

1 Nutrition in Plants



Exercise

A. Multiple Choice Questions (MCQs) :

Choose the correct option :

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

B. Fill in the blanks :

1. blue-green alga, fungus 2. insects 3. insectivorous
4. carbon dioxide 5. nitrogen

C. State True or False:

1. False 2. True 3. True 4. True 5. True 6. True 7. True
8. True 9. True 10. True

D. Differentiate between the following :

- Autotrophs : The organisms which make their own food from the simple substances present in the environment are called autotrophs.
Heterotrophs : The organisms which cannot make their food and depend on other for their food are called heterotrophs.
- Parasites : The plants which derive their food from the living tissues of other organisms are known as parasites.
Saprophytes : Organisms which feed on dead and decaying matter.
- Carnivores : The animals which eat meat or, flesh of the other animals are called carnivores.
Omnivores : The animals which eat both plants and meat are called omnivores.
- Symbiotic : Two plants of different species which live together and depend on each other for survival are known as symbionts.
In other words, it is a mutual association between two organisms. Their mode of nutrition is called symbiosis.
Insectivorous : The plants which derive nutrition from insects are known as insectivores and their mode of nutrition is insectivorous.

E. Define the following :

- Symbiosis Do yourself
- Parasite Do yourself
- Carnivores and Omnivores Do yourself
- Symbiotic and Insectivorous Do yourself

F. Very Short Answer Type Questions :

- Ans. 1. The process of taking in food and its utilization by the body is called nutrition.
2. The association between two different plants is called symbiotic association or symbiosis.
3. Carbon dioxide + Water Glucose + Oxygen
+ Water (from air) (from soil)

G. Short Answer Type Questions :

- Ans. 1. All green plants, cyanobacteria are called the autotrophs. They make

- their own food with the help of light energy of the sun, carbon dioxide from the air and water from the soil during the process of photosynthesis.
- Chlorophyll traps solar energy and changes it into chemical energy during photosynthesis. This is stored in glucose molecules.
 - Through the stomata, carbon dioxide from the atmosphere enters the leaves. Oxygen, a by-product of photosynthesis, and water (transpiration) also go out of the leaves through these stomata.

H. Long Answer Type Questions :

Ans. 1. Conditions Necessary for Photosynthesis

Chlorophyll : Chlorophyll is the green pigment found inside chloroplasts. It traps solar energy and changes it into chemical energy during photosynthesis. This is stored in glucose molecules.

Sunlight : When sunlight falls on a chlorophyll molecule, its energy is absorbed. This energy makes carbon dioxide and water to combine and glucose is formed.

Carbon dioxide : The cells of leaves get carbon dioxide from the air. The air enters leaves through tiny pores, called stomata. Stomata are present on the undersurface of leaves and open into air spaces.

Water : Water is obtained by the plant from the soil by roots and is transported to the leaves.

- Non-green plants obtain their food by four types of mode of nutrition.
 - Parasitic
 - Saprophytic
 - Insectivorous
 - Symbiosis

1. Parasitic mode of nutrition : In this type, the non-green plants live on other living organisms and obtain their food from them. **Example** : Nutrition in cuscuta plant.

2. Saprophytic mode : In this type, plants feed on dead and decaying organic matter. **Example** : Nutrition in fungi, mould, yeast, etc.

3. Insectivorous : In this type of nutrition, plants live in association with other plants eat animals, particularly insects. **Examples** : Pitcher plant, Venus flytrap.

4. Symbiosis : In this type of nutrition, the plant and share shelter and nutrients. **Example** : Lichen.

- The mode of nutrition in which non-green plants live on other living organisms and obtain their food from them is called parasitic mode of nutrition while the mode of nutrition in which organisms take in nutrients from dead and decaying matter is called saprophytic mode of nutrition.
 - In symbiotic mode of nutrition, the plants live in association with other plants and share shelter and nutrition while in parasitic mode of nutrition, the plants live on other living organisms called hosts and obtain their food from them.

I. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.

2 Nutrition in Animals



Exercise

A. Multiple Choice Type Questions (MCQs) :

Choose the correct option :

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

B. Fill in the blanks :

- | | | | |
|----------------|--------------|-----------|---------------|
| 1. holozic | 2. digestion | 3. Amoeba | 4. Liver |
| 5. rumination | 6. proteins | 7. small | 8. bile juice |
| 9. pseudopodia | 10. four | | |

C. State True or False :

- | | | | | |
|---------|----------|---------|----------|----------|
| 1. True | 2. True | 3. True | 4. True | 5. False |
| 6. True | 7. False | 8. True | 9. False | 10. True |

D. Match the following :

- | | |
|--------------------|------------------------|
| 1. Deer | a. Food vacuole |
| 2. Amoeba | b. Omnivore |
| 3. Humans | c. Ruminant |
| 4. Mouth cavity | d. bile juice |
| 5. Liver | e. Hydrochloric acid |
| 6. Stomach | f. Saliva |
| 7. Small intestine | g. Absorption of water |
| 8. Large intestine | h. Villi |

E. Very Short Answer Type Questions :

- Ans.** 1. The breakdown of complex components of food into simpler substances is called digestion.
2. The finger-like projections on the inner wall of the small intestine is called villi. These villi increases the surface area for absorption.
3. The chief function of the large intestine is the absorption of water.

F. Short Answer Type Questions :

- Ans.** 1. The first set of teeth that grow during infancy and fall off at the age of 6-8 are called milk teeth. They are replaced by a second set of teeth called permanent teeth that are never replaced.
2. A long, coiled food tube which is open at both ends. It is called alimentary canal. It begins with mouth and ends with anus. It is divided into the following compartments :

buccal cavity	oesophagus or foodpipe
stomach	small intestine
large intestine	rectum
anus	

3. The similarity between the nutrition in amoeba and human beings is that the digestion of food is done by some digestive enzymes as well as the digested food is absorbed and utilised by cell.
- The ingestion process in amoeba is done with the help of its false feet known as pseudopodia while in human beings, mouth cavity is responsible for food ingestion.

G. Long Answer Type Questions :

- Ans.** 1. The different modes of nutrition in animals are :

1. Ingestion : It is the process by which the food is taken into the body of an organism. Various organisms have special organs for ingestion.

2. Digestion : The food consumed by animals is normally solid and complex. The food has to be broken down into smaller, more simple

compounds which the body can utilise. This process of converting solid and complex food into simple and soluble food is called digestion.

3. Absorption : It is the process by which digested nutrients are absorbed by the intestines and transported to various parts of the body through the circulatory system.

4. Assimilation : It is the process of utilising absorbed food for the growth, development and energy requirement of the animal.

5. Egestion : It is the process of removing undigested food (waste) material from the body in the form of faeces.

2. The digestion in human beings starts in mouth cavity. The mouth is an opening between the lips. It leads to buccal or oral cavity. The oral cavity has a number of teeth and a muscular tongue. The process by which the food is taken into the body of an organism is called ingestion. When we chew food, our teeth help to cut and grind it into smaller pieces. The tongue mixes saliva with the food, pushes the food towards the teeth, and helps in swallowing the food.

The swallowed food passes through a long (about 25 cm) tube called oesophagus and reaches stomach. In stomach, the protein digesting enzymes breakdown proteins into simpler forms. Hydrochloric acid (HCl) kills many bacteria in the food and makes the medium in stomach acidic for digestive enzymes to be active.

The digestion of all components of food gets completed in small intestine. The nutrients present in the digested food are absorbed by villi present in small intestine. The remaining of food goes to large intestine where water is absorbed. Now, the remaining is passed out through anus.

3. There are four types of teeth spread out inside the mouth. They are incisors, canines, premolars and molars. Each type consists of teeth with separate functions. They differ in size, shape and number.

Incisors are at the front and centre of the mouth. They have a sharp, straight cutting edge to cut and bite food.

Canines are next to incisors. They are sharp and pointed. They are used to stab, tear and pierce food.

