections. If there are elections, they are not frequent, nor fair, and nor even freer. Salazar of Portugal did allow one month of campaign but there was little possibility of opposition leaders whining the elections.

Elections are necessary, but if the power is not given to those who win elections, there cannot be democracy in such countries. Aung San Suu Kyi won elections in Burma (now Myanmar) in 1990, but she was not given power, instead, she was put under house arrest.

Elections imply the existence of more than one political party so to enable them to contest elections. In China, only the ruling political party can put up candidates, two or more. How can we call such a system as a democratic one? Democracy requires elections free, fair and frequent; elections where people are able to remove those elected and install need leaders in power.

Assertion Reason Questions:

1. In the following questions, a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct option out of the choices given below each question.
   Assertion (A) :A referendum was held in Pakistan in the year 2002.
   Reason (R) : Pervez Musharraf was granted five year extension as President.
   A) Both A and R are true and R is the correct explanation of A
   B) Both A and R are true, but R is not the correct explanation of A
   C) A is true, but R is false
   D) A is false, but R is true
2. In the following questions, a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct option out of the choices given below each question.
   Assertion (A) : Pakistan is considered as a democratic country.
   Reason (R) : In Pakistan the final powers rested with military officers.
   A) Both A and R are true and R is the correct explanation of A
   B) Both A and R are true, but R is not the correct explanation of A
   C) A is true, but R is false
   D) A is false, but R is true

Assertion Reason Answer:

1. A) Both A and R are true and R is the correct explanation of A
2. D) A is false, but R is true

Case Study Based Question:

1. Read the source and answer the following questions.

In Pakistan, General Pervez Musharraf led a military coup in October 1999.

He overthrew a democratically elected government and declared himself the Chief Executive of the country. Later he changed his designation to President and in 2002 held a referendum in the country that granted him a five year extension. Pakistani media, Human Rights Organizations and democracy activists said that the referendum was based on malpractices and fraud.

In August, 2002 he issued a Legal Framework Order that amended the Constitution of Pakistan. According to this order, the President can dismiss the National and Provincial Assemblies. The work of the Civilian Cabinet is supervised by a National Security Council which is dominated by military officers. After passing this law, elections were held to the National and Provincial Assemblies. So, Pakistan has had elections, elected representatives have some powers. But the final power rested with military officers and General Musharraf himself.

(1) Why did Pakistani media and Human Rights Organisation criticise General Pervez Musharraf?

A) Musharraf over threw an elected government and declared himself as the Chief Executive .

B) Musharraf changed his designation to President and held a referendum that granted him a 5 year extension which was based on mal practices and fraud.

C) He was an autocratic ruler.

D) None of the above

(2) Find the incorrect statement from the given options

A) General Musharraf declared himself as the Prime Minister of the country in 1999.

B) In August 2002, General Musharraf amended the Constitution of Pakistan.

C) General Musharraf has the authority to dismiss the National and Provincial Assemblies.

D) General Musharraf imbibed himself with supreme powers.

(3) According to the Legal Framework Order , the work of the civilian cabinet of Pakistan is supervised by the.....

A) Chief Executive Council Members.

B) Prime Minister.

C) Military Officers of the National Security Council.

D) None of the above.

(4) The power to take final decision in Pakistan rested with

A) Elected representative of National Assemblies.

B) Elected representative of Provincial Assemblies.

C) Army officials and General Musharraf.

D) All of the above.

2. Read the given passage and answer the following questions.

Zimbabwe attained independence from White minority rule in 1980. Since then the country has been ruled by ZANU-PF, the party that led the freedom struggle. Its leader, Robert Mugabe, ruled the country since independence.

Elections were held regularly and always won by ZANU-PF. President Mugabe was popular but also used unfair practices in elections. Over the years his government changed the constitution several times to increase the powers of the President and make him less accountable.

Opposition party workers were harassed and their meeting disrupted. Public protests and demonstrations against the government were declared illegal. There was a law that limited the right to criticize the President.

Television and radio were controlled by the government and gave only the ruling party s version. There were independent newspapers but the government harassed those journalists who went against it.

