1 Nutrition in Plants

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. (d) 2. (b) 3. (d) 4. (b)

B. Fill in the blanks :

Ans. 1. **Food** contain substances that provide nourishment to the body.
2. The mode of nutrition by green plants is called **autotrophic nutrition**.
3. **Green leaves** are the kitchen of the plant.
4. The organism deriving food is called a **parasite**.
5. **Mistle-toe** is a partial parasite.

C. Write true or false :

Ans. 1. True 2. False 3. True 4. False 5. True

Section-II

A. Very Short Answer Type Questions :

Ans. 1. Food contain substances that provide nourishment to the body. These are called nutrients.
2. Photosynthesis is the process by which green plants and some other organisms use sunlight to synthesize nutrients from carbon dioxide and water. Photosynthesis in plants generally involves the green pigment chlorophyll and generates oxygen as a by product.
3. Vitamins, proteins, fat, calcium, iron, carbohydrates, sulphur, etc.
4. $$\underset{\text{Carbon dioxide}}{CO_2} + \underset{\text{Water}}{H_2O} \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} \underset{\text{Glucose}}{C_6H_{12}O_6} + \underset{\text{Oxygen}}{O_2}$$

B. Short answer type questions :

Ans. 1. Plants get their nutrients from air, water and soil.
2. As they can prepare their food from raw inorganic materials (carbon dioxide and water), they are also known as producers.
3. Green leaves are called the kitchen of the plant, as in the cells of these leaves, there are tiny structures, the chloroplasts (chloros = green) where food is made by the process of photosynthesis. The chloroplasts contain a green pigment, chlorophyll that makes the leaf look green. Chlorophyll absorbs the solar energy and converts it into chemical energy.

$$\underset{\text{Carbon dioxide}}{CO_2} + \underset{\text{Water}}{H_2O} \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} \underset{\text{Glucose}}{C_6H_{12}O_6} + \underset{\text{Oxygen}}{O_2}$$

The equation need not be balanced at this level. The arrow (®) represents 'produces'.

This chemical energy is stored in the food that is prepared.

4. Green leaves are called the kitchen of the plant, as in the cells of these leaves, there are tiny structures, the chloroplasts (chloros = green) where food is made by the process of photosynthesis.

   For photosynthesis, the leaves need water from the soil and carbon dioxide from the air. Water and minerals are absorbed from the soil by the roots, carried to the stem and finally to the leaves through water conducting tissues called xylem vessels.

C. Compare and contrast :

Ans. 1. The living organisms who prepare their own food are called autotrophic nutritions.

   The living organisms who take in ready-made food, either from plants and from animals are called heterotrophic nutrition.

2. **(a) Saprophytic :** Feeding on dead and decaying organic matter. These plants lack green colour.

   (b) Living in another organism and deriving food from that organism. The organism deriving food is called a parasite.

3. Parasitic plants are those plants that derive their nutrition form other plants, those are able to make their own food through photosynthesis. Parasitic plants are of two type root parasites and shoot parasities. Insectivorous plants also called as carnivorous plants, these plants are not able to take up nutrients from the soil because of poorly developed roots system. Such plants obtain their nutrients by trapping, digesting and absorbing the insects from external environment as their food.

4. Dodder or amarbel (Cascuta) is a total parasite. Mistle-toe is a partial parasite.

D. Long Answer Type Questions :

Ans. 1. **Aim :** To show that sunlight is necessary for photosynthesis.

   Materials Required : A potted plant, black paper and materials for starch test as in Activity-1.

   Procedure : Take a potted plant. Destarch the leaves by keeping the plant in a dark room for two days. Cover one of its leaves with black paper on which a star-shaped design is cut.

   Place the plant in sun. After a few hours, test the leaf which is covered with black paper for the presence of starch as in Activity-1.

   Observation : Only the parts of the leaf, which could get light through the cut out design as well as those that were left uncovered by the paper turns blue-black.

   Conclusion : This shows the presence of starch in parts of leaf leaf exposed to sunlight. Thus sunlight is necessary for photosynthesis.

2. Four such methods of heterotrophic nutrition are described below :

(a) Saprophytic : Feeding on dead and decaying organic matter. These plants lack green colour.
Examples : Mushrooms, yeast, many bacteria.
Saprophyte are commonly seen during and after rains.

(b) Parasitic : Living in another organism and deriving food from that organism. The organism deriving food is called a parasite and the other organism, from which the food is derived by the parasite, is called the host. The parasites produce special structures called haustoria for absorbing food from the host. Parasites may be total or partial. Dodder or amarbel (Cascuta) is a total parasite. Mistle-toe is a partial parasite. This plant has green leaves and can synthesize its own food. But it receives water and minerals from the host plant on which it grows.

(c) Symbiotic : Two different organisms live together and both benefit from each other.
Example : Lichen.

(d) Insectivorous : Feeding on small insects.
Examples : Pitcher plant, venus fly-trap, sundew plant and bladderwort.

E. Higher Order Thinking Skills (HOTS) :

Ans. 1. When we moisten a bread and then place in a dim light with warmth, it will begin to mold rapidly.
2. If we coated the leaves of a plant with wax, the transpiration does not occurs and stomata remains closed.

2 Nutrition in Animals

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. (a) 2. (a) 3. (b) 4. (a) 5. (a)

B. Fill in the blanks :

Ans. 1. The process by which food is taken inside the body of an organism is called **ingestion**.
2. A frog uses its tongue to catch its **food**.
3. **Hydra** is a multicellular organism.
4. **Tongue** is a muscular organ present in the mouth.
5. **Small intestine** is a coiled tube just beneath the stomach.

C. Match the following :

Ans.

1. Amoeba	a. Pseudopodia
2. Paramecium	b. Cilia
3. Hydra	c. Tentacles

4. Human beings — d. Mouth
5. Insects — e. Proboscis

Section-II

A. Very Short Answer Type Questions :

Ans. 1. The tongue secretes saliva.
2. Butterfly takes in its food with the help of proboscis.
3. The juice secreted by the liver is called bile juice.
4. Omasum is the smallest chamber of a ruminant's stomach.

B. Short Answer Type Questions :

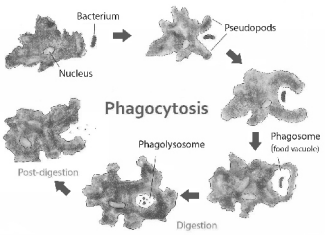
Ans. 1. The food eaten by animals undergoes five steps : Ingestion, digestion, absorption, assimilation and egestion.
2. Based on the structure and function, teeth are of four types : incisors, canines, premolars and molars.
3. Assimilation is the process of using absorbed food molecules for producing energy and growth.
4. The food ingested by a ruminant first goes into the rumen where it is partially digested. From rumen, this partially digested food goes to reticulum. The reticulum returns this food to the mouth end for thorough chewing, called rumination. Two ruminants are cow and goat.

C. Define the following terms :

Ans. 1. Nutrition
2. **Digestion :** The food taken in is solid and complex. The process of converting or breaking down complex food into simple and soluble forms is called digestion.
3. **Assimilation :** Assimilation is the process of using absorbed food molecules for producing energy and growth.
4. **Villi :** The inner walls of the small intestine is covered with millions of tiny projections called villi.
5. **Rumination :** The food ingested by a ruminant first goes into the rumen where it is partially digested. From rumen, this partially digested food goes to reticulum. The reticulum returns this food to the mouth end for thorough chewing, called rumination. Two ruminants are cow and goat.
6. **Holozoic Nutrition :** Majority of animals take food in the form of solids. This form of nutrition in which food is eaten in solid form is called holozoic nutrition.

D. Long Answer Type Questions :

Ans. 1. Amoeba is a microscopic unicellular (made up of only one cell) organism. It lives in ponds and slow moving streams. It moves very slowly over the bottom, or over the surface of dead leaves using its pseudopodia (pseudo, false; podium, foot). There are many other



Nutrition in Amoeba

organisms in the water, which are smaller than Amoeba. Amoeba feeds on these animals. When a small organism comes close to an Amoeba, it puts out pseudopodia around the organism and joins up the cavity. The prey becomes trapped in the cavity called food vacuole.

Some digestive juices are secreted in the food vacuole and the food is digested there. It is then absorbed and assimilated, and the undigested part is thrown out.

2. The main parts of human digestive system are : mouth, oesophagus, stomach, small intestine and large intestine.

   The process of digestion begins in the mouth. The mouth leads into the alimenary canal. It forms a tube that runs from he mouth to the anus. It is about 8 to 9 metres in length. Being so long, much of it is coiled up, and this enables it to fit into the abdominal cavity.

3. Different parts of the small intestine have different names. The part next to the stomach is called the duodenum. The middle region is called jejunum, and the lower part is called the ileum. The chyme passes out of the stomach into the duodenum. In the duodenum, the food is mixed with pancreatic juice secreted by the pancreas and the bile juice secreted by the liver. The small intestine serves both for digestion and absorption. From the duodenum, the food passes into the ileum through the jejunum.

4. Some higher mammals like goat, sheep, cow, buffalo, etc. have a typical variation in their digestive systems. These herbivorous mammals have complicated stomach which consists of four chambers, namely rumen, reticulum, omasum and abomasum.

   The food ingested by a ruminant first goes into the rumen where it is partially digested. From rumen, this partially digested food goes to reticulum. The reticulum returns this food to the mouth end for thorough chewing, called rumination. It is this particular activity which gives these animals the name ruminants. After thorough chewing, the food is swallowed second time and then it is digested in the other two chambers, namely omasum and abomasum. From these chambers, the food is sent to small intestine for absorption of nutrients.

E. Higher Order Thinking Skills (HOTS) :

Ans. 1.

2.

3 Natural Fibres

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs)

Ans. 1. (a) 2. (d) 3. (a)

B. Fill in the blanks :

Ans. 1. **Cotton** comes from the balls of the cotton plants.
2. The process of superficial removal of fur from the coat of an animal is called **shearing**.
3. The yolk consists of a complex chemical called **lanalin**.
4. **Scouring** is the process of cleaning the raw wool.
5. **Silk** is a protein fibre obtained from silkworms.

C. Write true or false :

Ans. 1. T 2. T 3. T 4. T

D. Match the following :

Ans.

1. Cocoon	a. Cover of pupa
2. Fleece	b. Hair of sheep
3. Mulberry leaves	c. Food of silkworm
4. Shearing	d. Removal of fleece

E. Encircle the odd-one out. Give reason for your choice :

Ans. 1. **Reeling :** It is a step involving in silk production. Rest are process of involved in wool.
2. **Tassar :** It is a kind of silk rest are breeds of sheep.
3. **Cotton :** It is a plant fibre whereas rest and animal fibres.
4. **Silk moth :** It is a source of silk rest are sources of wool.

Section-II

A. Very Short Answer Type Questions :

Ans. 1. We get wool from sheep, goat, yak, vicuna, cashmere goat, camel and silk is obtained from the Bombyx mori (silk worm).
2. Moonga, tassar.
3. Australia is the leading producer of wool.

B. Short Answer Type Questions :

Ans. 1. Wool used for making winter clothing because wool insulates against.
2. Assam, Karnata
3. The cultivation and production of silk is known as sericulture.
4. People doing sorting work may get infected by anthrax bacterium which causes a fatal blood disease called sorter's disease. This is an occupational hazard.

C. Define the following terms :

Ans. 1. **Woolmark :** Wool mark is a symbol of quality to assure that the woollen cloth is made from pure wool.
2. **Sericulture :** Sericulture is the cultivation and production of silk.
3. **Shearing :** The process of superficial removal of fur from the coal of an animal is called shearing.
4. **Carding :** The process of drawing woollen fibres into straight continuous form is called carding.

D. Long Answer Type Questions :

Ans. 1. Grading (sorting) : The fleece from the same sheep may be different from different parts of the body. So it is sort out into separate piles of similar nature. This process is called grading or sorting.
Washing (scouring) : The sheared skin is washed thoroughly with soap or detergents to remove dirt, dust and grease. This process of cleaning wool is called scouring.
Carding : The dried wool is disentangled. These disentangled fibres are then passed through the rollers which are covered with fine sheet of thin wire teeth. This process arranges the wool into a flat sheet called a web.
Spinning : The web is drawn into narrow strands and then passed through spinning machines. The spinning machines twisted the strands into yarn. The yarn is wound to form balls of wool. This yarn is either weaved into fabric or retained for knitting.