Premolars and molars are found at the back and sides of the jaw. They break up the food into smaller pieces before it is swallowed.

H. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

3 Natural Fibres



Exercise

A. Multiple Choice Questions (MCQs) :

Choose the correct option :

Ans. 1. d. 2. c. 3. c. 4. a. 5. c.

B. Fill in the blanks :

Ans. 1. **Wool** and **silk** are the two most important animal fibres.

2. The process of shaving a sheep's body to obtain fleece is called **shearing**.
3. The quality of the **wool** depends on the breed of the sheep.
4. Silk was first developed in **China**.
5. Workers of sericulture industry get affected by respiratory diseases such as **asthma** and **bronchitis**

C. Do yourself

D. State True or False :

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

E. Very Short Answer Type Questions :

- Ans.**
1. Covering around the pupa is known as Cocoon.
 2. Fibres are fine strands used to make fabrics.
 3. Sericulture or silk farming is the rearing of silkworm for the production of raw silk.

F. Short Answer Type Questions :

- Ans.**
1. People who work as sorters get infected by a bacterium, anthrax, which causes a fatal blood disease called Sorter's disease.
 2. The process of shaving a sheep's body to obtain fleece is called shearing.
 3. The best quality of silk is obtained from the cocoons of silk moth, Bombyx mori.

G. Give reasons for the following :

- Ans.**
1. We wear different types of clothes in different weathers because these help us to be comfortable. We wear cotton clothes in summer because cotton absorbs less heat while woollen clothes are worn in winter. Woollen helps to keep us warm.
 2. Wool-yielding animals have thick fur to protect their body from extreme cold. Wool-yielding animals are reared mainly in cold region. Their fur have a protective layer and help them to protect.
 3. Merino wool is considered to be the best variety of wool because the fibre is strong, fine, lengthy and has a good tensile strength.
 4. Worsted woollen cloth is better than the ordinary woollen cloth because in this system, the small fibres of unequal length are spun into yarn for soft and lengthy woven fabric.

H. Long Answer Type Questions :

- Ans.** 1. **Wool :** Wool is prepared from under-hairs of those animals which have hairy skin.

Wool is obtained mainly from several breeds of sheep. Some of the important breeds of sheep found in India are—Rampur bushair, Nali, Lohi, Bakharwal, Patanwadi, and Marwari. In addition, some breeds of goat like angora, kashmere and mohair, and the yak, camel, angora rabbit, llama, alpaca also provide wool.

Silk : Silk, called the 'queen of textiles', is a natural protein fibre, fibroin produced from cocoons of many commercial species of silkworms, Bombyx mori being the most widespread.

3. The quality of wool depends on the length of fibres, number of crimps or curls per centimeter and tensile strength.
4. **Occupational Hazards of Wool Industry**

Many people earn their livelihood by working in the wool industry. People who work as sorters get infected by a bacterium, anthrax, which causes a fatal blood disease called Sorter's disease. This is very common

in wool industry.

Occupational Hazards of Silk Industry

Workers of sericulture industry get affected by respiratory diseases such as asthma and bronchitis because of inhalation of vapours arising from cocoons when being steamed, boiled and reeled.

Workers develop infectious skin diseases due to dipping of hands in boiling water during killing of pupae.

I. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.

4 Physical and Chemical Changes



Exercise

A. Multiple Choice Questions (MCQs) :

Choose the correct option :

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

B. Fill in the blanks :

- Ans.** 1. The process that leads to a chemical change is called a **chemical reaction**.
2. A **chemical** change is a permanent change.
3. When CO_2 gas is passed through lime water, it turns milky.
4. **Oxygen** and **water** are two essential conditions for rusting of iron.

C. State True or False :

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

D. Very Short Answer Type Questions :

- Ans.** 1. Physical change : Water to ice.
Chemical change : Rusting of iron.
2. Rusting is the process of formation of a reddish-brown substance on an iron article in the presence of air and moisture.
3. Alloying is the method of mixing two or more metals.

E. Short Answer Type Questions :

- Ans.** 1. Physical changes are generally reversible because in physical change only physical properties of the substance are altered and no new substance is formed.
2. Oxygen and humidity in atmosphere are essential for rusting to take place.
3. Alloy is a mixture of two or more metals.

F. Give reasons for the following :

- Ans.** 1. Iron particles are often coated with paint to avoid rusting.
2. Carbon dioxide gas is used in fire extinguishers because it does not allow oxygen to combine with carbon and its compounds.

G. Long Answer Type Questions :

Ans. 1. **Differences between physical and chemical changes**

S.No.	Physical change	Chemical change
1.	No new substances are formed.	New substances are formed.

2.	Physical change is reversible.	Chemical change is irreversible.
3.	Physical change is a temporary change.	Chemical change is a permanent change.

2. Alloying is needed to prevent rusting. In alloying two or more metals are mixed. Stainless steel is an alloy of iron, nickel and chromium.

H. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.

5 Classification of Substances



Exercise

A. Multiple Choice Questions (MCQs) :

Choose the correct option :

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

B. Fill in the blanks :

- Ans. 1. **Lemon** and **vinegar** are common examples of substances containing acids.
 2. Acidity depends on the amount of **acid** present in the substance.
 3. Bases that are soluble in water are called **alkalies**.
 4. An **indicator** is a substance that changes colour in acids and bases.
 5. Phenolphthalein remains colourless in **acidic** and **neutral** solutions.

C. State True or False :

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

D. Match the columns :

- | Ans. | Column A | Column B |
|------|-------------------|--|
| | 1. Antacid | a. milk of magnesia |
| | 2. Wasp sting | b. rubbing vinegar |
| | 3. Sulphuric acid | c. king of chemicals |
| | 4. Ant sting | d. rubbing sodium bicarbonate solution |

E. Very Short Answer Type Questions :

- Ans. 1. Our stomach secretes hydrochloric acid may sometimes cause acidity. To neutralize this, antacids such as magnesium hydroxide are taken.
 2. Tartaric acid, lactic acid and malic acid
 3. Turmeric
 4. Sulphuric acid, nitric acid, hydrochloric acid, etc.

F. Short Answer Type Questions :

- Ans. 1. An indicator is a substance that changes colour in acids and bases. Turmeric and litmus are two acid-base indicators.
 2. Base is a substance that is bitter in taste, soapy to touch and turns red litmus blue.
 3. Some natural sources of acids are grapes, lemon, tamarind, orange, etc.
 4. (a) Phenolphthalein — acids **colourless** bases **pink**
 (b) Methyl orange acids — **red** bases **yellow**

(c) Turmeric acids — **no change** bases **red**

G. Long Answer Type Questions :

Ans. 1. Litmus is a natural dye which is extracted from lichens. It is the most commonly used indicator.

Litmus is available in the form of blue litmus paper and red litmus paper.

Blue litmus paper turns red in acids and remains blue in bases.

Red litmus paper turns blue in bases and remains red in acids.

Blue or red litmus paper do not change colour in neutral solutions.

2. All acids are not corrosive. Some acids are strong. Mineral acids are strong acids. They are corrosive in nature. Some acids are obtained from animals and plants. These acids are known as organic acids. Such acids are weak in nature and have a low tendency towards corrosive. These acids contain water in large quantity that is why organic acids are not so corrosive.
3. The reaction between an acid and an alkali to form a salt and water is called neutralisation reaction.

Activity

Aim : To demonstrate the neutralisation reaction.

Take about 5 mL of dilute solution of sodium hydroxide (NaOH) in a test-tube. Add 2 drops of phenolphthalein indicator to it. The solution in the test-tube turns pink. Now add dilute solution of hydrochloric (HCl) drop-wise using a dropper and shake the test-tube to mix the solution. Stop adding HCl when the pink colour of the solution just disappears.

