

# New Science Power 7

## Nutrition in Plants

1

### ANSWERS

#### Check Point 1

1. Why are green plants called autotrophs?

Ans. Green plants are called autotrophs because they make food for themselves from simple inorganic substances.

2. List four conditions necessary for photosynthesis.

Ans. The four conditions necessary for photosynthesis are presence of chlorophyll, sunlight, carbon dioxide and water.

3. Which component of green plants traps solar energy?

Ans. Chloroplast.

4. Why are green leaves boiled in alcohol to perform test for the presence of starch?

Ans. Green leaves are boiled in alcohol to perform starch test to destroy chlorophyll.

5. In what form is food prepared in plants by photosynthesis?

Ans. Food is prepared in plants in the form of glucose.

#### Check Point 2

1. Answer these questions.

(a) What is saprophytic nutrition?

(b) Why do some plants trap insects?

Ans. (a) The mode of nutrition in which plants obtain their food from dead and decaying organic matter is called saprophytic nutrition.

(b) Plants like insectivorous plants grow in nitrogen-deficient soil. These plants trap and digest insects to obtain nitrogen compounds.

2. Fill in the blanks.

(a) In lichens, alga and fungus live in symbiotic association.

(b) Leguminous plants are an example of symbiotic association.

(c) In pitcher plant, pitcher is the modified part of leaf.

## PRACTICE TIME

### A. MCQs—Choose the correct answers.

- Plants get nitrogen from  
 (a) air (b) soil  (c) animals (d) all of these
- The edible mushrooms are rich in  
 (a) proteins  (b) sulphur (c) phosphorus (d) all of these
- Plants manufacture food in the form of  
 (a) starch (b) fructose (c) glucose  (d) proteins
- Plants obtain carbon dioxide from air through  
 (a) stomata in leaf  (b) xylem of root  
 (c) leaf vein (d) stem surface
- This is a partial parasite.  
 (a) *Apodanthes* (b) *Cuscuta* (c) *Mistletoe*  (d) none of these
- All green plants are  
 (a) heterotrophs (b) autotrophs  (c) parasites (d) none of these
- Organisms that live on other organisms are called  
 (a) heterotrophs (b) autotrophs (c) symbionts (d) parasites
- In iodine test, starch turns  
 (a) yellow (b) blue-black  (c) green (d) black

### B. Fill in the blanks.

- Chlorophyll is green pigment present in chloroplasts.
- Chlorophyll traps energy from sunlight.
- Water and minerals are absorbed from soil by roots of the plant.
- The occurrence of photosynthesis can be tested by the presence of starch in the leaf.
- In insectivorous plants, digestive juice is secreted to digest the insects.
- The Rafflesia plant is a parasite and bears the largest flower in the world.

### C. Match the columns.

- | Column A                        | Column B             |
|---------------------------------|----------------------|
| 1. Nutrition in nongreen plants | (a) Saprophytes      |
| 2. Fungi                        | (b) Heterotrophic    |
| 3. Iodine                       | (c) <i>Mistletoe</i> |
| 4. Partial parasite             | (d) Starch           |

### D. Write *True* or *False* against each statement.

- Partial parasites make their food but depend on the host for mineral and water. True
- Mode of nutrition in bacteria and fungi is symbiotic. False
- The root nodules in leguminous plants have nitrifying bacteria. True
- Insectivorous plants trap and eat insects for supplementing their need for nitrogen. True

**E. Answer in one word.**

1. **The nutrition in which plants prepare their own food.**

**Ans.** Autotrophic

2. **The gas used by plants for the synthesis of glucose.**

**Ans.** Carbon dioxide

3. **Plants which derive their food from the body of a host.**

**Ans.** Parasitic plants

4. **The mode of nutrition in *Cuscuta*.**

**Ans.** Parasitic

5. **A mutually beneficial relationship between two living organisms.**

**Ans.** Symbiotic relationship

**F. Define these terms.**

1. **Autotrophic nutrition**

**Ans.** The mode of nutrition in which organisms make their food from simple inorganic substances is called autotrophic nutrition.

2. **Heterotrophic nutrition**

**Ans.** The mode of nutrition in which organisms obtain food from plants or other animals is called heterotrophic nutrition.

3. **Symbiotic relationship**

**Ans.** When two organisms live together and share shelter and nutrients, their association is called symbiotic relationship.