2. Wool yielding animals : sheep, rabbit
Pashmina wool : Cashmere goat

3. **Life Cycle of silk moth :** The female silk moth lays hundreds of tiny eggs on the mulberry leaves. The larvae that hatch out of the eggs are called caterpillars. They feed on mulberry leaves vigorously and grow in size. When a caterpillar is ready to enter the pupal stage, it stops feeding and its salivary gland secretes fibres around the pupa. The fibre is made of a protein, which hardens on exposure to air and forms a cover around the pupa. This cover the pupa is called cocoon. It is ball-shaped and is formed of silk fibre.
Further development of silk moth continuous inside the cocoon. At the end of pupal stage, moth cuts the silken fibre of the cocoon and the young moth fibres out.

4. According to a legend, the use of silk goes back to 3000 BC in China. The Chinese guarded the development of silk fibre until 300 AD as a secret when the development process was made known to Japanese and Indians. In India, the practice of rearing silkworms for silk started in Assam in Brahmaputra valley. The wild silkworms in this region produce golden silk, which improves with ageing. The fibre obtained is considered as the strongest natural fibre. Later, in 12th and 13th centuries, the silk reached the European countries with Italy becoming the silk centre of Europe. However, it failed to flourish in many of the European countries such as the United Kingdom and also in the United States of America.

E. Higher Order Thinking Skills (HOTS) :

Ans. 1.

2. The cocoons are boiled in hot water or fumigated to kill the larvae within, because if the larvae are allowed to grow, they break the cocoon thereby reducing the length of the only naturally occurring filament fibre. Filaments from several cocoons are grouped together and threaded in the reeling frame and then are twisted with several fibres.

4 Changes in Matter

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. (b) 2. (c) 3. (c)

B. Fill in the blanks :

Ans. 1. **Physical** changes are referred to temporary changes.
2. **Chemical** changes involve the formation of a new substance.
3. A chemical change is different from a **physical** change.
4. The process due to which iron changes into rust is called **rusting**.
5. **Galvanisation** is the process of depositing a layer of zinc or iron.

C. State true or false :

Ans. 1. F 2. T 3. T 4. F

D. Match the following :

Ans.

1. Evaporation	a. Physical change
2. Cooking	b. Chemical change
3. Crystallization	c. Physical change
4. Red deposition on iron	d. Chemical change

E. Classify the following as physical change or chemical change :

Ans. 1. Burning of wood : Chemical change
2. Photosynthesis in plants : Chemical change
3. Melting of wax : Physical change
4. Dissolution of sugar in water : Physical change

Section-II

A. Very Short Answer Type Questions :

Ans. 1. Physical Change Extearing of paper
Chemical Change Ex Burning of wood
2. Chemical Change
3. Chemical Change

B. Short Answer Type Questions :

Ans. 1. When in a change a new substance is formed we can say that it is a chemical change.
2. A change that involves alteration in the physical properties of a substance is known as physical change. No new substance is formed during a physical change.
3. The process of obtaining large crystals of pure substance from a concentrated solution is known as crystallisation.
4. Copper, Sulphate

C. Define the following terms :

Ans. 1. **Crystallisation :** It is the process of separating a soluble solid on heating

from the solution.

2. **Rusting :** The process due to which iron changes into rust is called rusting.
3. **Physical change :** A Physical change is a change that involves alternation in the physical properties of a substances.
4. **Desirable change :** Some changes are useful to us and we want them to take place. Such changes are called desirable changes.

D. Differentiate between the following pairs :

Ans. 1. Differences between physical change and chemical change

Physical Change	Chemical Change
i. No new substances are formed.	i. New substances are formed.
ii. Change is temporary and can be reversed, with few exceptions.	ii. Change is permanent and cannot be reversed.
iii. The mass of the substance does not change after a physical change.	iii. After a chemical change, the mass of individual substance changes.
iv. The amount of energy needed to bring the physical change is equal to the amount of energy needed to reverse the change.	iv. The energy needed to break the bonds in the reactant is not equal to energy released in forming of new bonds in the product. Hence, some energy is released or absorbed during the change.

2. Desirable change : The changes which are useful to us are called desirable changes. For example : ripening of fruits, growth of plants, turning of milk into curd etc., are some desirable change.
   Undesirable change : The change which are harmful to us are called undesirable timber etc. are some undesirable changes.
3. Evaporation : Evaporation is the process of a substance in a liquid state changing to a gaseous state due to an increase in temperatures and/or pressure. Evaporation is a fundamental part of the water cycle and is constantly occuring throughout nature.
   Crystallisation : The process of obtaining crystals from its hot saturated solution is called Crystallisation.
4. Reversible and Irreversible change
   Those changes which can be reversed are called reversible changes. Take a balloon. Blow air into it. Does its size change? Slowly release its air. Does it come back to its original position? Is this an example of a reversible change? Reversible changes are temporary.
   Some changes are permanent and cannot be reversed. These are called irreversible changes. If we burn a paper, it turns into ash. This ash cannot be turned back into paper. Burning is therefore an irreversible change.

E. Long Answer Type Questions :

Ans. 1. Characteristics of Chemical Change

(i) New substances having different properties are produced.

(ii) Chemical changes are usually irreversible and permanent.

(iii) A larger amount of heat is evolved or absorbed during chemical change.

A chemical change is different from a physical change. You have learnt that during a chemical change, one or more new products are formed. Apart from the formation of new products, a chemical change may be accompanied by the following changes :

(i) Heat, light or any other radiation may be evolved or absorbed.

(ii) A change of colour may be observed.

(iii) A gas may be evolved.

(iv) Sound may be produced.

Many of our daily activities involve chemical change. For example, the medicines we use are formed by a series of chemical reactions. Iron is extracted from its ore by a series of chemical reactions.

2. Rusting of Iron can be prevented in many ways :

(i) By avoiding direct contact with air and moisture : It is done by using the following methods :

Applying grease or oil on the exposed parts of iron articles. Painting the surface of iron articles. Galvanizing the surface of iron articles. Galvanizing is a process in which a layer of metals like chromium or zinc is deposited on the surface of iron articles electrolytically, i.e., by passing electric current. Electroplating the surface of iron articles with metals, which are not attacked by atmospheric moisture. The shining parts of bicycles are given a coating of chromium (chrome plating) to protect them from rusting.

(ii) By alloying : When mixed with certain corrosion resistant metals or some non-metals, iron forms alloys which are resistant to rusting. Stainless steel, an alloy of iron, nickel and chromium does not rust.

3.

F. Higher Order Thinking Skills (HOTS)

Ans. 1.

2.

5 Acids, Bases and Salts

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. (a) 2. (b) 3. (a) 4. (c)

B. Fill in the blanks :

Ans. 1. Organic acids are generally **weak or milk acids**.
2. Those acids in which water content is less are **concentrated** acids.
3. Acids are **sour** in taste.
4. The alkalis are **bitter** in taste.
5. A chemical reaction between an acid and a base is called a **neutralisation reaction**.

C. Write true or false :

Ans. 1. T 2. F 3. T 4. F

D. Match the following :

Ans.

1. Sulphuric acid	a. Strong acid
2. Citric acid	b. Weak acid
3. Carbonic acid	c. Aerated drinks
4. Nitric acid	d. Explosives

E. Give one word for the following :

Ans. 1. Neutralisation Reaction 2. Indicator
3. Strong bases 4. Acetic Acid

F. Encircle odd-one out. Give reason for your choice :

Ans. 1. Sodium bicarbonate solution : Sodium bicarbonate is salt solution rest are acids.
2. Milk of magnesia : It is a base and rest are salts.

Section-II

A. Very Short Answer Type Questions :

Ans. 1. Acids have sour taste.
2. Neutralisation Reaction
3. Potassium

B. Short Answer Type Questions :

Ans. 1. **(i) Mineral Acids :** The acids prepared from the minerals of the earth are called mineral acids. Mineral acids are the man-made acids. Mineral acids are also known as laboratory acids because they are used in the science laboratory to perform experiments.
Ex. Hydrochloric acid, Nitric acid
(ii) Organic Acids : Organic acids are the naturally occuring acids. They are found in various types of plants and animals.
Ex. Formic acid, Citric acid
2. Acids cannot be stored in metal containers as they will react with the metal, forming metal salt and liberating Hydrogen gas. Containers made of glass are ideal for storage of acid due to its chemical inertness.
3. Calamine solution applied on the skin when an ant bites because it is basic so it neutralises the formic acid that is injected into the skin during an ant bite.
4. When a low drops of phenolphtalein are added to an acidic solution it turns

colourness.

5. Few indicators are present in nature and are called natural indicators. These indicators occur naturally in few plants and can be extracted from them. Turmeric, purple cabbage and china rose are few examples.

C. Differentiate between the following :

Ans. 1. **Base and Alkali :** The compounds which react with acids to produce salt and water are known as bases. They are oxides and hydroxides of metals. The metallic oxides are basic oxides, but only those basic oxides that are soluble in water, are called alkalis.

2. **Weak and Strong bases :** Some bases are strong and some are weak. For example, sodium hydroxide and potassium hydroxide are strong bases. The examples of some weak bases are zinc hydroxide and ammonium hydroxide.

3. Acid and Base :

Acids	Bases
(i) Acids have a sour taste.	(i) Bases are bitter in taste and slippery to touch.
(ii) All acids are soluble in water and their solutions conduct electricity.	(ii) Not all bases are soluble in water. Soluble bases are called alkalies and these can conduct electricity.
(iii) They produce hydrogen ions (H+) when dissolved in water.	(iii) Bases give hydroxyl ion (OH) in their aqueous solutions.
(iv) The number of replaceable hydrogen atoms in an acid is called its basicity, e.g., HCl is monobasic, H2SO4 is dibasic, H3PO4 is tribasic.	(iv) The number of replaceable hydroxyl ions in a base is called its acidity. e.g., NaOH is monoacidic, Mg(OH)2 is diacidic, Fe(OH)3 is triacidic.
(v) Acid reacts with base to produce salt and water.	(v) Base solution reacts with acid to produce salt and water.

4. **Weak and Strong acids :** Acids may be weak or strong. Most of the mineral acids like sulphuric acid, nitric acid, hydrochloric acid and phosphoric acid are strong in nature. Hence they are called strong acids. On the other hand all the organic acids are weak acids by nature. For example, citric acid, tartaric acid, acetic acid and lactic acid are all weak acids. The organic acids are used as food ingredients.

D. Long Answer Type Questions :

Ans. 1. **Properties of Acids :** All chemical elements or compounds possess the common and unique physical and chemical properties. The common physical properties of acids include :

They are sour in taste.

They are soluble in water.

They turn blue litmus red, pink phenolphthalein colourless and methyl orange red.

All the acidic solutions, whether organic or inorganic, are good conductors of electricity as they all allow the passage of electric current through them.

Properties of Bases

The physical properties of the bases include :

Some bases are soluble in water and when dissolved they form hydroxide.

The alkalis are bitter in taste.

They are slippery to touch.

The bases turn red litmus paper blue.

Methyl orange is turned yellow, and the phenolphthalein remains unchanged in pink colour with bases.

The bases and alkalis react vigorously with acids to form salt and water. The reaction between an acid and alkali is called a neutralization reaction.

2. Sulphuric Acid

(i) It is used in the manufacture of fertilisers.

(ii) It is used in the batteries of cars, buses, trucks and inverter batteries.

b. Hydrochloric Acid

(i) It is used for cleaning metal surfaces during tinning and galvanising.

(ii) It is used in the dyeing industry.

3. **Calcium Hydroxide [Ca(OH)2]**

Calcium hydroxide is commonly known as slaked lime. Its main uses are as follows :

As a substitute for cement in low cost construction.

For whitewashing of buildings.

Sodium Hydroxide (NaOH)

Sodium hydroxide is commonly known as caustic soda. It is obtained commercially from concentrated brine (salt water). Its main uses are : In the manufacture of soap.

In the manufacture of several industrial chemicals such as 'hypo' (sodium hypochlorite).

Ammonium Hydroxide (NH4OH)

In the manufacture of fertilizers, such as ammonium nitrate.