Now add a drop of sodium hydroxide solution and shake the test-tube to mix the solution. What do you see? The solution turns pink. Add a drop of HCl solution to the solution in the test-tube. The pink colour disappears. Keep repeating the addition of sodium hydroxide and hydrochloric acid solutions one after the other and watch the appearance and disappearance of pink colour.

This experiment shows that the addition of HCl solution destroys the alkaline nature of NaOH. On the other hand the addition of NaOH solution destroys the acidic nature of HCl. That is, both NaOH and HCl appear to cancel the effect to each other. Such a reaction between an acid and an alkali is called neutralisation reaction.

4. Uses of Neutralisation

In the treatment of soil : Farmers usually need to change the nature of soil so that their crops can grow well. Certain plants do not grow well if the soil is acidic. Soil may get acidic due to acid rain or by the use of excessive fertilisers. If the soil is too acidic, it is neutralised by adding a base like slaked lime $[\text{Ca}(\text{OH})_2]$ or quick lime (CaO).

On the other hand if the soil is too basic, it is treated by adding organic matter which releases acids. This helps in neutralising the basic soil.

In the treatment of tooth decay :

Our tooth decay due to acid produced by fermentation of food particles in our mouth. By using toothpastes, which is alkaline in nature, acids are neutralized to keep our tooth decay free.

In treating indigestion : Our stomach secretes hydrochloric acid may sometimes cause acidity. To neutralize this, antacids such as magnesium hydroxide are taken.

In treating factory wastes : Some factory wastes contain harmful acids. If these are allowed to flow directly into rivers or lakes, the acids may

harm the aquatic plants and animals. To avoid this, factory wastes are usually treated with a base.

H. Higher Order Thinking skills (HOTS) Questions :

Ans. Do yourself.

Things To Do

Ans. Do yourself.

6 Heat and Temperature



A. Multiple Choice Questions (MCQs) :

Choose the correct option :

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

B. Fill in the blanks :

- Ans.**
1. **Sun** is the primary source of heat energy on Earth.
 2. Electrical energy is converted into **heat energy** by an electric heater.
 3. The doctors use **thermometer** to measure the temperature of patients.
 4. Heat is generally conducted from the **hot** end to the **cold** end of an object.
 5. **Black** bodies are good absorbers of radiant energy.

C. Very Short Answer Type Questions :

- Ans.**
1. Temperature is the measure of the degree of hotness or coldness of a body.
 2. Conduction, convection and radiation
 3. The energy transferred from one body to another body as a result of the temperature difference between them is known as heat.
 4. The kink or the constriction is a very useful innovation. It prevents the back flow of mercury column into the thermometer bulb when the thermometer is removed from mouth of the patient.
 5. The units of temperature are $^{\circ}\text{C}$, $^{\circ}\text{F}$ and Kelvin.

D. Short Answer Type Questions :

- Ans.**
1. We wear woollen clothes in winters because wool is a poor conductor of heat. The wool fibres trap air in between them which prevents loss of body heat.
 2. Insulators are materials which do not allow heat to pass through them.
Two examples of insulators in our daily life :
 1. The handles of utensils are made of wood or plastic.
 2. Slabs of ice are covered with saw dust or gunny bags.
 3. Shiny surfaces are poor radiators of heat. Radiation is reduced by silvering both walls on the vacuum side. The silvering on one glass wall reduces radiation of heat and the silvering on the other glass wall reflects back any heat that may have been radiated.
 4. We feel comfortable wearing light coloured clothes in summer because light coloured clothes absorb less amount of radiant heat of the Sun than dark clothes. The reverse applies in winter. Most winter clothes have dark shades so they absorb heat radiations more efficiently.

E. Long Answer Type Questions :

- Ans.**
1. **See Breeze and Land Breeze**
Sea Breeze : During the day, the land becomes hot faster than the sea, so the air above the land gets heated faster than the air above the sea. The air

above the land rises and cooler air from the sea rushes over land to take its place. This cool air from the sea blowing over land is called sea breeze.

Land Breeze : During the night, the land cools down much faster than the sea, so the air above the land cools faster than the air above the sea. The warm air above the sea rises up and the cool air above the land rushes to take its place. This cool air that moves from land towards the sea is called land breeze.

2. **Conduction**

Conduction is the spontaneous transfer of heat energy from a region of higher temperature to a region of lower temperature. Therefore, conduction acts to equalise temperature differences. It is also described as heat energy transferred from one material to another by direct contact. For example, if you stir hot milk with a stainless steel spoon, after sometime the edge of the spoon becomes a little warm. Similarly, when you leave the spoon in the pan while cooking noodles, you might have found it difficult to hold as it would have become hot after a while.

Convection

The method by which heat is transferred from one part of a fluid to another by the movement of the fluid itself is called convection.

In the case of the Earth's atmosphere, the sun's rays heat up the Earth's surface. This heat is then transferred in the air by convection.

Radiation

Radiation is the mode of transfer of heat in which energy is directly transferred from one place to another. Transfer of heat by radiation does not need any material medium.

Radiation is emitted by all bodies above absolute zero, whether they are solids, liquids or gases. When this radiant energy falls on an object, it is partly transmitted and partly absorbed; the absorbed part rises the temperature of the receiving object.

3. Vacuum or 'thermos' flask keeps hot liquids hot and cold liquids cold. It does this by stopping or reducing heat transfer by conduction, convection and radiation.

A thermos flask is a double-walled glass bottle. In the space between the two walls, both pieces of glass are coated with shiny bright 'silvering'. The air is pumped out so that a vacuum forms between the two walls. A vacuum is used because it stops that transfer by stopping conduction and convection.

F. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.

7 Weather, Climatic changes and Adaptation



A. Multiple Choice Questions (MCQs) :

Choose the correct option :

Ans. 1. b. 2. a. 3. c. 4. c. 5. a.

B. Fill in the blanks :

- Ans.** 1. **Air, water and soil** form a part of the surroundings of plants and animals.
2. The **maximum** temperature of the day is usually recorded in the afternoon.
3. **Climate** is the composite of average weather conditions over a period of many years.
4. Polar bears have thick layer of fat under their skin called **blubber**.
5. **Toucans** have large beaks that help them to access food available to other birds.

C. State True or False :

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

D. Select the odd one out giving reason :

- Ans.** 1. **Elephant** : Elephant does not show adaptation to polar region.
2. **Thick beak** : It is not a feature of adaptation in animals.

E. Very Short Answer Type Questions :

- Ans.** 1. Weather means the day-to-day change in temperature, air pressure, moisture, wind, cloudiness, rainfall and sunshine.
2. Climate is the composite of average weather conditions over a period of many years.
3. No, weather does not remain same everyday.
4. Maximum-during day time. Minimum-during night time.
5. Moving from place to place is called migration.

F. Short Answer Type Questions :

- Ans.** 1. The places near the equator receive sunlight directly while the sunlight does not reach directly to the places near the poles. The places near the poles receive sunlight only six months. So the places near the equator get more heat and are hotter than the places near the poles.
2. 1. Amount of sunshine it gets.
2. Direction of prevailing winds from the sea
3. Distance from the sea
4. Distance from the equator
3. Weather
4. Toucans have large beaks that help them to access food unavailable to other birds. The strong beaks act as nut crackers helping them to crack open to tough shells of nuts.
5. The dense fur made of keratin, thick layer of fats under skin, short ears, soft bumps in feet etc.