**G. Differentiate between the following.**

1. **Autotroph and heterotroph**

**Ans.** An organism which can make food from raw materials is called autotroph. A green plant can make food, therefore, it is called an autotroph. On the other hand, the organism which cannot make food for itself but, obtains food from plants or other animals is called heterotroph.

2. **Partial and total parasites**

**Ans.** Partial parasites can synthesise their food but, they depend on the host for water and minerals. For example, *Mistletoe* plant. On the other hand, total parasites completely depend on the host plant for their food. For example, *Cuscuta*.

**H. Answer these questions.**

1. **Why is nutrition essential?**

**Ans.** Nutrition is essential for obtaining energy to perform various life processes. It is also essential for growth and development of the body and to repair worn out cells.

2. **Describe the process of photosynthesis.**

**Ans.** During photosynthesis, green plants take carbon dioxide from air and water from soil through roots. The chlorophyll present in leaves traps sunlight and converts it into chemical energy. Plants combine these inorganic compounds into complex organic substance called glucose.

**3. Name various conditions that affect photosynthesis.**

**Ans.** Conditions that affect photosynthesis are presence of chlorophyll, sunlight, carbon dioxide, water and minerals.

**4. What is the role of carbon dioxide and water in the process of photosynthesis?**

**Ans.** Carbon dioxide and water are the raw materials in the process of photosynthesis. Photosynthesis will not take place in the absence of carbon dioxide and water.

**5. Describe the role of alga and fungus in lichens.**

**Ans.** In lichens, the alga being green makes food by photosynthesis while the fungus provides shelter, water and minerals to the alga.

**6. Give equation for the synthesis of glucose.**

**Ans.** Carbon dioxide + Water  $\xrightarrow[\text{Chlorophyll}]{\text{Sunlight}}$  Glucose + Oxygen  
(from air) (from soil)

**7. Why does an insectivorous plant trap insects?**

**Ans.** An insectivorous plant grows in nitrogen-deficient soil. So, it traps insects to meet its nitrogen requirement.

**8. Label the parts 1– 4 of the leaf.**

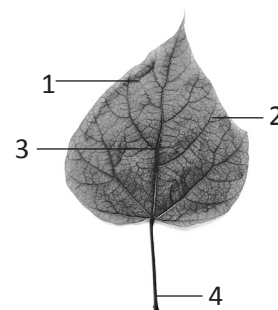
**(a) How does a leaf get carbon dioxide from air?**

**(b) Which part of leaf carries synthesised food to other parts?**

**Ans.** 1-Lamina 2-Vein 3-Midrib 4-Petiole (stalk)

(a) A leaf gets carbon dioxide from air through stomata.

(b) Phloem part of veins and midrib carries synthesised food to other parts of the plant.



**I. Give reasons for the following.**

**1. Chlorophyll is essential for photosynthesis.**

**Ans.** Chlorophyll is essential for photosynthesis because it traps light energy and converts it into chemical energy.

**2. Fungi cannot synthesise their food.**

**Ans.** Fungi cannot synthesise their food because they do not contain chlorophyll.

**3. Mushrooms are called saprophytes.**

**Ans.** Mushrooms obtain their food from dead and decaying matter of animals and plants. Therefore, they are called saprophytes.

**4. Total parasite *Cuscuta* is without leaves and without chlorophyll.**

**Ans.** *Cuscuta* is a total parasite and completely depends on the host plant for its food. It has a yellow, wire-like stem which twines around the host stem and branches. It gives out special fine roots called haustoria which enter the host stem and absorb ready-made food from there.

**5. Legumes have root nodules.**

**Ans.** The root nodules of leguminous plants have nitrogen-fixing bacteria, *Rhizobium*. These bacteria convert atmospheric nitrogen into nitrates which are utilised by leguminous plants.

6. **Insectivorous plants feed on insects, though they are green and carry out photosynthesis.**

**Ans.** Insectivorous plants grow in nitrogen-deficient soil. So, to fulfil their nitrogen requirement, they trap insects.

7. **Mistletoe is called a partial parasite.**

**Ans.** *Mistletoe* can make its food by photosynthesis, but depends on the host plant for minerals and water.

**J. Skill-based questions.**

1. **Why are insectivorous plants called partially heterotrophs?**

**Ans.** Insectivorous plants are photoautotrophs. They synthesise their food but they grow in nitrogen-deficient soil. To meet their nitrogen need, they trap insects. So, they are called partial heterotrophs.