The government ignored some court judgments that went against it and pressurized judges. He was forced out of office in 2017.

(1) Which of the following statement is/are correct in the case of Zimbabwe?.

A) Popular governments are always democratic.

B) Popular governments can be undemocratic.

C) Popular leaders can be autocratic.

D) Both (a) and (c).

(2) What kind of oppressive practices were adopted under the rule of Mugabe?

A) Public protests and demonstrations against the government were declared illegal.

B) Opposition party workers were harassed and their meeting disrupted.

C) There was a law that limited the right to criticise the President.

D) All of the above.

(3) Which of the following statement is incorrect?

A) Democracy also lead to instability.

B) A democratic government rules within limits set by constitutional law and citizens rights.

C) A democratic government cannot do. whatever it likes, simply because it has won an election.

D) In democracy, rulers elected by the people cannot take all the major decisions.

(4) Which of the following facts are correct with respect to Robert Mugabe?

A) He always followed a pragmatic approach to benefit the common people.

B) He always intended to convert Zimbabwe from a parliamentary democracy into a one-party socialist state.

C) He was an autocratic leader.

D) Both (a) and (c).

Case Study Answer:

1. **Answer:**

(1) B) Musharraf changed his designation to President and held a referendum that granted him a 5 year extension which was based on mal practices and fraud.
(2) A) General Musharraf declared himself as the Prime Minister of the country in 1999.
(3) C) Military Officers of the National Security Council
(4) C) Army officials and General Musharraf

2. **Answer:**

(1) D) Both (a) and (c)
(2) D) All of the above
(3) D) In democracy, rulers elected by the people cannot take all the major decisions.
(4) D) Both (a) and (c).

Textual Question:

Exercises:

Q1. a. Country A: Undemocratic.
b. Country B: Not Sure.
c. Country C: Democratic.
d. Country D: Undemocratic.

Q2. a Country P: Undemocratic.
b. Country Q: Democratic.
c. Country R: Undemocratic.
d. Country S: Undemocratic.

Q3. Democracies are more prosperous than others is not a good argument in favour of democracy because in democratic form of government, government keeps on changing which leads to instability. The prosperity of any country depends on the correct policies of the govt. It also depends on the availability of natural resources not with the form of govt. Democracy can't guarantee prosperity.

Q4. a. Democratic Element: A minister said that some laws have to be passed by the parliament.
Undemocratic Element: To the regulations decided by the WTO.

b. Democratic Element: Election Commission ordered repolling in a constituency.
Undemocratic Element: Large-scale rigging was reported.

c. Democratic Element: This led women's organizations to demand one-third seats for women.
Undemocratic Element: Women's representation in the parliament has barely reached 10%.

Q5. Option “d” is not a valid reason for arguing that there is a lesson possibility of famine in a democratic country. This is because practicing a religion has nothing to do with preventing famine.

Q6. Option “d” which advocates the government officials money is an undemocratic one.

Q7. A democracy is the government elected by the people themselves. The Army is integral in protecting the country, but it is not elected by the people; hence it can’t be a democratic govt. The second statement is dangerous because bringing religion into politics can cause serious conflict.

Q8. a. This statement of father is undemocratic. As every adult has right to choose their life partner. The father does not have the right to impose his choice on daughter.

b. The statement is undemocratic as students have the right to ask questions. This is undemocratic if his right is denied.

c. The statement is democratic as it is their fundamental right.

Q9. a. This is democracy as only democratic set up allows right to vote and also elections at regular intervals of time.

b. A democratic country has to look after the welfare of its people. Therefore it can’t perform any functions which go against the welfare of the country and people. Moreover, it doesn’t allow the international agency to interfare in the internal affairs.

c. In democracy, education is available in all language s as it is basic right.

d. Democracy provides people the right to strike or the right to free speech and demonstrations.

e. A very important part of democracy is the freedom of press. Therefore, the total control of media shows that there is no freedom of speech and expression and right to speak against the govt. Thus thought the country is democratic in some manners, it is also undemocratic in some ways.

Q10. Self attempt.