G. Long Answer Type Questions :

- Ans.** 1. i. The dense fur made of keratin keeps the polar bear warm and dry. The white fur merges with the snowy background and hence protects them from predators.
ii. Polar bears have thick layer of fat under their skin called blubber. They are as thick as 11 cm. This provides complete insulation from cold.
iii. Ears are short to prevent heat loss.
iv. The feet has soft bumps which provide traction on ice and short tough claws grip the ice.
v. Their nostrils can remain closed underwater for over two minutes. They can dive underwater upto depths of 6 metres to catch fish. Their front paws propel them through water while hind feet act like rudders.
2. **Adaptations of Penguins**

- i. Being birds, penguins have a feathery coat on their body. Also, there is a layer of fat under this feathery coat. Both these layers help them keep their body warm.
- ii. The structure of their body is streamlined and they have webbed feet like ducks. These adaptive features help them in swimming.
3. The animals living in the tropical rainforest have adapted themselves to their climate. These animals have many interesting characteristics. They live on the trees, have developed strong long tails, long and large beaks, bright colours, loud voices, sharp patterns, sensitive hearing, sharp eyesight, thick skin, ability to camouflage in order to protect themselves from predators. Their diet consists mostly of fruits.
4. The tropics represent hot climate where the mean annual temperature is 27°C. The Sun is almost overhead in the sky. There is very little variation in the length of day and night. This region is characterised by very heavy rainfall.
- The adaptations of animals in the rainforests make them compete better for food and survival. The warm temperature and the vertical habitat contribute to the abundant animal life. There are three clear cut strata.
- As the region has a large number of trees, therefore a large number of animals are adapted to living on trees.
5. We find animals of certain kinds living on a particular climatic conditions due to their adaptation to the climate surrounding them. All living organisms are affected by climate and climatic changes. They adapt to survive in the conditions in which they live. Animals living in very cold and hot climate must possess special features to protect themselves against the extreme cold or heat.
- For example, Animals living (adapted) to polar region have feathery (fur) coat on their body. Also, there is a layer of fat under this feathery coat. Both these layers help them keep their body warm.
- Animals adapted to desert region possess characteristics in their body to meet the requirement of losing water.

H. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.

8 Respiration in Organisms



Exercise

A. Multiple Choice Questions (MCQs) :

Choose the correct option :

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

B. Fill in the blanks :

- Ans. 1. All food molecules contain **carbon, hydrogen** and **oxygen** atoms.
2. Respiration requires **oxygen** present in the atmosphere.
3. **Anaerobic** respiration takes place in the absence of oxygen.
4. **Pharynx** is a common passage at the back of the mouth for air and food.
5. Breathing in an amoeba occurs by simple **diffusion**.

C. State True or False :

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

D. Very Short Answer Type Questions :

- Ans.**
1. Yeast and bacteria
 2. All organisms respire to get energy from their food.
 3. Living organisms obtain energy for their activities by the process of respiration.
 4. The two types of respiration are aerobic and anaerobic respiration.

E. Short Answer Type Questions :

- Ans.**
1. The process of breaking down of the food materials inside the body with the release of energy is known as respiration.
 2. Most of the animals require oxygen for respiration. Oxygen combine with glucose present in our food and form carbon-di-oxide and water with releasing of energy. This energy is used by animals for perform various activities.
 3. Spiracles are the breathing aperture of insects.
 4. Gills are projections of skin. These are formed of large number of gills filaments with a network of fine blood capillaries.

F. Long Answer Type Questions :

- Ans.** 1. There are two modes of respiration—Aerobic and Anaerobic respiration.

Aerobic Respiration :

The word aerobic means that oxygen is needed for this chemical reaction. In this process, the food molecules are combined with oxygen and get oxidised inside cell. These food molecules are then broken down into carbon dioxide and water, and energy is released.

Anaerobic Respiration :

Some organisms like yeast and some bacteria can survive in the absence of oxygen. In such organisms, food is broken down even in the absence of oxygen. The process of respiration, that takes place in the absence of oxygen, is known as anaerobic respiration. Carbon dioxide and ethyl alcohol are released as by-products during anaerobic respiration.

2. **Experiment**

Aim : To show that heat is released during respiration.

Materials required : Two thermos flasks, two thermometers, cotton wool, bean seeds, water, beaker and burner.

Procedure : Soak some bean seeds overnight in a beaker. After they have germinated, take half of them and boil them over a burner in order to kill them. Then keep the live seeds in one flask and the dead seeds in another flask. Insert a thermometer in each flask. Put the cotton wool on the mouths of the flask in order to plug them. Note the temperature in the beginning and then after a day.

Observation : The temperature in the flask, which contains the germinating seeds, increases while it remains the same as it was in the beginning in the other flask which has the dead seeds.

Conclusion : Heat is released by the germinating seeds during respiration.

3. **a. Fish :** Fishes and other animals living in water are called aquatic animals. Their respiratory organs are gills. They obtain oxygen dissolved in water when it passes over the gills.

Gills are projections of skin. These are formed of large number of gills

filaments with a network of fine blood capillaries. The oxygen dissolved in water enters the blood capillaries. Carbon dioxide present in capillary blood is released into water. The oxygenated blood from capillaries is taken to heart and pumped to different parts of the body and blood from body tissues which has carbon dioxide is taken to gills for the exchange of respiratory gases.

b. Insects : In cockroach, the tracheal system consists of 10 pairs of spiracles, located on the body surface. The spiracles are guarded by fine hairs to keep the foreign particles out. There are pairs of valves that help to open or close the spiracles as required. The spiracles open into a number of air tubes called the tracheae. Oxygen is absorbed directly from the atmosphere into the air tubes and carbon dioxide-rich air is sent out through the last six pairs of spiracles.

c. Earthworm : Earthworms have a moist and slimy skin. Gaseous exchange takes place through the skin.

4. Do Yourself

G. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.

9 Transportation in Animals and Plants



Exercise

A. Multiple Choice Questions (MCQs) :

Choose the correct option :

Ans. 1. a. b. d. 3. a.

B. Fill in the blanks :

- Ans.** 1. **Excretory** system takes away waste products from the body cells.
2. WBCs are **colourless** as they do not contain any pigment.
3. The largest artery in the body is called **aorta**.
4. The dialysis machine is also called an **artificial** kidney.
5. **Transpiration** is the loss of water from leaves to the air.

C. State True or False :

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

D. Very Short Answer Type Questions :

- Ans.** 1. A human circulatory system consists of blood, blood vessels and the heart.
2. The three kinds of blood vessels are arteries, veins and **capillaries**.
3. The rhythmic contraction and relaxation of heart is called heartbeat. The pulse is the measurement of heart beat per unit time.
4. William Harvey discovered the mechanism of circulation of blood in human body.
5. Xylem and phloem are the tissues that form vascular bundles in plant.

E. Short Answer Type Questions :

- Ans.** 1. Transportation is necessary in living organisms for the following reasons :
Supply of nutrients and oxygen to every cell of the body.
Transport of substances formed in one part of the body to those parts

where they are needed, like hormones and certain enzymes in animals and food in plants.

2. The process of removing toxic waste from the body is called excretion and the organs that remove these toxic wastes are called excretory organs.
3. White blood cells (WBC) fight and destroy the germs that enter in our body.
4. Numerous biochemical reactions occur round the clock in all living cells. They produce a variety of waste products like carbon dioxide, ammonia and other nitrogen compounds. If they accumulate in the body, they may prove to be toxic.
5. 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.

F. Differentiate between the following :

- Ans.**
1. Blood is a fluid that transports nutrients as well as waste materials from one part of our body to another while plasma is a straw-coloured liquid in blood in which different cells float.
 2. Circulatory system is the life supporting system that provides animals body cells with food and oxygen. It takes away waste products from the body cells. While the transport system in plants is known as vascular system. It is a well developed transport system.
 3. **Arteries :** Arteries are the largest of the blood vessels. They transport blood from the heart to other parts of the body.
Veins : Veins transport blood from the different parts of the body to the heart. They have thinner walls as compared to arteries and hence blood flows with low pressure in them.
 4. The xylem transports water and the dissolved minerals upwards from the root. While 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.
 5. Excretion is the process of removing toxic wastes from the body while transpiration is the loss of water from leaves and other aerial parts of a plant into the air.