In the manufacture of nylons, plastics, dyes, etc.

4. The presence of acid or base is tested using certain specific materials such as litmus paper. These materials are called indicators because they indicate whether the substance is an acid or a base. In laboratory, there are many indicators that are used to identify a substance as an acid or a base. These indicators include :

Litmus paper : There are two types of litmus paper : the red and the blue. The blue litmus paper is turned into red in presence of an acid and the red litmus paper turns blue in presence of a base.

Methyl Orange : It is an acid-base indicator, when added to acidic solutions, turns red and yellow in the basic solutions.

5. Calcium carbonates treats in digestion by decreasing the level of Acidity in the stomach by neutralizing it. This can make it an effective fast short-term treatment for heart burn and stomach upset. Their effect often wear of after a while because their neutralising effect withers off. The level of acidity rises again making the effect gone off.

E. Higher Order Thinking Skills (HOTS) :

Ans. 1. The nature of the solution is basic.

2.

6 Heat and Temperature

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. (a) 2. (b) 3. (d)

B. Fill in the blanks :

Ans. 1. An electric heater converts electrical energy to **heat energy**.

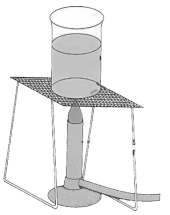
2. **Radiaiton** is the process of transfer of heat energy without heating the interesting material medium.
3. **Sea breeze** blows from the sea towards the land during the day.
4. Winds are **convection** currents in air.
5. A **termos flask** consists of a double-walled vessel of glass.

C. Write true or false :

Ans. 1. F 2. F 3. F 4. T 5. T

D. Draw and label the diagrams :

Ans. 1.



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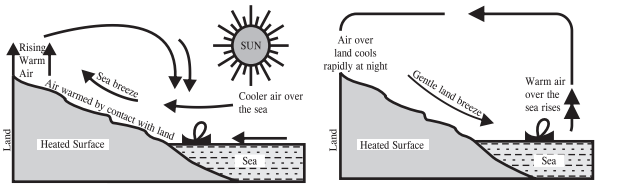


Section-II

A. Very Short Answer Type Questions :

Ans. 1. Clinical thermometer

2. Conduction
3. During ventilation the convection current moves into take the space produced by the outgoing warm air.

B. Short Answer Type Questions :

Ans. 1. We estimate the temperature of a body by simply touching it.

2. The bottoms of cooking utensils are blackened because it absorbs more

heat and hence cooking is made faster.

3. We cover ice with saw dust to prevent it from gaining.
4. Ventilators are made near the roof of room because the hot air being lighter in weight tends to rise above and escape from the ventilators at the top. This allow the cool air to come in the room to take its place.
5. People are advised to wear white clothes in summer because they absorb less radiant heat and keep our body cooler than dark clothes.
6. Handle of metallic kettle is covered with strips of cane because when kettle is heated, the heat does not pass through strips cane. The strips of cane are bad conductor of heat and we may hold the handle with our bare hands.
7. This is so because heat from the candle always rises upwards and makes the air hot due to radiation. This does not happens when we keep our hands in side of the flame.

C. Define the following :

Ans.

1. **Radiation :** Radiation is the process of heat transfer from a hot body to a colder body without heating the space between the two.
2. **Temperature :** Temperature is the degree of hotness of a body.
3. **Convection :** The method of heat transfer in which heat is carried from the hotter to the colder part of a liquid or gas by the movement of particles themselves is called convection.
4. **Heat :** Heat is the energy transferred from one body to another body due to a temperature difference between them.
5. **Conduction :** Conduction is the process of heat transfer in solids from molecule to molecule from hot to cold end.

D. Differentiate between the following :

Ans.

1. **Conduction :** The process of transfer of heat energy in solids from molecules to molecules by being in touch without their actual movement.
   Convection : The process of transfer of heat energy in fluids in which the heated molecules move away from the source of heat and cold molecules move towards the source of heat.
2. **Clinical :** A clinical thermometer is used to measure the temperature of the human body. It is marked from 35°C to 42°C. The temperature of a healthy human being is 37°C.
   Laboratory thermometers : A laboratory thermometer has markings from 10°C to 110°C. It does not have a kink. Alcohol thermometers are used to measure very low temperatures as alcohol has a very low freezing point, i.e., 117°C. In order to measure very high temperatures, e.g., that of flames and furnaces, bimetallic thermometers are used.
3. **Conductor :** Materials which allow heat to be conducted through them easily are called good conductors of heat. Some other good conductors of heat are silver and aluminium. Notice that all these are metals. In fact, most metals are good conductors of heat.

Insulator : Materials which do not allow heat to be conducted through them easily are called insulators or Bold conductors of heat. Some bad conductors of heat are wood, plastic and ebonite.

4. **Heat :** Heat is the energy transferred from one body to another body due to a temperature difference between them.
   Temperature : Temperature is the degree of hotness of a body.

E. Long Answer Type Questions :

Ans. 1. A silvered pot of hot water will cool faster in comparison to a black pot of hot water. This is so because black colour is a good absorber of heat and does not allow heat to vanish off. On the other hood hand silver colour is a great reflection of heat. It very quickly reflects all the heat and cools off.

2. A thermos flask consists of a double-walled vessel of glass. There is vacuum in between the two walls, which reduces the loss of heat due to conduction and convection. The outer surface of the inner wall and the inner surface of the outer wall are silvered and polished. The silvered surface prevents the loss of heat due to radiation. Its mouth is closed with a cork, which is a bad conductor. The flask is kept on a rubber cork. Heat is also not allowed to enter the flask. Thus, the flask keeps hot things hot and cold things cold for a sufficiently long time.

3. **Sea Breeze and Land Breeze :** During the day, land gets heated up faster than water. As a result, the air over the land becomes warm and, as hot air is lighter, it rises up. An upward current of air is set up over the land. The cool air blowing over the sea, rushes towards the land to fill the space left by the hot air. Therefore, the breeze that blows from the sea towards the land during the day is known as sea breeze.
   At night, land cools down faster than the water in the sea. The air over the sea remains comparatively warmer than the air over the land. So, the cool air over the land rushes towards the sea, setting up land breeze.
   The breeze that blows from the land towards the sea after sunset is known as land breeze. Land and sea breezes are actually convection currents.

4. Conduction is the process of heat transfer in solids from molecule to molecule from hot to cold end.
   Aim : To show that heats travels through metallic solids by conduction.
   Materials required : A thin metallic stip or rod, nails, wax, iron stand.
   Procedure : Take a long thin metallic strip (or rod). Fix a few nails on this strip at equal gaps with the help of wax.
   Clamp this strip (or rod) to a stand as shown in the figure alongside. Now place a burner (or spirit lamp) below the free end of the strip (or rod). Note down the order in which nails begin to drop.
   The nail nearest to the flame drop first, then the next and finally the nail farthest from the flame. This happens because as the heat travels gradually from the hot end of the metallic strip to its colder end, the wax melts and the nails fall down one by one.

This gradual flow of heat in a solid from the hot end to the cold end is called conduction of heat.

Conclusion : Heat travels through solids by conduction.

F. Higher Order Thinking Skills (HOTS) :

Ans. 1. Sometimes when hot water or tea is poured in a thick tumber, it breaks, because the part of the part of the glass that the boiling water touches first expands due to the heat, but the heat doesn't conduct through the glass quickly so there is stress between the expanded inside of the glass and unexpanded outside of the glass. This stress is sometimes too much and the glass breaks.

2. This is so because snow is a bad conductor heat. It does not allow heat to escape through it. That is why Eskimos are able to survive in the houses made of show.

7 Weather, Climatic Changes and Adaptations

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. (d) 2. (c) 3. (b) 4. (b)

B. Fill in the blanks :

Ans. 1. **Humidity** is the amount of water vapour present in the atmosphere.
2. **The Sun** is a ball of hot gases.
3. The tropical rainforests are found in the **tropical regions**.
4. The climate of deserts is **dry** and **hot**.
5. The camouflage helps animals to hide from their **predators**.

C. Write true or false :

Ans. 1. T 2. T 3. T 4. F 5. F

Section-II

A. Very Short Answer Type Questions :

Ans. 1. Whale, turtle
2. Weather is the day to day condition of the atmosphere at a place.
3. (i) Distance from the Equator (ii) Height above of the sea level
(iii) Distance from the tea (iv) Direction of the winds

B. Short Answer Type Questions :

Ans. 1. Humidity, rainfall
2. (i) the presence or absence of water (rainfall),
(ii) amount of sunshine it gets,
(iii) the ability to transfer water to the atmosphere (evaporation), and
(iv) the place whether it is a hilly or a plain region.
3. Weather is the day-to-day condition of the atmosphere at a place. It is influenced by factors like humidity, rainfall, temperature, wind speed, etc.

Weather can vary over short periods of time. The weather is predicted by the Meteorological Department, that collects data on temperature, wind, etc.

Climate, on the other hand, is arrived at after considering weather of a place over a long period of time. Climate means the average pattern in which weather changes with time. This average is determined over long periods of time. The climate of a region depends on :

(i) the presence or absence of water (rainfall),

(ii) amount of sunshine it gets,

(iii) the ability to transfer water to the atmosphere (evaporation), and

(iv) the place whether it is a hilly or a plain region.

4. Polar regions have an extreme climate. They are very cold throughout the year.

5. (i) They have a very thick layer of deposits that keep their bodies warm.

(ii) They take on the temperature of the water which is usually stable.

(iii) Some large fish and mammals keep their bodies warm and insulated from the cold.

(iv) They hibernates that is during extreme winter, they become inactive and stay in their dens.

B. Long Answer Type Questions :

Ans. 1. The factors that influence the climate are as follows :

(a) Latitude (distance from the equator) : The hottest areas of the earth are located close to the equator and the coldest to the poles. This is due to the shape of the earth. The places closes to the equator receive the most direct rays of the sun. Regions farther from the equator receive the rays that hit the earth's surface on a slant, so the sun's energy is spread over, and heats a large area of the earth.

(b) Altitude (elevation above the sea level) : The atmosphere is not warmed by direct contact with the Sun's rays. The Earth's surface absorbs most of the heat from the sun and then diffuses the heat into the lower layers of atmosphere in turn transfer some of the heat to the upper layers of the atmosphere. Thus at high altitudes like mountains that are far from the Earth's surface receive very little heat. Most of the heat is being trapped within the lower layers of the atmosphere close to the Earth's surface. Hence higher the elevation, the colder the climate is.

(c) Humidity (moisture content of the air) : Higher the humidity, lower is the evaporation process. In areas that are very dry, the humidity is so low that the water evaporates very quickly.

(d) Wind (cold or hot) : Wind determines the climate depending on topography and latitude of the place. An area exposed to the prevailing wind on a mountain will likely be wetter because moisture from any storm systems run in to the slope it rains, while the aspect facing away from a slope will likely be drier because there are no winds bringing in moisture.

(e) Distance from the sea : Oceans heat up and cool down much more slowly than land. Hence the coastal locations tend to be cooler in summer and warmer in winter than places in land at the same latitude and altitude.

(f) Human Factors : Human activities like burning of fossil fuel like coal and petroleum have contributed immensely to the emission of greenhouse gases like carbon dioxide that traps more heat making the earth's surface warmer.

2. Penguins huddle together in groups to stay warm and fight their enemies. The male penguins huddle together to protect the eggs laid by the female from the severe cold. If exposed to the cold, the eggs get destroyed. The female penguins then return to the sea to feed themselves and bring food for their chicks
3. Polar bear, another member of the same family of bears, lives in the polar regions. While normal bear is black in colour, polar bears are milk-white. These polar bears have a few adaptations to live in snow-covered polar regions.

   The white colour camouflages them from their prey and enables them to hunt for food. Polar bears have a thick layer of fat below their skin which is called blubber. The presence of blubber protects them from cold and keeps the body warm. Polar bears hibernate, i.e., during extreme winter, they become inactive and stay in their dens.

   All these adaptations help them to live in cold polar regions.

C. Higher Order Thinking Skills (HOTS)

Ans. 1.

2.