2. **How does *Cuscuta* derive its nourishment?**

**Ans.** *Cuscuta* gives out special fine roots called haustoria, which enter the host stem and then the vascular bundles from where they absorb ready-made food.

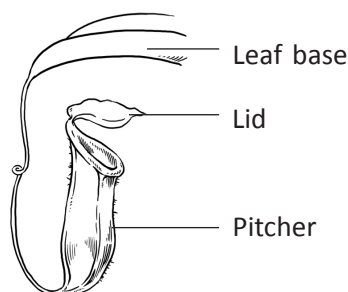
3. **Why do the leaves of a plant kept in dark become yellow?**

**Ans.** Chlorophyll gets degenerated in plants kept in the dark, so the green pigment is lost and leaves become yellow.

**K. Draw and label the diagram.**

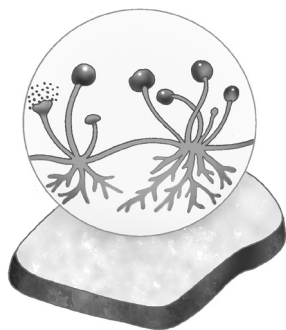
1. **Leaf modified into pitcher**

**Ans.**



2. **Bread mould**

**Ans.**



**L. Activity/Project–Do as directed.**

1. **Perform an activity to show that starch is formed during photosynthesis.**

2. **Perform an activity to show that sunlight is necessary for photosynthesis.**

**Ans.** Do yourself.

## Think Zone

**1. Why does soil become rich in nitrates and no fertilisers are needed when leguminous plants are grown in it?**

**Ans.** Roots of leguminous plants have nodules which contain nitrogen-fixing bacteria called *Rhizobium*. These bacteria convert atmospheric nitrogen into nitrates. These nitrates are utilised by leguminous plants. So, they do not need to obtain nitrogen from nitrate fertilisers of the soil.

**2. Why do insectivorous plants need to feed on insects when they are green and synthesise their food?**

**Ans.** Insectivorous plants grow in nitrogen-deficient soil. To supplement their nitrogen requirement, they feed on insects.

**3. What is the benefit of association between fungi and algae in lichens?**

**Ans.** Algae in lichens provide food to fungi and fungi provide shelter, water and minerals to the algae.

## ANSWERS

### Check Point 1

#### 1. Fill in the blanks.

- (a) Feeding by ingesting complex organic food is called holozoic nutrition.
- (b) *Hydra* has stinging cells that kill the prey.
- (c) Butterflies, bees and wasps suck nectar from flowers.
- (d) Proteins are digested into amino acids.
- (e) Mosquitoes and leeches suck blood.
- (f) Aquatic microscopic organisms form the food of *Amoeba*.
- (g) Digestion in *Amoeba* occurs inside the food vacuole.

#### 2. Mark these statements as true or false.

- (a) *Amoeba* ingests food through mouth. False
- (b) *Amoeba* is a carnivorous animal. True
- (c) The organs that help in the ingestion of food in *Amoeba* are cilia. False

### Check Point 2

#### 1. Name different types of teeth found in our mouth.

**Ans.** Different types of teeth in our mouth are incisors, canines, premolars and molars.

#### 2. What is the role of saliva in the digestion of food?

**Ans.** Saliva contains an enzyme called salivary amylase. It converts starch into maltose.

#### 3. What is the role of stomach in the digestion of food?

- Ans.**
- (a) Muscular wall of stomach churns the food by rhythmic contractions.
  - (b) Stomach wall secretes hydrochloric acid that kills bacteria which enter stomach along with food.
  - (c) Enzymes of digestive juice secreted by stomach wall digest proteins.

#### 4. In which part of alimentary canal, is the chemical digestion of food completed?

**Ans.** Small intestine

#### 5. What are villi? What role do they play?

**Ans.** Villi are finger-like projections in the inner wall of intestine. They increase surface area of intestine for the absorption of digested food.

**6. Where do the digestive juices come from in the small intestine?**

**Ans.** Small intestine receives bile juice from liver, pancreatic juice from pancreas and produces several digestive juices of its own.

**7. Where are most of the food nutrients absorbed from?**

**Ans.** Most of the food nutrients are absorbed in the small intestine.

### **Check Point 3**

**1. What is a cud?**

**Ans.** The partially digested food in ruminants is called cud.

**2. What are ruminants?**

**Ans.** Grass-eating animals like cows, horses, etc., which have a specialised part of stomach called rumen to store half-chewed food, are called ruminants.