G. Long Answer Type Questions :

- Ans.**
1. Transpiration is the loss of water from leaves and other aerial parts of a plant into the air. It occurs through stomata. It helps plants to loss excess water. This process is helpful in the survival of xerophytic plants.
 2. Septum is a type of partition that separates the right and left atria of the heart. It prevents the blood from flowing from the right to the left ventricle or vice versa during contraction. This helps to prevent the deoxygenated blood in the right ventricle mixing with the oxygenated blood in the left ventricle. It also helps maintain the shape and rigidity of the heart and provides strength to the walls of the heart.
 3. Human heart is four-chambered. It has two auricles or atria and two ventricles. The heart is divided into two halves by a thick muscular septum. Each half has an auricle above and a ventricle below. The right half of the heart has deoxygenated blood while the left half has pure or oxygenated blood present in the right and left halves of the heart.

Auricles or Atria

Auricles are the receiving chambers of the heart. Their walls are thinner than those of ventricles.

Ventricles

These are distributing chambers of the heart. Their walls are thick. The right ventricle receives deoxygenated blood from right auricle and pumps it to the lungs for oxygenation.

There are four valves in the heart. They control the direction of blood flow in the heart and into the blood vessels. They open and close about 100,000 times a day.

A tricuspid valve guards the opening of right atrium into right ventricle.

A bicuspid valve guards the opening of left atrium into left ventricle.

Semilunar valves are present at the base of pulmonary aorta and dorsal aorta respectively.

4. The technique of removing waste products artificially from the blood is called dialysis. In dialysis, blood from an artery in the arm (or leg) is drawn into a dialysis machine and the purified blood is fed into a vein. The person requiring dialysis has to undergo an eight hour session connected to the dialysis machine every two or three days. The dialysis machine is also called an artificial kidney. Dialysis is an exhausting and expensive process.

H. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.

10 Multiplication in Plants



Exercise

A. Multiple Choice Questions (MCQs) :

Choose the correct option :

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

B. Fill in the blanks :

- Ans. 1. The **flowers** are the reproductive parts of a plant.
2. **Asexual** reproduction does not involve the fusion of male and female cells.
3. The pistil is the **female** reproductive part of the leaves.
4. Pollination is of two types : **self pollination** and **cross pollination**.
5. Seeds of **cotton** and **dendilion** have hairs around them for dispersal by wind.

C. State True or False :

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

D. Match the following :

- Ans. 1. Fragmentation b. Spirogyra
2. Bud d. Yeast
3. Sugarcane c. Cutting
4. Eyes a. Potato
5. Spores e. Rose

E. Very Short Answer Type Questions :

- Ans.** 1. The method of reproduction that involves the fusion of male and female cells is known as sexual reproduction.
2. Rose
 3. Petals, sepals, pistils and stamens
 4. Wind, water, and animals

F. Short Answer Type Questions :

- Ans.** 1. The ability of all living organisms to produce new individuals of their own kind is called reproduction. Plants reproduce through asexual and sexual mode.
2. The method of reproduction that does not involve the fusion of male and female cells is known as asexual reproduction. In this type of reproduction, new plants are obtained without formation of seeds or spores.
While the reproduction that involves the fusion of male and female cells is known as sexual reproduction.
3. In fungi (mucor), bacteria, ferns (mosses), etc. the reproduction takes place by the formation of spores. The spores are very small and have thick walls. They give rise to new organisms under favourable conditions. In bread moulds the spores are formed during the process of reproduction.
4. In flowering plants, After the pollen grains are transferred from anther to the stigma of the flower, then pollen tube is formed through which the male gametes enter into the ovary and fuse with the eggs in ovules. This process is referred to as fertilization.
“Fertilization is the process in which fusion of nuclei of male and female gametes takes place which lead to the formation of zygote.” This fusion of male and female gametes is called syngamy.

F. Long Answer Type Questions :

- Ans.** 1. **Advantages of Vegetative Propagation**
Some of the plants such as bananas do not reproduce from seeds at all. They multiply only vegetatively.
Vegetative reproduction is faster. It does not involve waiting for the seeds to grow.
Sometimes, the seeds produced are not viable or fit that means they cannot form new plants. In such cases, the new plants are produced through vegetative means.
The new plants formed through vegetative are exactly like the parent plants. They are like photocopies of the original plant. If the plants with similar qualities as that of the parent are required, vegetative propagation is the best method.
- Disadvantages of Vegetative Reproduction**
Since vegetative reproduction produces an exact copy of the parent, some undesired qualities of the parent plant also pass on to the plants of new generation.
2. When the pollen grains are transferred to the stigma of the same flower, it is known as self-pollination. When the pollen grains are transferred to the stigma of another flower of the same plant or of a different plant of the

same kind, it is known as cross-pollination.

3. **1. Budding** : Tiny organisms like yeast can be seen only under a microscope.

If sufficient nutrients are made available to these tiny organisms then they grow and multiply every few hours. Remember that, yeast is a single-celled organism.

During budding in yeast, a small bulb-like projection (protuberance) appears on the upper part of an adult cell. This projection is called a bud. This bud gradually grows and gets detached from the parent cell and forms a new yeast cell. The new yeast cell grows, matures and produces more yeast cells. If this process continues for some time then it results in the formation of a chain of yeast cells.

2. Fragmentation : Fragmentation is a very common form of asexual reproduction in lower plants. In this process, the parent body breaks into several pieces, each of which can produce offspring.

3. Spore Formation : In non-flowering plants (the plants which do not produce seeds), like fungi (mucor), bacteria, ferns or mosses, formation of spores is a common method of reproduction.

4. Vegetative Propagation : It is a type of asexual reproduction in which new plants are produced from roots, stems, leaves and buds. Since this reproduction is through the vegetative parts of the plant, it is known as vegetative propagation.

4. The dispersal of seeds can be carried out by various methods or agents.

By Wind

Certain seeds have developed several adaptive modifications which help them to be dispersed by wind easily. A few examples are given below.

1. Madar seeds are small and dry. A fine tuft of fine hair is present on the tip of each seed. These fine hairs help the seeds to be carried to far-off places by wind.

2. Seeds of drumstick and maple have wings and thus can be carried to far off places by wind.

3. Seeds of cotton and dandelion have hairs around them for dispersal by wind.

4. Some seeds like grass are light in weight so that they can be carried by wind easily.

By Water

Some seeds are dispersed by water. They too have some special features to be dispersed by water. For example, coconut fruits fall in water, and being fibrous they float in water and are carried away by water currents.

By Animals

Certain seeds are carried to far off places by animals. Animals eat seeds along with the fruits. These seeds remain undigested and pass out with their faeces at some other place. For example, African olive fruits are dispersed to far-off places by foxes.

G. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.

11 Moving Objects : Time, Motion and Speed



Exercise

A. Multiple Choice Questions (MCQs) :

Choose the correct option :

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

B. Fill in the blanks :

- Ans. 1. We can define **time** as a passage of a period.
2. The time between one sunrise and the next was known as a **day**.
3. Motion any be classified as **uniform** are **non-uniform**.
4. The distance time graph is a **line** graph.
5. The physical quantity that informs us how fast or slow a body is moving is called **speed**.

C. State True or False :

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

D. Very Short Answer Type Questions :

- Ans. 1. 1. The motion of pendulum
2. The revolution of Earth around the sun
2. A sand clock consists of two round glass bulbs. The two bulbs are separated by a narrow glass tube. The upper bulb is filled with a fixed amount of sand that passes through the tube into the lower bulb in a fixed interval of time.
3. a. 60 seconds
b. 360 seconds
4. If an object covers equal distances in equal intervals of time, it is said to be in a state of uniform motion.
5. The objects which do not change their position with time are said to be at rest.
The objects which change their positons with time are said to be in motion.

E. Short Answer Type Questions :

- Ans. 1. The bob of an oscillating simple pendulum passes 10 times the mean position after five complete oscillations.
2. Motion may be classified as uniform and non-uniform. If an object covers equal distances in equal intervals of time, it is said to be in a state of uniform motion. For example, a car is travelling at a uniform speed of 40 km/hr.
If an object travels unequal distances in equal intervals of time or vice-versa, it is said to be in a state of non-uniform motion.
Imagine an ant moving along a line towards a direction in such a way that in the first second, it covers a distance of 3 cm. In the next second it covers a distance of 7 cm and in the last second it again covers a distance of 3 cm. In this case the motion is non-uniform.