8 Soil

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. (b) 2. (a) 3. (b) 4. (c) 5. (d)

B. Fill in the blanks :

Ans. 1. The layers of the soil are called **soil profile**.
2. The **o-horizon** has a very high accumulation of organic matter.
3. **Loamy** soil has an almost equal proportion of sand and clay.
4. The moisture in soil is important for the survival of **plants** and **organisms**.
5. Overuse of fertilisers has changed the **structure** and **properties** of soil.

C. Write true or false :

Ans. 1. T 2. F 3. T 4. T 5. F 6. F

Section-II

A. Very Short Answer Type Questions :

Ans. 1. Soil is the thin layer of fine material containing organic matter, air, water, and weathered rock materials that rest on bed rock.
2. Soil is formed by breaking down of rocks by the action of wind, water and climate. This process is called weathering.
3. Soil is formed by breaking down of rocks by the action of wind, water and climate. This process is called weathering.
4. The layers of soil prevent in the soil profile is called Horizon.
5. Clayey and loamy soil.

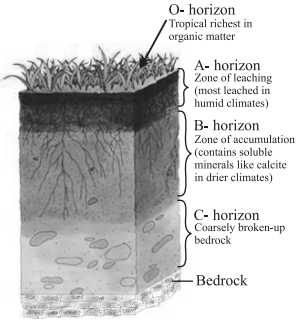
B. Short Answer Type Questions :

Ans. 1. The mixture of rock particles and humus is called the soil.
2. It has three main layers : Topsoil (Horizon A), Subsoil (Horizon B) and Rocky layer (Horizon C).
3. Humus is the rotten dead matter in the soil.
4. Soil found in India are of six main types : Alluvial soil, Black soil, Red soil, Laterite soil, Mountain soil, Desert soil.
5. A vertical section of the soil showing its different layers or horizons is called soil profile.
6. The layers of soil present in the soil profile is called Horizon. The layer or horizons name are :
(i) O-Horizon, (ii) A-Horizon (Zone A), (iii) B-Horizon (Zone B), (iv) C-Horizon (Zone C), (vi) Bedrock (Zone R).
7. (i) Topsoil is the uppermost layer of soil. It consists of fine particles.
(ii) Bedrock is the lowermost layer and mainly consists of the parent rock.
8. Clayey soil is useful for crops because
9. It is good for the growth of plants because of rich minerals present in it.
The ratio of the amount of water percolated to the percolation time.

C. Long Answer Type Questions :

Ans. 1. Big pieces of parent rock crack and breakdown due to action of natural forces like sun, rain, wind, variations in day and night temperatures. This is called weathering.
Weathering breaks down big rock pieces into smaller pieces. The process continuous for thousands of years.
Large rock pieces break into fine soil particles that form the upper layer. Dead remains of plants and animals form humus, the fertile part of soil. Minerals present in the soil from the inorganic matter. It is taken up by plants for its healthy growth.
2. **Sandy Soils :** It is the soil with large proportion of sand grains. The pore spaces are large; and hence it has low water retention capacity. Sand particles are quite large. They cannot fit closely together, so there are large space between them. These spaces are filled with air. We say that the sand is well aerated. Water can drain quickly through the spaces between the sand particles. So, sandy soils tend to be light, well aerated and rather dry.
Clayey Soils : The percentage of clay particles is the maximum in this

type of soil. This soil is extremely sticky and hence cultivation is difficult. It has excellent water retention capacity but poor air circulation. It is good for the growth of plants because of rich minerals present in it.

3. 

Soil profile

4. (i) A-Horizon : (Zone A) : The soil of A-horizon is called top soil. It contains lots of humus (dead and decaying organisms) and it is dark in colour. It may contain much of organic matter, such as decayed plant leaves, twigs, animal remains, as well as clay and sand grains. It is the most fertile soil. It is soft, porous and has got good water holding capacity. Plants get their essential nutrients from this layer. This layer provides shelter to many living organisms such as worms, rodents, moles and beetles. The roots of small plants are embedded entirely in the topsoil.
(ii) B-Horizon : (Zone B) : It contains much less humus, but some of the minerals washed out of the A-horizon are deposited here. If the soil is not too wet, any iron left here will oxidise, producing a yellow or reddish brown colours.
(iii) C-Horizon : (Zone C) : It is very hard and is made up of small lumps of rocks with cracks and crevices. It is the lowermost layer of the soil. It is an unfertile layer and forms the framework of the soil.

5. **(Under Teacher supervision) :** Take a hard glass test tube (You can get one from the chemistry laboratory). Put two spoonfuls of a soil sample in it. Heat the test tube on a flame and observe what happens.
On a careful look, do you see water drops anywhere? If yes, where did you find them?
You will find that on heating, water (moisture) present in the soil evaporates, moves up and condenses on the cooler inner walls of the upper part of the boiling tube.
After heating the soil, take it out of the tube. Compare it with the soil which has not been heated. Note the difference between the two.

6. Soil Erosion and pollution can be prevented by the following method.
In order to prevent soil erosion (soil conservation), the following factors should be taken into account :
(i) Afforestation (planting more trees) should be encouraged. The deforested areas should be brought under afforestation.

(ii) Farmers should adopt proper crop rotation techniques on their land. This will also help in restoring the minerals lost after one cultivation. Water retention capacity also increase by this method.
(iii) Excessive fertilizers should not be used in crop fields.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. The top soil contains much more herms than the subsoil because their water and the remains of animals are mixed with the particles of soil on a regular bases.
2. Earthworms are called the friends of farmers because they by their movement and excretion not only make the soil fertile but also break it in the fine particlers.

9 Respiration in Organisms

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. (a) 2. (a) 3. (d) 4. (c)

B. Fill in the blanks :

Ans. 1. The process of inhalation and exhalation of air is called **breathing**.
2. The word anaerobic means in the **absence** of oxygen.
3. The trachea branches into two tubes called **bronchic (singular bronchus)**.
4. **Earth worms** breathe through their skins.
5. Fish and many other aquatic animals have a special organ called the **gill** to breathe under water.

C. Write true or false :

Ans. 1. T 2. T 3. T 4. T 5. F

D. Match the following :

Ans.

1.	Diaphragm	a. Present in chest cavity
2.	Frog	b. Lungs and skin
3.	Yeast	c. Alcohol
4.	Muscles	d. Lactic acid
5.	Leaves	e. Stomata

Section-II

A. Very Short Answer Type Questions :

Ans. 1. $C_6H_{12}O_6 + 6O_2 \xrightarrow{\text{Enzyme}} 6CO_2 + 6H_2O + \text{Energy (38 ATP)}$

Glucose Oxygen Carbon dioxide Water

2. Trachea
3. Anaerobic respiration occurs in the abscence of oxygen.

B. Short Answer Type Questions :

Ans. 1. The word anaerobic means 'in the absence of oxygen'. In this process energy is released from food by breaking it down chemically but the reactions do not use oxygen though they often produce carbon dioxide.

$$\underset{\text{Glucose}}{C_6H_{12}O_6} \longrightarrow \underset{\text{Ethyl alcohol}}{2C_2H_5OH} + \underset{\text{Carbon dioxide}}{2CO_2} + \text{Energy}$$

2. Cramps occur sometimes after heavy exercise because the partial breakdown of glucose produces lactic acid. Accumulation of lactic acid causes cramps.
3. The process whereby micro-organisms like yeast and bacteria respire anaerobically to produce alcohol and carbon dioxide from fond us called fermentation.
4. Lungs are the organs of respiration in human beings. They are present in the thorax (chest) and are protected by the rib-cage. A dome-shaped muscle is present beneath the lungs. It is called the diaphragm.

C. Define the following terms :

Ans. 1. **Aerobic respiration :** The process of Respiration that takes place in the presence of oxygen is called aerobic respiration.
2. **Breathing :** The process of inhalation and exhalation of air is called breathing.
3. **Diaphragm :** A muscular sheet forming the floor of chest cavity is called Diaphragm.
4. **Stomata :** The tiny pores present on the surface of the leaves are called stomta.

D. Differentiate between each of the following pairs :

Ans. 1. Cellular respiration and Breathing.

S.No.	Breathing	Cellular respiration
1.	Physical process of exchange of gases.	Chemical process in which food molecules are broken down to carbon dioxide and water.
2.	Occurs outside the cells.	Occurs inside the cells.
3.	No energy is released.	Energy is released.

2. Respiration in Plants :
   - Plants respire through tiny pores present on their leaves.
   - While Respiration they take in carbon dioxide and exhale oxygen.
   - Respiration in animals.
   - Animals Respire through special organs present in their body such as lungs, gills and spiracles.
   - Animals take in oxygen and give out carbon-dioxide.

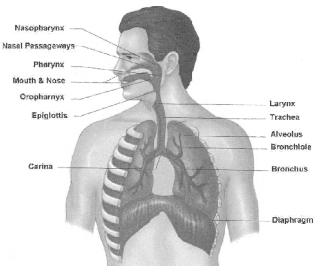
3. Aerobic respiration and Anaerobic respiration.

S.No.	Aerobic respiration	Anaerobic respiration
1.	It occurs in all living organisms.	It occurs only in some bacteria, fungi, germinating seeds and certain animal tissues.
2.	Oxygen is required for this type of respiration.	Oxygen is not required.
3.	Complete oxidation of food occurs during the process.	Oxidation of food remains incomplete in this process.
4.	Oxidation of glucose produces carbon dioxide, water and energy.	Oxidation of glucose produces ethyl alcohol and carbon dioxide. It also produces some amount of energy.

E. Long Answer Type Questions :

Ans. 1. The three basic requirements a respiration can be termed as :
All living organisms are made up of a number of cells. Each of these cells requires oxygen to break down food and obtain energy. The intake of air rich in oxygen is the first step. This is called inhalation or breathing in. The next step involves a series of chemical reactions, which help in the release of energy. Several enzymes and catalysts (substances that speed up reactions) are also involved in this process. When food is broken down, the reaction produces water and carbon dioxide. Carbon dioxide to the body, so it has to be moved out.

2.



Human Respiratory System

S.No.	Breathing	Respiration
1.	It is a physical process involving exchange of O2 and CO2.	It is a biochemical process in which glucose is oxidised.
2.	There is no release of energy.	Energy is released in this process.
3.	Enzymes are not involved.	Enzymes are involved.
4.	Modes of breathing are different in different organisms.	Details of respiration are similar in every living cell whether of plants or animals.

4. **Aim :** To show that exhaled air contains more carbon dioxide than inhaled air.
You need : Two test tubes, two-holed stoppers, two clips and glass tubes.
Procedure : Fill the test tubes with lime water to about half their volume. Set up the apparatus as shown using glass tubes and clips. Name them as test tube A and test tube B. Now breathe in through test tube A and breathe out through test tube B. When you breathe in air, close clip Y and open clip X. When you do this, the inhaled air passes through the lime water in test tube A. Open clip Y and close clip X, as you exhale. When this is done, the exhaled air passes through the lime water in test tube B.
Observation : The lime water in test tube B turns milky faster than the lime water in test tube A.
Conclusion : Exhaled air contains more carbon dioxide than inhaled air.

F. Higher Order Thinking Skills (HOTS)

Ans. 1. The reason of yawing while we full sleepy is that by doing sow take in the extra amount of oxygen required by our brain to make us sleep.
2. If we take out a fish from water it will not die for want to oxygen because it can take oxygen directly from air.

10 Transportation of Materials

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. c. 2. a. 3. d. 4. a.

B. Fill in the blanks :

Ans. 1. The vascular system is composed of **xylem** and **phloem** tissues.
2. **Transpiration** is the process of loss of water in vapour form from the leaves in plants.
3. **Blood** is a red-coloured fluid which flows inside the blood vessels.
4. The person who gives blood is called the **donor.**
5. The process of removal of the waste products is called **excretion.**

C. Write true or false :

Ans. 1. True 2. True 3. False 4. True 5. True

D. Encircle the odd one out. Give reason for your choice :

Ans. 1. It is not a part of blood.
2. It is not an excretory element.
3. It is present in leaves, other are parts of vascular system.
4. It is external, all others are internal.

E. Match the following :

Ans.

1. Amobea	a. Diffusion
2. Cockroach	b. Nephridia

3.	Man	c. Kidneys
4.	Carbon dioxide	d. Lungs
5.	Fish	e. ammonia
6.	Lizard	f. Uric acid

Section-II

A. Very Short Answer Type Questions :

Ans. 1. Lungs.
2. The urinary system comprises the kidneys, ureters, urinary bladder and urethra.
3. Platelets.