**3. How is cellulose digested in ruminants?**

**Ans.** In ruminants, cellulose is digested in the caecum which is present at the junction of small and large intestines. Caecum contains cellulose-digesting bacteria.

**4. Why is cellulose not digested in man?**

**Ans.** Cellulose is not digested in man because caecum is small in size and cellulose-digesting bacteria are absent in it.

### **PRACTICE TIME**

**A. MCQs—Choose the correct answers.**

**1. Pseudopodia help in the ingestion of food in**

- (a) *Amoeba*  (b) earthworm  
(c) *Paramecium* (d) snake

**2. Cockroach is**

- (a) herbivorous (b) omnivorous   
(c) carnivorous (d) symbiont

**3. Digestion of food inside food vacuole occurs in**

- (a) *Hydra* (b) cockroach  
(c) *Amoeba*  (d) birds

**4. This is not a blood-sucking animal.**

- (a) tick (b) housefly   
(c) leech (d) bedbug

**5. In human, this type of teeth are used for tearing.**

- (a) molars (b) premolars  
(c) incisors (d) canines

**6. Breakdown of complex insoluble organic compounds into simple soluble molecules is**

- (a) digestion  (b) absorption  
(c) assimilation (d) egestion



7. The largest gland in the human body is  
 (a) adrenal gland (b) salivary gland  
 (c) pancreas (d) liver
8. This organ begins with mouth and ends with anus.  
 (a) stomach (b) alimentary canal   
 (c) foodpipe (d) buccal cavity

**B. Fill in the blanks.**

- Carbohydrates are digested into glucose.
- Cellulose is not digested in man.
- Digestion of fat produces fatty acids and glycerol.
- Liver secretes bile juice which is alkaline in nature.
- Grass-eating animals like cows and buffaloes are called ruminants.
- Liver is the largest gland in human body.

**C. Match the columns.**

- | Column A          | Column B                     |
|-------------------|------------------------------|
| 1. Proteins       | (a) Fatty acids and glycerol |
| 2. Lipids         | (b) Simple sugar             |
| 3. Carbohydrates  | (c) Amino acids              |
| 4. Salivary juice | (d) Fats                     |
| 5. Bile juice     | (e) Buccal cavity            |

**D. Write True or False against each statement.**

- Tongue helps in mixing of saliva with food. True
- Bile juice is produced by gall bladder. False
- Chemical digestion is completed in large intestine. False
- Small intestine does not produce any digestive enzymes. False
- Saliva changes starch into sugar. True

**E. Answer in one word.**

- Hardest substance in human body. Enamel
- Teeth with flat grinding surface. Molars
- The long tube with a large number of finger-like projections. Small intestine
- The part of stomach that temporarily stores partially chewed food in cows. Rumen
- Breaking down of food into simple soluble form in the body. Digestion

**F. Define these terms.**

**1. Pseudopodia**

**Ans.** Pseudopodia are finger-like projections arising from the body surface of *Amoeba*.

**2. Rumen**

**Ans.** Rumen is one of the four chambers in the stomach of ruminants. It is the largest chamber and is specialised to store half-chewed food.

### 3. Caecum

**Ans.** Caecum is a sac-like structure in the digestive system of herbivores which harbours cellulose-digesting bacteria.

### 4. Canine

**Ans.** Canine is a round, sharp and pointed tooth which helps in tearing the food. There are 4 canines in humans.

## G. Differentiate between the following.

### 1. Endoparasites and ectoparasites

**Ans.** The parasites which live inside the host body and derive nutrients from host's body fluid, blood or tissue are called endoparasites. For example, malarial parasites live in RBCs, flatworms and roundworms live in liver or intestine of their host. On the other hand, the parasites which live on the body surface of their host are called ectoparasites. For example, ticks, mites, body louse and bedbugs cling on to the body surface of their host and suck their blood.

### 2. Ingestion and egestion

**Ans.** Ingestion is the process of taking in food while egestion is the process of getting rid of undigested solid part of the food.

## H. Give functions of the following.

### 1. Gall bladder

**Ans.** Gall bladder stores the bile which is produced in liver.

### 2. Rectum

**Ans.** Rectum holds undigested part of food which enters from large intestine, for some time before it is expelled through anus.