F. Long Answer Type Questions :

Ans. 1. The States of Rest and Motion are Relative

Nothing is at absolute rest in the universe. Any object said to be in the state of rest or motion is relative to a fixed point. Such a fixed point is

chosen arbitrarily.

Let us imagine ourselves to be sitting inside a compartment of a running train. Take a situation when everybody in the compartment is sitting at rest. Then, each passenger is at rest relative to the compartment as well as with respect to the other passengers.

But, if we consider any point outside the compartment, e.g., platform, as the reference point, then the compartment, as well as all the passengers in it are in motion.

2. **a. Mean position of pendulum :** When a pendulum is suspended by an inextensible thread from a fixed point and no force acts on it, this does not show any motion and remain in rest to position. This position of pendulum is its mean position.

b. Oscillation : One complete vibrational motion (to and from motion). When the bob of the pendulum moves from one position and come back to the same position.

c. Amplitude : The maximum displacement of the bob on either side from its mean position.

3. Distance (d) = 400 m
Time (t) = 10 seconds
Speed (s) = Distance (d) / Time (t)
= 400 m / 10 sec = 40 m/sec
d = 400 m = 400 / 1000 km = 0.4 km
t = 10 sec = 10 / 3600 hrs = 1 / 360 hrs

$$s = \frac{d}{t} = 40 \div \frac{1}{360} \text{ km/h}$$
$$= 40 \times 360 = 144 \text{ km/h}$$

4. For first 15 minutes :
The distance covered in 1 hour (60 min) = 40 kms
The distance covered in 15 min = $40 / 60 \times 15 = 10$ kms
For second 15 minutes :
The distance covered in 1 hour (60 min) = 60 kms
The distance covered in 15 min = $60 / 60 \times 15 = 15$ kms
Total distance covered by car = (10 + 15) kms = 25 kms.

G. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.

12 Electric Current and Its Effects



Exercise

A. Multiple Choice Questions (MCQs) :

Choose the correct option :

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

B. Fill in the blanks :

- Ans. 1. We cannot imagine life without **electricity**.
2. The path along which electric current can flow is called **electric circuit**.

- In a symbol, the **shorter** line denotes the negative terminal.
- The **electrical resistance** of a material is a measure of its hindrance to the flow of electric current.
- A **electric bell** is also known as a make and break screw.

C. State True or False :

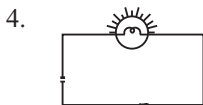
Ans. 1. True 2. False 3. True 4. True 5. True.

D. Very Short Answer Type Questions :

- Ans.**
- The flow of electric charge is called electric current.
 - Electric bulb, electric heater, washing machine, air-conditioner and electric fan.
 - Two or more cells joined together form a battery.
 - A current carrying coil of insulated wires wrapped around a piece of iron is called an electro magnet.
 - A safety device in an electric circuit which prevents short circuits is caved fuse.

E. Short Answer Type Questions :

- Ans.**
- Electromagnets are used in various electric appliances like electric bell, electric fan, electric motor, etc.
 - Electromagnets are used for the magnetic separation of iron ore.
 - They are also used for the preparation of strong, permanent magnets. Here, steel or ALNICO (an alloy of aluminum, nickel and cobalt) is put in the closed coil carrying current. The permanent magnets thus formed find wide application in making magnetic stickers, magnetic toys and magnetic compass.
 - A nichrome wire get is heated in an electric circuit because it offers very high resistance to the electric current.
 - When we want to stop the current in a circuit consisting of a cell and a bulb, we can simply disconnect one of the wires. The circuit is now said to be open, and there is no current in it. By reconnecting the wire the circuit becomes closed.



F. Long Answer Type Questions :

Ans. 1. **Activity**

Aim : To make an electromagnet.

Take an iron nail of about 6-10 cm in length and wind an insulated copper wire on it.

Now connect the ends of the copper wire to the two terminals of a dry cell via a switch.

Switch on the current through the circuit and bring a few pins near the wounded nail.

Now switch off the current and see what happens.

The iron nail behaves like a magnet as long as current flows through the circuit. The pins cling to the nail when the switch is 'on', while they drop as soon as the switch disconnects the electric circuit.

We can see an enhanced magnetic field (more pins cling to the nail) if we use a battery in place of a cell.

- An electric bell is one of the most common applications of an electromagnet. You can think of an electric bell as a device that has two switches connected in the electromagnet's circuit. The first switch is outside the bell. The second switch is inside the bell, and consists of the parts S and T. When the outer switch (at your door) is pushed, current flows through the electromagnet inside the bell. This causes the electromagnet to pull the springy iron strip S. As soon as the strip moves towards the electromagnet, its contact with the terminal T is lost. This breaks the circuit inside the bell. So, the electromagnet stops attracting the iron strip.
- Electrical resistance of a material is a measure of its hindrance to the flow of electric current. The unit of resistance is ohm.
In centre of electric bulb, there is a coil of thin wire called filament which is made up of metal called tungsten that has a high melting point. When electric current passes through it, the thin wire inside a light bulb glows white-hot. When the filament breaks, the circuit breaks and the bulb does not glow.
The filament becomes hot? because the thin wire has a resistance to the current. As the electrons are forced through this thin wire, they heat it up. Air is pumped out of the bulb, so that the filament does not catch fire.

4. **Activity**

Aim : To show magnetic effect of electric current.

Take a small piece of cardboard, make two holes and pass a wire through them.

Now put a magnetic compass under the wire and rotate the cardboard till the needle of the compass comes parallel to the wire as shown in Fig a.

Now connect the two free ends of the wire to the two terminals of a cell as shown in Fig. b.

Note your observation. Is there any deflection in the compass needle?

Now change the connections of the wire with the cell by reversing the terminals and observe the direction of deflection. What happens when you disconnect or break the circuit?

The compass needle shows deflection when connected to the cell. This deflection gets reversed when the connection is reversed. There is no deflection upon disconnection.

The experiment shows that when electric current is passed through a conducting wire, it behaves like a magnet.

G. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.

13 Wind, Storm and Cyclone



Exercise

A. Multiple Choice Questions (MCQs):

Choose the correct option :

Ans. 1. c. 2. d. 3. c.

B. Fill in the blanks :

- Ans. 1. **Wind** is the movement of air in the atmosphere.
2. Air moves from a region of **high** air pressure to a region of **low** air pressure.
3. Land and sea breezes are **wind** currents.
4. **Tornadoes** are dark, funnel shaped violent storms.
5. The cyclone winds can be extremely **destructive**.

C. State True or False :

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

D. Very Short Answer Type Questions :

- Ans. 1. Wind is the movement (usually horizontal) of air in the atmosphere.
2. The 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. The roofs are blown off during storms because it causes low air pressure.
4. Too much rain causes flood.

E. Short Answer Type Questions :

Ans. Activity

1. **Aim** : To show that air exerts pressure.

Materials required : A plastic bottle and some hot water.

Procedure : Fill the plastic bottle with some hot water. Next, empty the bottle and tighten its cap. Then place the bottle under running tap water for some time.

Observation : The shape of the bottle gets distorted.

Explanation : When cold water is poured over the bottle, some water vapour in the bottle condenses into water. This leads to a decrease in the amount of air inside the bottle. The pressure exerted by the outside air is more than the pressure of the air inside the bottle. This difference in pressure compresses the bottle and it gets distorted.

Conclusion : Air exerts pressure.

2. Thunderstorms are severe local storms accompanied by lightning and thunder.
Thunderstorms are disastrous as they can damage buildings, uproot trees, destroy crops and may even lead to floods.
3. A storm is a strong, high-speed wind. Storms can be of different types based on their intensity. Some storms are severe, while some are moderate.
4. A violent storm with very strong winds which move in a circle is called a cyclone.