B. Short Answer Type Questions :

Ans. 1. Transportation of materials is necessary in living organisms. So that nutrients reach all the parts of the body an waste materials from the body.
2. (i) White blood cells (WBCs) help to fight infection. (ii) They destroy germs which may have entered the body.
3. The phloem carries the food prepared by the leaves downwards to the other parts of the plant.
4. In a child, the heartbeats from 90 to 100 times a minute. In an adult, heartbeat varies from 70-72 times per minute.
5. If excretory waste product would collected in our body there would be severe health problems in front of us.

C. Define the following terms :

Ans. 1. Diffusion is the movement of particles from a place where they are high in concentration to a place where they are low in concentration.
2. Transpiration is the process of loss of water in vapour form from the leaves in plants.
3. The process of removal of the waste product is called excretion.
4. The technique of removing waste products artificially from the blood is called dialysis.

D. Differentiate between the following :

Ans. 1. **Xylem :** Xylem conducts water and dissolved mineral salts from the roots to the stem and leaves. The cells of xylem join to form long tubes extending from the roots to the tip of the leaves.
Phloem : The phloem carries the food prepared by the leaves downwards to the other parts of the plant. In some plants, however, the material made in the roots is transported by phloem upwards to the leaves.
2. **Circulatory System :** Circulatory system is the life support system that provides our body cells with food and oxygen. It takes away waste products from the body cells.
Circulatory System is a system of vessels which connects all the cells, tissues and organs of the body together.
Vascular system : Plants also have a well-developed transport system. It

is called vascular system. It has two main functions.
(i) It transports water and minerals dissolved in water from roots to all the aerial parts of plant.
(ii) It transports the food synthesised in leaves to all other parts of the plant.

3. **Excretion :** The process of removal of the waste product is called excretion.
Transpiration : Tanspiration is the process of loss of water in vapour form from the leaves in plants.
4. **Arteries :** Arteries are the blood vessels which carry oxygen-rich blood from the heart to various parts of the body. Arteries lie deep inside the tissues, except at the wrist, temple and sides of neck.
Veins : Veins are the blood vessels which bring impure blood, which is rich in carbon dioxide, from various parts of the body, back to the heart. Veins lie closer to the surface of the skin. They are visible as blue lines in the hands and feet.

E. Long Answer Type Questions :

Ans. 1. The composition of Blood are three types of blood cells present in the plasma. These are :
i. red blood cells (RBCs),
ii. white blood cells (WBCs), and
iii. platelets.
i. Red blood cells (RBCs), as the name suggests, are red-coloured due to the presence of a red pigment called haemoglobin. Haemoglobin is a carrier of oxygen. It binds with oxygen and transports it to all parts and cells of the body. The red colour of blood is also due to the presence of haemoglobin.
ii. White blood cells (WBCs) help to fight infection. They destroy germs which may have entered the body.
iii. Platelets help in clotting of blood. These collect in the capillaries at the site of a wound and act to block the flow of blood by forming clots.

2. There are three different kinds of plants, i.e., herbs, shrubs and trees. Though the complexity may vary but the mode of transport in all the three types of plants is the same. Plants have a well-developed transport system. It is called vascular system. It has two main functions.
It transports water and minerals dissolved in water from roots to all the aerial parts of the plant.
It transports the food synthesised in leaves to various parts of the plant right up to the roots.
The vascular system comprises two sets of vessels for the transport of substances. The vessels are made up of specialised cells that form the vascular tissue. The vascular system is composed of xylem and phloem tissues.

3. Heart consists of the right auricle, left auricle, right ventricle and left ventricle. The auricles are smaller and are placed above the ventricles. Auricles are partitioned by a muscle called septum. The right auricle receives the deoxygenated blood from all parts of the body except the lungs. It pumps this blood into the right ventricle. Then, the right ventricle pumps the dexogenated blood to the lungs. The left auricle receives oxygenated blood from the lungs through pulmonary veins. It pumps this blood into the left ventricle. The left ventricle pumps the oxygenated blood to the distant organs in the body.

   Each auricle communicates with the ventricle of its side by a pore which is guarded by valves. These valves allow the blood to flow from the auricles to the ventricles but check its return to the auricles.

4. A normal human being has two kidneys which work with same efficiency. If one kidney is damaged, then the other kidney is sufficient for excretory needs. But failure of both kidneys would lead to death. The reason being that due to the result of kidney failure, the waste products start accumulating in the blood. Such a person cannot survive unless their blood is filtered periodically through an artificial kidney. This process is called dialysis.

   In dialysis, the patients blood is taken from the radial artery in his arm through the machine in which cellophone membrane acts as filtrating media and removes urea and excess salts and then purified blood is returned to a vein in the same arm.

   This method artificially rids off all the unwanted products and increases the life time of the patient.

F. Higher Order Thinking Skills (HOTS) :

Ans. 1. We see this because of the transpiration by leaves.
2. A living body well became poisonous if it did not get rid of its wastes.

11 Multiplication in Plants

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. b. 2. d. 3. d. 4. b.

B. Fill in the blanks :

Ans. 1. **Asexual Reproduction** does not require both male and female.
2. Underground fleshy stems that store food are known as **rhizome.**
3. A swollen stem that stores food is known as **tuber.**
4. Sepals are **green** in colour.
5. The pollination done by pollen grains carried by water is called **water pollution.**

6. A collection of carpels is called the **pistil.**

C. Write true or false :

Ans. 1. True 2. False 3. True 4. False 5. True

D. Give one word for the following :

Ans. 1. The part of embryo that grows into shoot. **Seedling**
2. Method of asexual reproduction in Rhizopus. **Spore formation**
3. Mode of reproduction in which male and female gametes are formed. **Sexual Reproduction**
4. The common method of reproduction in yeast. **Budding**

E. Encircle the odd-one out. Give reason for your choice :

Ans. 1. **Gamete :** It is a associated with sexual reproduction. Others are associated with asexual reproduction.
2. **Binary fission :** It is a natural method of reproduction others are artificial methods of reproduction.
3. **Pollen grains :** They are made reproductive organs of flowers. Rest are female reproductive organs.

F. Mention the functions of the following :

Ans. 1. The main function of flower is the produce seed for reproduction.
2. Scattering of seed for pollination.
3. The function of Anther is too produce pollen.
4. The function of ovary to produce ovule for the process of Reproduction.

G. Match the following :

Ans.

1. Spores	a. Potato
2. Hairy seeds	b. Madar
3. Eyes	c. Bread mould
4. Bud	d. Yeast
5. Stem cutting	e. Rose
6. Fertilization	f. Zygote

Section-II

A. Very Short Answer Type Questions :

Ans. 1. Reproduction. 2. Stem cutting.
3. Stamen. 4. Hybridisation.
5. Coconut.

B. Short Answer Type Questions :

Ans. 1. Vegetative propagation means how human beings propagate plants from parts of the plant.
2. **(a) Potato :** A swollen stem that stores food is known as tuber. A tuber has some depressions called eyes. Each eye has one or more buds from which new plants arise. Potato reproduces by forming tubers. If a potato is planted in soil the roots arise from its 'eyes' and new plants are formed.
(b) Mint : In mint and *Chrysanthemum*, underground stems are divided into nodes and internodes. New shoots develop from the nodes. When the

inernodal regions decay, each shoot separates and forms a new plant.
(c) Sugarcane : Sugarcane can be grown by cutting.

3. The pollen-tube carries the male gamete. The gamete passes through the pollen-tube to reach the ovule where it fuses with the egg. The fusion of male and female gametes produces a zygote. This process is known as fertilisation
4. When the pollen grains are transferred to the stigma of a flower of the same kind on another plant, it is called cross-pollination. Wind, water etc.
5. Dispersal by Water, Dispersal by wind, Dispersal by Animals, Dispersal by Explosive Mechanism

C. Define each of the following :

Ans. 1. The pollen-tube carries the male gamete. The gamete passes through the pollen-tube to reach the ovule where it fuses with the egg. The fusion of male and female gametes produces a zygote. This process is known as fertilisation.

2. **Tissue Culture :** The root tip and stem tip of the plants are made of immature rapidly dividing cells. When tissues containing such portions of the plant are grown in a suitable medium, under suitable nutrient conditions, they develop into new plants. The nutrient medium consists of nutrients and hormones which induce cell division. The tissues grow into an unorganised mass. They are then kept in another medium which induces the formation of new plantlets. These plantlets are transplanted in the soil. This method is also known as micropropagation.
3. The whole process of producing better seeds/crops from the existing plants/seeds is called hybridisation.
4. The transfer of pollen from an anther (the male reproductive organ) to a stigma (the receptive part of the female reproductive organ), either of the same flower (self-pollination) or of different flowers of the same species (cross-pollination) is called pollination.

D. Differentiate between the following :

Ans. 1. A flower having either male or female reproductive parts is called unisexual and that having both types of reproductive parts is called a bisexual flower.

2. **(i) Self-pollination :** When the pollen grains are transferred to the stigma of the same flower, it is called self-pollination.
(ii) Cross-pollination : When the pollen grains are transferred to the stigma of a flower of the same kind on another plant, it is called cross-pollination.
3. The female reproductive organs of the flower consist of the carpels. A collection of carpels is called the pistil. It includes an ovary, a style, and a stigma. The ovary contains ovules. Ovules contain the female reproductive cells.
The male reproductive organs consist of the stamen. A stamen consists of

an anther (which produces pollen) and a filament. The pollen consist of the male reproductive cells.

4. The method of reproduction in which a single organism is able to reproduce one or more of its kind by itself is called asexual reproduction. Asexual reproduction does not require both male and female. The asexual reproduction involves only one organism to reproduce. It occurs in all unicellular organisms and those multicellular organisms that do not exhibit sexual dimorphism, i.e., have organisms with separate sexes.

E. Long Answer Type Questions :

Ans. 1. In binary fission, as individual divides into two new individuals. It is common in bacteria.

2. **Budding :** This type of asexual reproduction occurs in yeast, a fungus that is microscopic and unicellular. It takes place under normal conditions when the yeast cell grown in sugar solution. Each cell produces one or more tiny outgrowths called buds which increases in size. The nucleus divides and one of them passes on to each bud. These buds ultimately cut off from the parent cell and are released as an independent, identical copy of the parent. Budding may be repeated resulting in the formation of one or more chains of bead-like cells.

3. Flower is the reproductive organ of flowering plants. You already know from your previous class that parts of a flower include petals, sepals, one or more carpels, and stamens. These are called the four whorls of a flower. A flower in which all the four whorls are present is called a complete flower and if any one whorl is missing, it is called an incomplete flower. A flower is attached to the stem by a stalk.

4. **Germination of Seeds :** A seed has a hard covering. When a seed is placed in moist soil, its covering becomes soft.

   The food inside swells up and the shell bursts open. In the presence of water, the enzymes present in the seed, digest the stored food and make it soluble. This soluble food helps radicle and plumule to grow. The radicle grows first and moves into the soil forming the root. The plumule moves upwards and comes out of soil to form the stem. The plumule now utilises the sunlight to start photosynthesis. At this stage, the plant starts making its own food.

5. Dispersal by water, Dispersal by wind, Dispersal by animals, Dispersal by explosive mechanism.

F. Higher Order Thinking Skills (HOTS) :

Ans. 1. When the pollen grains are transferred to the stigma of the same flower it is called self-pollination. When the pollen grains are transferred to the stigma of a flower of the same kind on another plant, it is called cross pollination. Self pollination is intra plant process. Cross-pollution is inter-plant process.

2. Night Blooming cerus and Lily are two-insect pollinated flower and

wheat and rice flower are two wind-pollinated flowers.

3. **Monoecious :** A plant having both the male and female reproductive organs in the same individuals.
   Dioecious : A plant having the male and female reproductive organs in separate individuals.

12 Motion and Time

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. b. 2. c. 3. c. 4. d.