The cyclone winds travel at a very high speed. They can be extremely destructive. They can damage houses, uproot trees, telephone and other communication systems leading to the loss of life and property.

F. Long Answer Type Questions :

Ans. 1. A cyclone develops over the warm, moist waters of the Atlantic and Pacific oceans near the equator. Several small thunderstorms merge to form one devastating storm or cyclone. Before a cyclone, the warm and lighter air moves up and creates a low-pressure region. The cooler air from the surrounding region moves towards the centre of the storm to occupy the empty space of this low-pressure region. The whole cycle is repeated several times. Due to the rotational movement of the Earth, air moving towards the centre of the storm starts circulating around it at a high speed. This forms a spinning cyclone. The strong wind current moves this spinning cyclone forward.

The cyclone winds travel at a very high speed. They can be extremely destructive. They can damage houses, uproot trees, telephone and other communication systems leading to the loss of life and property. A cyclone is accompanied by heavy rains. Heavy rains may bring floods.

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.

Uneven Heating of the Equator and the Poles

Equatorial region receives more sunlight during most part of the year. As a result, equatorial region gets maximum heat from the sun.

Thus, the air at the equator gets warm and rises up creating low pressure region. As a result, the cold air from the 0° - 30° latitude belt on either side of the equator move in towards the equator.

The air in the polar region is colder than that at latitude 30° - 60° . Thus the warm air from 30° - 60° belt moves up and the colder air moves down from the polar regions.

The movements of air from warmer to the colder and from the colder to the warmer regions is known as wind currents.

3. The Indian Meteorological studies the Department development of cyclones with the help of INSAT satellites and cyclone detection radars. This governmental organisation is responsible for meteorological observations, weather forecasts, and detection of earthquakes. The IMD is also responsible for forecasting tropical cyclones in the Arabian Sea and the Bay of Bengal. It is located in New Delhi.

4. The safety measures one must take in advance to tackle with the problems created by a cyclone are :

1. One should not go into the sea if there is a possibility of a cyclone.

2. One must follow the government instructions.

3. Leave your place if your are living near coastline of sea at the time of cyclone.

G. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.



Exercise

A. Multiple Choice Questions (MCQs) :

Choose the correct option :

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

B. Fill in the blanks :

- Ans. 1. We cannot see very well when it is **dark**.
 2. A very narrow stream of light energy showing the direction of path taken by light is called a **ray**.
 3. **Mirrors** are smooth surfaces of glass which are made reflecting by polishing them silver on one side.
 4. The image formed by actual meeting of reflected rays is called a **real image**.
 5. Convex lenses are used in **spectacles** to help people see nearby things clearly.

C. State True or False :

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

D. Give one word for the following :

- Ans. 1. **Focal length (f)** 2. **Pole (P)**
 3. **Spectrum** 4. **Centre of curvature (C)**
 5. **Dispersion of light**

E. Very Short Answer Type Questions :

- Ans. 1. Light travels from one point to the other in straight line. The light rays can also travel in vacuum.
 2. A very narrow stream of light energy showing the direction of path taken by light is called a ray.
 3. Sun, stars, firefly and electric bulb are the names of four different sources of light.
 4. Concave mirror is used in the headlight of a car.
 5. There are seven colours in a rainbow.

F. Short Answer Type Questions :

- Ans. 1. A mirror that curves in (like a cave) is called a concave mirror. The surface of the concave mirror also curves away from us or the reflecting surface is concave.
 2. The focus is the point on principal of axis where all the rays of light, parallel to principal of axis, converge after reflection from mirror.
 3. **Concave mirror** : A dentist uses a concave mirror to see the magnified image of teeth.
Convex mirror : Convex mirrors are used as rear view mirrors in vehicles. Since a convex mirror forms smaller images of objects, it can be used to view a much larger area than would be possible with a plane mirror. For the same reason, they are also used as side mirrors in vehicles.
 4. Some elderly people, who have both the defects in their eyes, use both the types of lenses in their spectacles. Such spectacles are known as bifocal spectacles.
 5. Concave mirror can form a real image.

G. Long Answer Type Questions :

- Ans.** 1. The characteristics of image formed by a plane mirror are :
- The size of the image is equal to the size of the object.
 - The image is upright or erect.
 - The left and the right sides of the image get interchanged, as compared to those of the object. This behaviour is known as lateral inversion. The image formed is called laterally inverted.
 - The image is formed in a plane mirror at the same distance from the mirror, as the object is kept in front of it.
2. **Convex mirror** : Convex mirrors are used as rear view mirrors in vehicles. Since a convex mirror forms smaller images of objects, it can be used to view a much larger area than would be possible with a plane mirror. For the same reason, they are also used as side mirrors in vehicles.
3. The left and the right sides of the image formed by plane mirror get interchanged, as compared to those of the object. This behaviour is known as lateral inversion. The image formed is called laterally inverted.
4. A **lens** is a curved and polished piece of glass or any other transparent material.

Common lenses are of two types : concave and convex lens.

A **convex lens** is thicker in the middle than at the edges.

Whereas a **concave lens** is thicker at the edges than in the middle. Things look smaller through a concave lens.

H. Define these terms :

- Ans.** 1. **Divergent beam** : A beam of light rays which comes or appears to come from a point or source is called a divergent beam.
2. **Pole mirror** : The central point of mirror is called pole. It is denoted by the letter 'P'.
3. **Focal length** : It is the distance between the focal point (focus) and the pole of mirror. The focal length of a mirror is always found to be half of the radius of curvature.
4. **Focus of a convex mirror** : The focus of a convex mirror is the point outside the mirror where all the light rays appear to meet or appears to come from this point.
5. **Convergent lens** : A convex lens is also called a converging lens, as it converges the rays of light falling of it.
6. **Real image** : The image formed by actual meeting of reflected rays is called a real image.

I. Differentiate between the following :

- Ans.** 1. A mirror that curves in (like a cave) is called a concave mirror. The surface of the concave mirror also curves away from us or the reflecting surface is concave.
while a mirror that curves outwards is called a convex mirror or its reflecting surface is convex.
2. A beam of light which converges or appears to converge at a point after reflection or refraction is called convergent beam of light. While the beam which comes or appears to come from a point or a source is known as divergent beam of light.
3. A convex lens is thicker in the middle than at the edges. Whereas a concave lens is thicker at the edges than in the middle. Things look smaller through a concave lens.

J. Give reasons for the following :

- Ans.** 1. The ambulance vans have the word AMBULANCE written laterally inverted as ECNALUBMA, so that when its image is read in the mirrors of other vehicles moving ahead, it is read correctly.
2. While a convex lens can be used to burn a piece of paper using the sunlight because it converges the beam of light rays at a point.
3. The image formed by a plane mirror cannot be obtained on a screen because a plane mirror form a virtual image and virtual image cannot be obtained on screen.
4. Lemons kept in a glass of water appear to be enlarged due to the refraction of light rays.

K. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.

15 Water



Exercise

A. Multiple Choice Questions (MCQs) :

Choose the correct option :

- Ans.** 1. d. 2. c. 3. b. 4. b. 5. b. 6. d.

B. Fill in the blanks :

- Ans.** 1. Most of the water in industries is used for **cooling**.
2. Out of all the water on Earth, **97.4** percent is in the oceans.
3. In the villages people draw water from **wells, tubewell** or **hand-pumps**.
4. **Water** is not distributed evenly over the entire globe.
5. Relatively high percentage of rain water goes as **run-off** and **stream flow**.