B. Fill in the blanks :

Ans. 1. A **Stop watch** is used to measure time in athletics, swimming etc.
2. Clocks that measure small intervals of time are used in **scientific research.**
3. The **Speed** of something is how for it travels in a certain time.
4. **Pie chart** and **Bar graph** are two commonly used charts.
5. The duration from one sunset to sunrise is called **night.**

C. Write true or false :

Ans. 1. True 2. True 3. False 4. False 5. True

D. Differentiate between the following :

Ans. 1. **Uniform moiton :** When a body covers equal distances in equal intervals of time, however, small may be time intervals, the body is said to describe uniform motion.
   Non-uniform motion : When a body covers unequal distances in equal intervals of time, the body is said to be describing a non-uniform motion.
2. **Stopwatch :** A stopwatch is used to measure time in athletics, swimming, etc.
   Clock : Clock are used to measure time. It depends on the principle of periodic motion.
3. **Speed :** Distance travelled by an object in a unit time is called speed. It is scaler quantity.
   Velocity : The rate of change of displacement is called velocity. It is vector quantity.

E. Name the types of motion in each case :

Ans. 1. The motion of a moving car execute. **Non-uniform motion**
2. The motion of the hands of a watch. **Uniform motion**
3. The to and fro motion of a pendulum. **Periodic motion**
4. A car travelling on a busy road. **Non-uniform motion**
5. The motion of the Earth round the Sun. **Uniform motion**

Section-II

A. Very Short Answer Type Questions :

Ans. 1. events or phenomena.

2. When the position of a body changes continuously with respect to time and its surroundings, the body is said to be in motion.

3. Stop watch or digital watch.

B. Short Answer Type Questions :

Ans. 1. When the position of a body changes continuously with respect to time and its surroundings, the body is said to be in motion. A simple pendulum shows periodic motion. The principle of periodic motion of a simple pendulum is used in making clocks and watches. A pendulum consists of a small mass like a piece of stone or a metallic ball known as bob. The bob is suspended by a string. At rest, the bob is at its mean position (i.e., at the centre). The bob begins to move to and fro when it is released from one side. This to and fro motion of a pendulum is known as periodic motion.

2. A pendulum consists of a small mass like a piece of stone or a metallic ball known as bob. The bob is suspended by a string.

3. Sundial is based on the fact that length of the shadow cast by an object changes with the time of the day.

4. A graph representing the distance travelled and the time-taken.

5. 2.67 km.

C. Define the following terms :

Ans. 1. **Motion :** When the position of a body changes continuously with respect to time and its surroundings, the body is said to be in motion.

2. **A pendulum :** A pendulum consists of a small mass like a piece of stone or a metallic ball known as bob. The bob is suspended by a string.

3. **Speed :** Yes, because it depends on its length and speed of oscillation of the bob.

4. **Time period :** The time taken to complete one oscillation is known as time period.

D. Give one word for the following :

Ans. 1. The distance travelled by a body in unit time. **Speed**

2. The time taken by a pendulum to complete one oscillation. **Time period**

3. A weight hung from a string. **Bob**

4. A body covering unequal distances in equal intervals of time. **Non-uniform speed**

E. Long Answer Type Questions :

Ans. 1. You also know from your everyday experience that the same body may appear moving for one person and at rest for some other person. For example, to the passengers in a moving car or a train; trees, buildings and the people on the roadside appear to be moving backward. However, to the people standing on the roadside, the car or the train and its passengers are moving in the forward direction. At the same time, each person in the moving car on train finds that other persons are not moving as the distance

between them is not changing. From the above observations we can conclude that motion or rest is relative.

2. **Length :** Measurement of string or wire as a simple pendulum is called length.
   Oscillation : When the bob moves from its mean position O to A, then to B and back to D, it is said to have completed one oscillation.
   Amplitude : Maximum displacement of a bob is called its amplitude. It is represented with a
   Time period : The time taken to complete one oscillation is known as time period.
3. Generally, a vehicle travelling on a road does not travel at a constant speed throughout its journey if we note the distance travelled by the object at equal intervals of time (like every second or every minute) , we will get a clearer picture of its speed at different points of time.
   The data of the distance travelled and the time taken can be presented in many ways. One method would be to make a table. See the table. The information given in Table can also be represented in a graph as shown in figure given below. This kind of a chart is called a line chart or line graph. It is created by plotting a series of data points and connecting them to form a line. In the figure we have taken time on the x-axis and the distance on the y-axis.
4. When we try to locate an object, we usually relate it to some sort of reference point. This point is usually the origin, the zero point of an axis (x or y). We provide a numeric value for an object's location by placing it either in the positive direction (+) or the negative direction () in relation to that reference point. We usually take the starting point as the origin (x = 0).

F. Higher Order Thinking Skills (HOTS) :

Ans. 1. Yes, because it depends on its length and speed of oscillation of the bob.

2. r = 1.496×1011 km

Total distance country earth = 2pir

$= 2 \times 3.14 \times 1011 \times 1.496$ km

Time taken = 365 days

$= 365 \times 24$ hours

$= 8760$

$$\text{Speed of Earth} = \frac{2 \times 3.14 \times 1.496 \times 1011}{8760} \times \text{km/hr}$$

$$= \frac{939488}{8760} \times 106$$

1.07×108 km/hr

Project Work

Ans. Do yourself.

13 Electric Current and Its Effects

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. b. 2. d. 3. d. 4. c.

B. Fill in the blanks :

Ans. 1. The unit of current is **Ampere.**
2. **Battery** is a source of current.
3. A standard method of drawing an electrical circuit is called **circuit diagram.**
4. An **electric fuse** is arranged to melt at a definite current.
5. An **electromagnet** works on the magnetic effect of current.
6. The **live** or **neutral** wire carries the current to the appliance.

C. Write true or false :

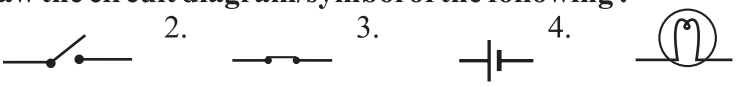
Ans. 1. True 2. False 3. True 4. False 5. True

D. Encircle the odd-one out. Give reason for you choice :

Ans. 1. Because all other shows heating effect of electric current.
2. Because all other works on the application of electromagnet.

E. Draw the circuit diagram/symbol of the following :

Ans. 1. 2. 3. 4.



Section-II

A. Very Short Answer Type Questions :

Ans. 1. Circuit.
2. Tungsten.
3. Bulb.

B. Short Answer Type Questions :

Ans. 1. When the circuit is broken, it is said to be an open circuit. We usually use a switch to control the flow of current in a circuit.
2. Because a fluroescent tube light contains mercury vapour. In inside of glass tube is called with an opaque. White material called phosphor. There is filament in it that's why it is not get heated.
3. An electric fuse is a short length of easily fusible wire put into an electrical circuit for protection purposes. A fuse is inserted with each gadget which needs protection, it is inserted in modern power plugs and it is of course there in each branch circuit and at the main supply input point to provide safety everywhere. These are essential for the safety everywhere.
4. Electromagnetic effects of current.
5. Televisions use an electromagnet to deflect the electron beam of the picture tube.

C. Define the following terms :

Ans. 1. **Electric bell :** Electromagnets are used in electric bells. Let us see how an electric bell functions. The circuit shows a coil of wire wound around a piece of iron. The coil behaves like an electromagnet. A soft iorn strip having a hammer at one end is placed close to the electromagnet. A screw is present near the iron strip.

2. **Electric current :** Electricity actually is movement of charges through a body and the flow of electric charge is called current. The unit of current is ampere.

3. **Electric bulb :** The electric bulb (or electric lamp) which we use for producing light works on the heating effect of electric current. The electric bulb has a very thin filament of tungsten metal. The filament of an electric bulb has a high resistance.

4. **Electromagnet :** An electromagnet works on the magnetic effect of current. We have read that when electric current is passed through a long coil, called solenoid, a magnetic field is produced. It is found that if a soft iron rod is placed inside a solenoid, the strength of magnetic field increases because the iron gets magnetized.

D. Differentiate between the following :

Ans. 1. **A cell :** The electric cell is a common source of electric current to run a number of devices in our everyday. For example, electric cells are used in torches, radios, TV remote controls, casette playerss, electric and watches, toys and laboratory experiments. A single electric cell gives 1.5 volts of electricity.

Battery : When the positive terminal of one cell is joined with the negative terminal of the other cell, then the cells are said to be joined in series. A group of cells joined in series is called a battery.

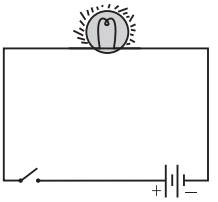
2. When the switch is in the ON position, the circuit from the positive to negative terminal of a battery is closed. And the current flows through the closed circuit. When the switch is in the OFF position, the circuit is open and the current does not flow through the circuit. That is how you switch on and switch off an electric appliance.

E. Long Answer Type Questions :

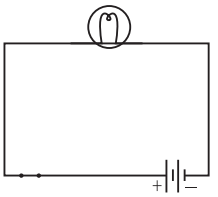
Ans. 1. A diagram which tells us how the various components in a circuit have been connected by using the electrical symbols of the components, is called a circuit diagram. It is much easier to draw a circuit diagram by using symbols. So, we usually represent an electric circuit by its circuit diagram. An electric circuit consisting of a cell, a bulb and a closed which was drawn in Figure 2 can be represented by drawing a circuit diagram shown in figure. In the circuit diagram shown in Figure, a bulb has been connected the two terminals of a cell by copper wires through a closed switch.

The electric circuit consisting of a cell, bulb and an open switch which was

drawn in Figure 2 be represented by drawing a circuit diagram shown in Figure. In the circuit diagram shown in Fig 2., a bulb has been conneted to the two terminals of the cell by copper wires through an open switch.



(a) this is the circuit diagram of the circuit shown in Figure 2(a).



(b) This is the circuit diagram of the circuit given in Figure 2(b).

The circuit shown in Figure 4 is complete (due to closed switch). Since there is no gap, therefore current flows in this circuit and the bulb lights up. The circuit given in Figure 4 is broken (due to because of open switch), so no current flows in this circuit and bulb goes off.

2. The electric current is basically the drifting of a very large number of electrons through conducting materials. As these electrons drift through the conducting materials, they experience resistance or friction which depends upon the nature of the material. It is the friction due to which the mechanical energy, possessed by the drifting electrons, changes to the heat energy, much the same way as our hand gets warm when we rub them against each other.

   If the conducting material is copper or aluminium, then it offers practically no resistance to the passage of electrons (electricity). Thus, the electric current just passes through them without producing any heat energy. It is for the same reason that element of the electric heater gets red hot, but not the connecting copper wires.

   However, in case of the element of a heater, which is made of nichrome, a large resistance is offered. Thus, the mechanical energy of the drifting electrons changes to heat energy rapidly, with the result it becomes red hot and attains a temperature of around 1000°C.

3. An electric fuse is a short length of easily fusible wire put into an electrical circuit for protection purposes. It is arranged to melt ("blow") at a definite current. It is an alloy of lead and tin (63% tin + 37% lead). It offers a high opposition to the flow of current through it and has a low melting point. As soon as the safe limit of current exceeds the fuse "blows" and the electric circuit is cut off.

   A fuse is inserted with each gadget which needs protection, it is inserted in modern power plugs and it is of course there in each branch circuit and at the main supply input point to provide safety everywhere. These are essential for the safety everywhere. These are essential for the safety of the person and building as well as for the protection of the electrical gadgets in use. Whenever there is high current (in excess of some

predetermined value) the fuse blows and that part of the circuit is turned off. This prevents damage to the gadget and any fire that cold have resulted from over heating due to excess current.

4. Magnetism is something you are already familiar with. You have also learnt about magnetic substances (such as iron, steel, nickel and cobalt) in your previous class. A current carrying conductor behaves like a magnet. In other words, when electric current passes through a conductor a magnetic field is generated around it. This is magnetic effect of current.
   An electromagnet works on the magnetic effect of current. We have read that when electric current is passed through a long coil, called solenoid, a magnetic field is produced. It is found that if a soft iron rod is placed inside a solenoid, the strength of magnetic field increases because the iron gets magnetized.
   Several electrical appliances like electric bell, fan, electric motor and telephone use an electromagnet.
5. Please note that only irion is used for making electromagnets. This is because when current is switched off in the coil of an electromagnet made of iron piece, then the iron piece loses all its magnetism. Steel is not used for making electromagnets because when current is switched off from the coil of an electromagnet made of a steel piece, the steel piece does not lose all its magnetism. The steel piece retains the magnetism and becomes a permanent magnet. Another point to be noted is that just like ordinary magnets (called permanent magnets), an electromagnet can attract and hld only the objects made of magnetic materials such as iron, steel, nickel and cobalt. An electromagnet cannot attract objects made of non-magnetic materials such as wood, plastic, paper and aluminium, etc.

F. Higher Order Thinking Skills (HOTS)

Ans. 1. Because copper offices practically no resistance to the passage of electrons. The electric current just passes through them without producing any heat energy.
2. North direction.
3. Because birds sit only on one wire either lives wire or neutral wire than, there will be no circuit built but when monkeyfawns between two parallel wires it get electric shock due to short circuit and can be died.

Project Work

Ans. Do yourself.

14 Winds, Storms and Cyclones

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. b. 2. a. 3. b. 4. c.

B. Fill in the blanks :

Ans. 1. **Air** surrounds the Earth completely.
2. **Thunderstorm** is caused by violent air current inside the comulus clouds.
3. A cyclone is known as **'chakkravat' or 'bavendor'** in Hindi.
4. Cyclone that originate in the western Atlantic and eastern pacific are called **hurricane.**
5. The centre of cyclone is called the **'eye'** of the cyclone.

C. Write true or false :

Ans. 1. False 2. True 3. True 4. False 5. True

D. Match the following :

Ans.

1. Blowing air	a. Wind
2. Strong wind	b. Strom
3. Loud sound from the sky	c. Thunder
4. Low pressure area in the atmosphere	d. Cyclone
5. The envelope of air that surrounds the Earth	e. Atmosphere

Section-II

A. Very Short Answer Type Questions :

Ans. 1. Air is mixture of gases, water vapour and dust particles etc.
2. We live in troposphere.
3. Thunderstorm.
4. 'eye'.
5. Dark funnel shaped clouds.

B. Short Answer Type Questions :

Ans. 1. Air pressure.
2. We know that air (in fact all gases) expands on heating. Due to expansion, it occupies more space (or volume). As a result, its density decreases and it becomes lighter. Thus warm air is lighter than the cold air.
3. Tornadoes occur in cold countries especially in the U.S.A. In India, there are hardly any tornadoes.
   Tornadoes are dark funnel-shaped clouds that reach from the sky to the ground. The neck of the funnel sucks up anything which comes in its path. The winds can circle around in the tornadoes at a speed of 300 km/h.
4. The hurricanes occur frequently in the western Atlantic and eastern pacific.
5. Modern technoloy has provided us means and ways of forecasting the cyclones. Thanks to satellites and radars, a Cyclone-Alert or CycloneWatch is issued 48 hours in advance of any expected storm and a Cyclone-Warning is issued 24 hrs in advance. The message is broadcast every hour or half an hour when a cyclone is nearer the coast. Several National and International organisations cooperate to monitor the cyclone related disasters.

C. Define the following terms :

Ans. 1. Storms are severe atmospheric disturbances followed by very fast moving winds. They are generally accompanied by rain or snow and sometimes by thunder and lightning.

2. A cyclone is a huge revolving storm caused by very high speed winds blowing around a central area of very low pressure in the atmosphere. A cyclone is formed over warm sea-water and it is about 10 to 15 kilometres high. A cyclone revolves due to the force exerted by the rotation of Earth. The centre of a cyclone is a calm area (having very low air pressure). The centre of cyclone is called the 'eye' of the cyclone.

3. Thunderstorm is caused by violent air currents inside the cumulus (thunder) clouds. Inside the clouds, the warm and moist air rapidly rises up.

4. Tornadoes occur in cold countries especially in the U.S.A. In India, there are hardly any tornadoes. Tornadoes are dark funnel-shaped clouds that reach from the sky to the ground. The neck of the funnel sucks up anything which comes in its path. The winds can circle around in the tornadoes at a speed of 300 km/h.

D. Differentiate between the following :

Ans. 1. **Wind :** A movement (usually horizontal) of air in the atmosphere.
Storm : Storms are severe atmospheric disturbances followed by very fast moving winds.

2. **Storm :** Storms are severe atmospheric disturbances followed by very fast moving winds.
Thunderstorm : Thunderstorm is caused by violent air currents inside the cumulus (thunder) clouds. Inside the clouds, the warm and moist air rapidly rises up.

3. **Tornado :** Tornadoes occur in cold countries especially in the U.S.A. In India, there are hardly any tornadoes. Tornadoes are dark funnel-shaped clouds that reach from the sky to the ground. The neck of the funnel sucks up anything which comes in its path. The winds can circle around in the tornadoes at a speed of 300 km/h.
Cyclone : A cyclone is a huge revolving storm caused by very high speed winds blowing around a central area of very low pressure in the atmosphere. A cyclone is formed over warm sea-water and it is about 10 to 15 kilometres high. A cyclone revolves due to the force exerted by the rotation of Earth. The centre of a cyclone is a calm area (having very low air pressure). The centre of cyclone is called the 'eye' of the cyclone.

E. Long Answer Type Questions :

Ans. 1. Air moves from a region of high air pressure to a region of low air pressure. The greater the pressure difference, the faster the air moves. An increased speed of wind (moving air) is accompanied by a reduction in air pressure.

2. All the places on the Earth are not heated to the same extent. In other words, there is uneven heating of the Earth. This results in the generation of wind currents. Let us study about two regions where the Earth is unevenly heated.

   a. Uneven heating between the equator and the poles : Places near the equator are always warm as they get the maximum heat from the Sun. The warm air from these regions rises and cool air from the regions in the 0-30° latitude belt on either side of the equator moves in. At the poles, the air is cold. Warm air from latitudes of about 60° rises up and cold air from the poles rush to take its place, thus setting up a wind circulation from the poles to warmer latitudes.

   b. Uneven heating of land and water : You are familiar that land gets heated faster than water. The air over the land gets heated and rises and the winds from the oceans blow towards the land. These wind currents generated are called monsoon winds. They carry water and bring rain. For example, uneven heating of the region of Rajasthan generates monsoon winds from southwest direction which carries water from the Indian ocean. In winter, the direction of the wind is reversed and it flows from the land to the ocean.

3. Thunderstorm is caused by violent air currents inside the cumulus (thunder) clouds. Inside the clouds, the warm and moist air rapidly rises up. In doing so, the water vapour in it rapidly condenses to form tiny droplets of water, which freeze to form small particles of ice. During the condensation and freezing, a large amount of heat energy is released. This heat energy further pushes up the air at a higher speed. The water and ice particles rub against each other in rapidly rising air. This builds up a negative electric charge in the clouds. This electric charge is then released by the clouds, by the stroke of lightning. The lightning heats the surrounding air to a temperature of 30,000°C, which is five times hotter than the surface temperature of the Sun.

4. A cyclone is a huge revolving storm caused by very high speed winds blowing around a central area of very low pressure in the atmosphere. A cyclone is formed over warm sea-water and it is about 10 to 15 kilometres high. A cyclone revolves due to the force exerted by the rotation of Earth. The centre of a cyclone is a calm area (having very low air pressure). The centre of cyclone is called the 'eye' of the cyclone. The diameter of the eye of cyclones varies from 10 to 30 kilometres. The eye of cyclone is a region free of clouds and it has only light winds. Around the calm and clear eye of cyclone, there is cloud region of about 150 kilometres in size. In this region, there are very high speed winds (having speeds of 150 km/h to 250 km/h) which are moving in circles around the eye, and thick thunderclouds which produce heavy rain. Away from this region of clouds, the wind speed gradually decreases. A cyclone is known as

'chakkravaat' or 'bavandar' in Hindi.
The centre of the cyclone is a cloudless, calm area. This is called the eye. In this area, the winds are not strong and there is no rain. But the winds around the eye can have speeds of upto 200 km/hr.

5. Some of the effective safety measures against cyclones to be taken by the administration :
i. Installation of a cyclone forecast and warming system.
ii. Rapid communication of warnings to the Government agencies, the ports, fishermen, ships and to the general public.
iii. Construction of cyclone shelters in the cyclone prone areas, and Administrative arrangements for moving people fast to safer places.
Some of the effective safety measures against cyclones to be taken by the people :
i. Shelter in the strongest part of your home, like the bathroom, cellar, hallway or built-in wardrobe.
ii. If necessary, cover yourself with a mattress, blanket, or tarpaulin, under a table.
iii. Stay clear of windows and skylights. Close curtains and blinds to protect against flying glass.
iv. Don't use the phone-it is dangerous if there is lightning also.

F. Higher Order Thinking Skills : (HOTS) :

Ans. Do yourself.

Project Work

Ans. Do yourself.

15 Light

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. b. 2. b. 3. b. 4. c.

B. Fill in the blanks :

Ans. 1. **Light** is a form of energy.
2. A light ray which falls on a mirror is called an **incident ray.**
3. A mirror can be **plane** or a **curved mirror.**
4. Torches and headlights of cars have **concave mirrors.**
5. **Image virtual** is formed behind the mirror.

C. Write true or false :

Ans. 1. True 2. False 3. True 4. True 5. False

Section-II

A. Very Short Answer Type Questions :

Ans. 1. (i) Light is a form of energy, (ii) Light travels in a straight line.

2. Plane mirror and curved mirror.
3. Convex mirrors are used as side-view mirrors in cars and scooters as they can form a compressed image of objects spread over a large area.
4. Convex lenses are used in cameras of all types except in pin hole camera. Convex lens are used in telescopes and microscopes. Concave lenses are used in spectacles to help people see distant objects clearly. Convex lenses are used in spectacles to help people see nearby things clearly.

B. Short Answer Type Questions :

Ans. 1. A light ray which falls on a mirror is called an incident ray and the ray which emerges after reflection is called the reflected ray.
2. A virtual image is always erect (upright) and is formed behind the mirror.
3.
4. In case of a concave mirror, as shown by the figure below, rays coming from inifinity are reflected and meet actually at a point known as the 'focus' and form a real image.
5. (i) Doctors use concave mirrors for diagnosing problems in organs like eyes, ears, nose and throat.
   (ii) Torches and headlights of cars have concave mirrors.
   (iii) Solar cookers and solar furnaces have concave mirrors to focus the radiation of the Sun.
6. Convex mirrors are used as side-view mirrors in cars and scooters as they can form a compressed image of objects spread over a large area. A natural convex lens is present in each of our eyes, it helps us to create accurate images on the retina of each eye.

C. Define the following terms :

Ans. 1. **Dispersion :** The splitting up of white light into seven colours on passing through a transparent medium like a glass prism is called dispersion of light.
2. **Reflection :** When a light ray falls on any object, it is thrown back. The bouncing back of light rays is called reflection of light.
3. **Real image :** A real image is one in which light rays actually intersect, or pass through, the image point. A real image can obtained on a screen.
4. **Convex mirror :** A mirror which has one or two spherical surfaces such that it is thicker to the middle and tapering of the edges and one of its side is painted with silver or black polish is called convex mirror.
5. **Concave mirror :** A mirror which does one or two spherical surface such that it is thicker at the edges and tapering in the middle and one of its side is painted with silver or black polish, is called concave mirror.
6. **Virtual image :** A virtual image is one in which the light rays do not really pass through the image point but appear to diverge from that point. A virtual image cannot be obtained on a sceren. The image formed by a plane mirror is virtual image.

D. Differentiate between the following :

Ans. 1. **Virtual image :** A virtual image is one in which the light rays do not really pass through the image point but appear to diverge from that point. A virtual image cannot be obtained on a sceren. The image formed by a plane mirror is virtual image.

Real image : A real image is one in which light rays actually intersect, or pass through, the image point. A real image can obtained on a screen.

2. **Refraction :** In case of a lens, the light rays do not bounce off its surface. Instead, the light rays pass through it, but in doing so they change their path, i.e., they bend from their original path. The phenomenon of bending rays from their path in another medium is called refraction of light.

Reflection : When a light ray falls on any object, it is thrown back. The bouncing back of light rays is called reflection of light.

3. **Concave mirror :** A mirror which does one or two spherical surface such that it is thicker at the edges and tapering in the middle and one of its side is painted with silver or black polish, is called concave mirror.

Convex mirror : A mirror which has one or two spherical surfaces such that it is thicker to the middle and tapering of the edges and one of its side is painted with silver or black polish is called convex mirror.