C. State True or False :

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

D. Select the odd one out :

- Ans.** 1. Ocean, (groundwater), lakes
2. (Water), ice, snow
3. Infiltration, aquifer, (drip, irrigation)
4. Water harvesting, bawris, (aquifer)

E. Complete the tables :

Do Yourself

F. Very Short Answer Type Questions :

- Ans.** 1. Solid, liquid and gaseous are the three forms in which water is present on the Earth.
2. During water cycle, ocean water which is salty changes to fresh water, as the huge amount of evaporation from ocean surface forms cloud and precipitates as rain or snow. The rain over the land mass are stored in lakes, rivers, dams and also replenishes the groundwater.

3. The level of water under the ground is known as the watertable.
4. The process of seeping of water into the ground is called infiltration.
5. Water lying inside the Earth is ground water.

G. Short Answer Type Questions :

- Ans.**
1. Ground water is used for human consumption and for irrigation purpose in rural and urban both areas.
 2. Some of these causes are increase in population, industrial and agricultural activities. Scanty rainfall is another factor that may deplete the water table.
 3. Aquifers are like huge underground lakes filled with gravel and rocks from which water can be pumped out.
 4. Increasing population has put a greater demand for construction of houses, shops, offices, roads and pavements. Construction of pavements, cementing of paths and grounds of different places does not allow seepage of water into the ground. As a result the water table in these places does not get recharged easily.
 5. In rain-water harvesting method, big pit is dug near house for collecting rainwater. This pit is filled with different layers of bricks, coarse gravels, and sand or granite pieces. The water, which gets stored in the pit, is better percolated into the soil.
 6. The water crisis in many cities of India is increasing at an alarming rate. Irregular water supply in urban areas has become very common. People often take groundwater for granted. We use groundwater for most of our household needs.
If we keep using groundwater at a faster rate than it is replenished by rain, the groundwater may get depleted and we may face water shortage.

H. Long Answer Type Questions :

- Ans.**
1. Water plays an important role inside our bodies too. We need water for digesting food, transportation of digested food to various body parts and also for dissolving waste materials and removing them from our body. Water is also required by plants and animals. The roots of the plants help in absorbing water from the soil. So, we say that water is precious to us.
 2. During water cycle, ocean water which is salty changes to fresh water, as the huge amount of evaporation from ocean surface forms cloud and precipitates as rain or snow. The rain over the land mass are stored in lakes, rivers, dams and also replenishes the groundwater.
 3. Water exists in all three states of matter, which are interchangeable. The alternating process of evaporation, condensation and precipitation produces a continuous circulation of water between land, water bodies and atmosphere, forming water cycle on the Earth.
Various Forms of Water Available on the Earth
Solid Glaciers, Ice-caps, Snow, Ice-sheets,
Liquid Oceans, Sea, Rivers, Lakes, Ponds, Groundwater,
Gaseous : Water vapour in the atmosphere.
 4. **Water Management**
 - a. Water is wasted and mismanaged at the level of individuals, knowingly or unknowingly. This can be prevented by :
 - Avoiding bath under a running shower, and instead using a bucket with mug.
 - Avoiding washing of utensils with running tap.

Getting leaking pipelines repaired.

b. Treating domestic and municipal waste water to make it for the agriculture and industry.

c. Controlling floods by interlinking of rivers.

d. Diverting water from surplus areas to regions of scarcity.

Drip Irrigation

Another technique employed to save water is drip irrigation. You might have heard of drip irrigation. Drip irrigation is a technique of watering plants by making use of narrow tubings which deliver water directly at the base of the plant. This saves a lot of water.

I. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.

16 Forests



Exercise

A. Multiple Choice Questions (MCQs) :

Choose the correct option :

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

B. Fill in the blanks :

- Ans.** 1. **Tropical** forests grow in a band around the Earth's equator.
2. Cinchona tree provides an important medicine for treating **malaria**.
3. Trees check **global warming** by taking in carbon dioxide.
4. **Nepal** and **Switzerland** generate most of their income from tourism.
5. Illegal **logging** has led to the decrease of a lot of trees over the years.

C. State True or False :

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

D. Give two examples of the following :

- Ans.** 1. Oil yielding trees — **Mustard, Coconut**
2. Timber yielding trees — **Teak, Shesham**
3. Components of food chain — **Plants, Animals**
4. Methods of forest conservation — **Afforestation, Planted cultivation**

E. Very Short Answer Type Questions :

- Ans.** 1. Forests cover about one-third of the Earth's land surface of which about 50 per cent is occupied by tropical forests.
2. Excess of carbon-di-oxide in atmosphere causes global warming.
3. All food chains are linked together. Interlinked food chains form a food web.
4. Afforestation is planting new trees on a large scale.
5. A roof or cover formed by the tree branches in the upper regions is called a canopy.

F. Short Answer Type Questions :

- Ans.** 1. The plant layers found at different heights below the canopy are known as understoreys.

2. The ever increasing human population has been the most important factor responsible for increased felling of trees.
3. Wood, medicine, fruits, vegetables and oxygen.
4. A chain in which one organism eats another one is called a food chain. This is a process of eating and being eaten.
Example, grass is eaten by a grasshopper which in turn is eaten by the frog. The frog is further eaten by a snake, and the snake by an eagle. This food can be represented as follows:
Grass → Grasshopper → Frog → Snake → Eagle
5. Animals depend upon plants for:
 - Food like grasses, leaves, fruits, vegetable and nuts
 - Oxygen, released by plants during photosynthesis and required for respiration by animals
 - Shelter, birds build nests on trees and trees also serve as shelter for a number of animals like monkeys.

G. Long Answer Type Questions :

- Ans.** 1. Forests are important in the following ways :

Regulation of climate : Trees help to regulate the climate of a place. They absorb water from the ground through their roots, and then release some part of it as water vapour. Thus, they help in keeping the air cool and also help bring the rain. Trees also help in checking global warming by taking in carbon dioxide, the main greenhouse gas, for photosynthesis.

Prevent soil erosion : Forests prevent soil from being washed away with water or blown away with wind by holding it together in their roots. Thus, they keep the land fertile which is good for practising anything on it. In this way, land degradation is also avoided.

Control floods : Forests control floods by holding water in roots. They even lower the water speed by standing as an obstruction in the path of floods. The excess water brought in by floods may then pass through to other areas at a pace, which is not much dangerous or disastrous as it could have been.

Noise absorbers : Forests absorb the noise of nearby highways and reduce noise pollution.

Purify water : Forests filter water through the fallen leaves and layers of soil. The groundwater is thus, pure.

2. The energy is transferred from one organism to another. Green plants are the producers. They prepare their food by the process of photosynthesis in which they convert solar energy of sun into chemical energy. This chemical energy is stored in their different parts.
The parts of the plants are taken by heterotrophs like cow, deer, etc. and also by other animals. The energy stored in plants parts is transferred and converted into different forms in animals body and is used by them.
In a food chain, all organisms are linked together and the energy is transferred from one organism to another by this way.
3. Wood, found in the forests, has a number of applications in domestic and industrial processes. Wood, when used as a fuel has an advantage over coal, as its sulphur and ash content are very low. Forests provide the raw

material for building, making paper and for furniture. Other uses are in match industry, fibre and rubber industries. Our forests are home to several kinds of plants, which are used to make medicines. Plants such as neem, eucalyptus, amla, cassava are used for making several ayurvedic medicines. Cinchona tree provides the alkaloid quinine, an important medicine for treating malaria.

4. Following are a few measures that could be followed to conserve our forests.

1. Afforestation : People living near forest areas should be sensitized to the damages caused by felling of trees. They should be encouraged to cut branches, twigs and leaves of the trees to meet their everyday requirements instead of chopping down the full grown trees. Governments and communities should take steps to plant trees on a large scale. Trees that will meet the basic requirements of fuelwood, fodder, and timber

2. Planet cultivation : People should be made aware that a forest should not be cleared of all its trees and converted to an agricultural land, as this can lead to soil erosion.

3. Prevent illegal logging : Illegal logging has led to the decrease of a lot of trees over the years. The Indian government has laid out rules to prevent illegal logging by making it punishable under law.

H. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself.

Project/Activity

Ans. Do yourself.