4. **Concave lens :** A lens which has one or two spherical surfaces such that it is thicker at the edges and tapering in the middle is called concave lens.

Convex lens : A lens which has one or two spherical surfaces such that it is thicker in the middle and tapering at the edges is called convex lens.

E. Long Answer Type Questions :

Ans. 1. **Regular Reflection :** When the light rays falling on a surface get reflected in a particular direction, it is known as regular reflection. Regular reflection takes place from a smooth, shiny surface.

Irregular Reflection : When the light rays falling on a surface get reflected in various directions, i.e., get scattered, it is known as irregular reflection. Irregular reflection takes place when the reflecting surface is rough and irregular.

2. In case of a convex mirror, the rays after reflection do not meet but appear to meet behind the mirror on producing the reflected rays backwards, thus forming a virtual image.

3. **(i) Convex Lens :** A lens which has one or two spherical surfaces such that it is thicker in the middle and tapering at the edges is called convex lens.

When a parallel beam of light passes through a convex lens, it bends and narrows to a point. This point where parallel beam of light converges is called focal point or principal focus. The figure shows the geometric diagram for the path of rays through the convex lens. The convex lens is sometimes called converging lens, for the simple reason, that it converges a parallel beam of light to a point.

(ii) Concave Lens : A lens which has one or two spherical surfaces such that it is thicker at the edges and tapering in the middle is called concave lens.

When a parallel beam of light passes through a concave lens, it spreads (diverges). The concave lens is sometimes called diverging lens, for the simple reason, that the parallel beam of light on passing through it diverges. The figure shows the geometric diagram for the path of rays through the concave lens.

4. It is thicker in the middle and thinner at the edges. It forms a virtual, erect, magnified image of an object which is held close to it. It forms a real, inverted image when held away from the object. The image may be magnified or diminished.
5. In the year 1665, Newton discovered by his experiments with glass prisms that while light (like sunlight) consists of a mixture of lights of seven colours. Newton found that if a beam of white light is passed through a glass prism, then the white light splits to form a band of seven colours on a white screen. The band of seven colours formed on a white screen, when a beam of white light is passed through a glass prism, is called spectrum of white light. The seven colours of the spectrum are Red, Orange, Yellow, Green, Blue, Indigo and Violet.

F. Higher Order Thinking Skills (HOTS) :

Ans. 1. There will be no difference, is the distance of the object is same.
2. When a parallel beam of light passes through a convex lens, it bodies are narrows to a point. It that act is continued on a paper it may burn.
3. Because soap bubbles act as a prism and due to dispersion of light soap bubbles sometimes appear colourful.

Project Work

Ans. Do yourself.

16 Water : A Precious Resources

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. a. 2. d. 3. c. 4. b.

B. Fill in the blanks :

Ans. 1. Availability of potable water is important in **urban areas** and **villages.**
2. Water present in the **oceans** is not fit for human use.
3. Underground water is also known as **aquifer.**
4. **Water** is essential for all living organisms.
5. **Fertilizers** are usually highly soluble in water.

C. Write true or false :

Ans. 1. True 2. False 3. True 4. True 5. False

D. Match the following :

Ans.

1. Water	a. An essential natural resource
2. Water cycle	b. Helps in regulating weather
3. Typhoid	c. Water related disease
4. Boiling	d. Purification of water at home
5. Water conservation	e. Careful and economical use of water

Section-II

A. Very Short Answer Type Questions :

Ans.
1. Water on the Earth is a renewable resource.
2. Water table.
3. Aquifiers.
4. Wet.
5. Rainwater harvesting.

B. Short Answer Type Questions :

Ans.
1. Natural water is not considered safe for drinking because it may contain some impurities dissolved in it.
2. Sea/Ocean water is not fit for domestic use because it is salty in nature.
3. Decrease in the amount of ground water is known as depletion of water table.
4. Plants need water for their growth and development. They can't grow without water. As such water scarcity bady affect their growth.
5. Drip irrigation.

C. Long Answer Type Questions :

Ans.
1. **(i) Infiltration :** Groundwater is present in between the various layers of Soil and impervious rock. It is actually rainwater which mainly comes from seepage of water accumulated under the ground. The process of seeping of water into the ground is called infiltration.
   (ii) Aquifer : Rainwater seeps through topsoil and layers or rocks like limestone, sand and gravel, and gets collected on top of non-porous layers. The top level of this underground water is called the water table. Underground water is also known as an aquifer.
2. In this drip irrigation, water is applied to the specific sites drop by drop using emitters to reduce wastage of water. Its advantage is that it helps in conserving water by preventing its wastage.
3. **For this we can do the following :** Avoid wastage of water. Turn the tap off whenever not needed. Turn the tap off while brushing. You can reduce the amount of water while flushing the toilet by placing glass bottle inside the flushing tank. Don't ever pollute water without any reason. Adopt rain water harvesting technique. Make people aware of the problems which arise due to scarcity of water. Mop the floors instead of washing them.
4. Insufficient rainfall is called 'scanty rainfall'. Sometimes there is scanty rainfall during the rainy season. Since there is less rainfall, less rainwater

seeps into the ground. In such a situation, much more groundwater is drawn out by the people for various purposes than gets replenished by rainfall. This results in depletion of water table.

5. About three-fourth of the Earth's surface is covered with water. But people in many countries do not get enough drinking water. This is because most water on the Earth's surface is not fit for drinking. The drinking water therefore must be conserved. Careful, economical use and avoiding the wastage of water is called conservation of water.

   Suggestion for Conserving Water : Some suggestions to conserve water are given below :

   Close the tap while brushing teeth.

   Check for leaking taps and water-pipes.

   Instead of using sprinklers or sprays, use drip irrigation, so that water is conserved. In this type of irrigation, water is applied to the specific sites drop by drop using emitters to reduce wastage of water.

   Rain is the purest source of water. We should try and hold this water in tanks and tubs for later use. This is called rainwater harvesting. (You have read about it in your previous class). Rainwater harvesting is a process of storing rainwater in underground tanks or tanks made on terraces. This stored water can be used for household purposes. Free flowing wells should be covered to save them from contamination. Help in spreading water education and creating awareness amongst the masses.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. This happens because of going down of water table. To get water back into the well we should put some water into it from the top.

2. This is so because we are using a lots of water due to change in our life styles, than what we were using ten decades back.

3. Yes, this is so because we are continually contaminating the water bodies due to our industrial activities.

Project Work

Ans. Do yourself.

17 Forests : Our Lifeline

EXERCISE

Section-I

A. Tick (✓) the correct answer (MCQs) :

Ans. 1. a. 2. d. 3. b. 4. c.

B. Fill in the blanks :

Ans. 1. The **forests** are the store houses of biodiversity.

2. The forest floor appears **dark** and rich in **nutrients.**

3. All animals depend on plants for **food** and **shelter.**

4. Plants provide different types of **medicine** and **spices.**
5. People should avoid **smoking** or **cooking** in the forest area.

C. Write true or false :

Ans. 1. True 2. True 3. False 4. False 5. True

D. Match the following :

Ans.

1. Canopy	a. The topmost layer of crown of leaves
2. Forest floor	b. The ground surface of the forest
3. Biennial	c. Plants having life span of two years
4. Lac, dye, can	d. Non-wood products
5. A forestation	e. Large-scale planting of tree saplings

Section-II

A. Very Short Answer Type Questions :

Ans.
1. Forest is natural resource consisting of trees and other vegetation.
2. Canopy is a roof-like cover of forest made by trees.
3. Besides fuel, forests provide raw material for wood based industries such as pulp and paper, composite wood, rayon, sports goods, boat building, matches, etc.
4. The crown of a tree is the branched part of the stem and leaves above the main trunk.
5. Forests are being depleted due to ever-rising demand for clearing forest areas and converting them to residential for and agricultural areas.

B. Short Answer Type Questions :

Ans.
1. Evergreen, deciduous, thorny and mountainous forests.
2. The trees that are not as tall as the canopy trees, create different layers or tiers under the canopy. They form understoreys. They are formed of shrubs and tall grasses. The lowest layer is formed by herbs.
3. **Forests have a wide variety of plants and trees :** The plants having life span of one year are called annual. The plants having life span of two years are called biennial. The plants having long life spans varying from a decade to a few hundred years are called perennial. Forests are the main reservoir of such plants.
4. Almost all the energy needed by living beings on the Earth comes ultimately from the Sun through green plants (known as producers). Animals and nongreen plants obtain nutrients from the green plants. They are called consumers.
5. Plants taken in carbon dioxide and give out oxygen. That is how they purify air.
6. Afforestation helps in the improvement of O2 and CO2 ratio, and to prevent global warming, soil erosion and floods.

C. Long Answer Type Questions :

Ans. 1. The three regions in a forest are as follows :

Canopy

It is the topmost layer of crown of leaves and branches of very tall trees. When viewed from above, the canopy appears as a green cover forming a roof or umbrella over the forest land.

Undergrowth : The trees that are not as tall as the canopy trees, create different layers or tiers under the canopy. They form understoreys. They are formed of shrubs and tall grasses. The lowest layer is formed by herbs.

Forest Floor : It is the ground surface of the forest. It is formed of soil and remains covered with dead and decaying leaves, fruits, seeds, twigs, small herbs, fungi, etc. Therefore, the forest floor appears dark and rich in nutrients.

2. Forests are a very important natural resource and extremely important to man. We can classify their functions into three categories :

(i) Regulatory functions : The forests perform the following important functions and are essential for maintaining climate of the area :

Thes regulate the percentage of gasescarbon dioxide and oxygen in the atmosphere. Animals, you know take in oxygen all the time during respiration and release carbon dioxide which is taken by the leaves of the plants to produce food by photosynthesis. Thus a balance is maintained in the atmosphere. Transpiration process : The dense forests help maintain humidity in the air. The forests help maintain proper climatic conditions, mineral elements and biogeochemical cycle in nature.

Forests prevent soil erosion : The roots of the trees help to prevent soil erosion by binding it and not allowing the soil to run away with water or blow away with wind.

(ii) Productive functions : Forests provide a number of economically important products such as timber, cane, bamboos, tannins, essential oils, resins etc. Forest animals provide us with honey, meat, ivory, hide, skin, lac etc. Apart from these a number of forest plants find use in medicines, such as, eucalyptus and Cinchona. The oil from eucalyptus is used to get relief from pain whereas the bark of Cinchona tree gives medicine "Quinine" which is helpful against malaria.

(iii) Accessory functions : These include the role of forests in recreation, aesthetics and as habitat to a wide variety of wild life. The importance of forests can also be classified as ecological and economic.

Economic significance. Wood, the chief product of forests has various domestic and industrial applications. Wood when used as a fuel is considered better than coal as its sulphur and ash contents are low. However, excessive use of wood as a fuel would mean cutting down a large number of trees because of which other important functions of forests may suffer. Besides fuel, forests provide raw material for wood based industries such as pulp and paper, composite wood, rayon, sports goods, boat building, matches, etc.

3. **Plants and animals are inderdependent in the following ways :**

Animals Obtain Food from Plants, Animals Obtain Oxygen from Plants, Animals get Shade and Protection from Sun and Rain, Plants Purify Air, Plats Depend on Animals for Carbon Dioxide, Plants Depend on Animals for Pollination and Seed Dispersal, Animals Provide Nutrients to Plants

4. **We depend on plants in following ways :** We food, natural fibres like cotton and jute from plants. We get a variety of wood products like firewood, timber, plywood, pulp for paper, etc. Many plants provide different types of medicines and spices. We also get nonwood products from plants, like lac, dyes, cane, bamboo, grasses, fodder, bidi leaves, gums, resin, rubber, etc.
5. **Some measures of forest conservation areas follows :** Large scale felling of the forest trees must be stopped. When trees are cut, more trees should be planted in their place. Overgrazing by cattle and other animals should be stopped. To develop new forests, more saplings should be planted every year during the rainy season. Forests must be protected from insects, pests and infections by treating them with insecticides and pesticides. Forest fires must be checked. People should avoid smoking or cooking in the forest area. Human activities leading to soil erosion must be stopped.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. This is so because they purify air.
2. This means that everything that is produced in forest is utilized by the animals and plants found there.

Project Work

Ans. Do yourself.