### 3. Salivary glands

**Ans.** Salivary glands release saliva in buccal cavity. Saliva helps in chewing, swallowing and digestion of the food. It contains enzyme salivary amylase which digests starch into maltose.

## I. Answer these questions.

### 1. What happens when two drops of iodine are added to starch?

**Ans.** Starch becomes blue-black when iodine is added to it.

### 2. What is the function of tongue in frog?

**Ans.** The tongue of frog helps in catching the insects.

### 3. How does an *Amoeba* capture its food?

**Ans.** *Amoeba* projects its pseudopodia around the food. These pseudopodia surround and engulf the food.

### 4. Name different types of teeth and find the number of permanent set of teeth in man.

**Ans.** Different types of teeth are incisor, canine, premolar and molar. There are 32 teeth in the permanent set of teeth in man.

**5. What happens to the following during digestion (a) fats (b) proteins (c) starch?**

- Ans.** (a) Fats are broken down into fatty acids and glycerol.  
(b) Proteins are broken down into amino acids.  
(c) Starch is broken down into maltose.

**6. What are villi? Give their functions.**

**Ans.** Villi are finger-like projections found in the inner wall of small intestine. They absorb the digested food.

**7. Describe structural specialities of small intestine for the absorption of food.**

**Ans.** For efficient absorption of nutrients, the small intestine has following specialities:

- (a) Small intestine is very long.
- (b) The wall of intestine is thin to allow rapid diffusion of substances.
- (c) The inner wall of small intestine contains numerous finger-like projections called villi.
- (d) The villi increase surface area of intestine to about five times for the absorption of digested food.
- (e) Each villus is supplied with an arteriole, a venule and blood capillaries, a lymph vessel or lacteal and lymph capillaries.

**8. What are the components of gastric juice?**

**Ans.** Gastric juice contains mucus, hydrochloric acid and digestive enzymes.

**9. Give the function of rumen. Define animals in which rumen is present.**

**Ans.** In rumen, the half-chewed food is partially digested by the action of saliva. This partially digested food is called cud.

Animals like cows, buffaloes, etc. in which rumen is present are called ruminants.

**J. Give reasons for the following.**

**1. The digested food is absorbed mainly in small intestine.**

**Ans.** Digested food is mainly absorbed in small intestine because its inner wall has numerous villi. They are supplied with blood vessels and lymph vessel called lacteal. The absorbed food is passed into blood vessels and transported to all the parts of the body.

**2. Small intestine is as long as 3.5 metres.**

**Ans.** The digested food is absorbed in the small intestine. The wall of small intestine is provided with numerous villi to increase the surface area for the absorption of digested food. Therefore, to ensure maximum absorption of food, small intestine is long.

**3. Digestion is essential.**

**Ans.** The food we eat is in complex form but our body cells take it in simpler form. So before absorbing into blood, it needs to be digested. Therefore, the food we eat is broken down into simple molecules by the digestive system.

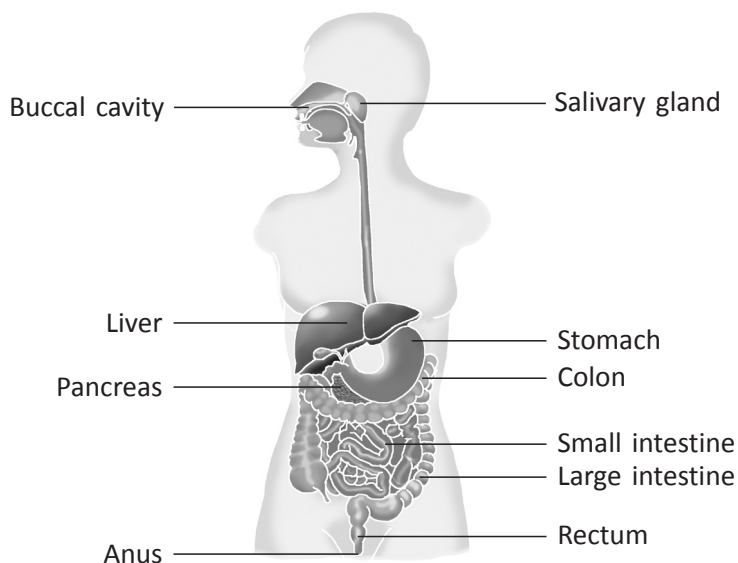
**4. Stomach wall is thick and muscular.**

**Ans.** In stomach, the food is churned into fine paste and is mixed with the digestive juices by the rhythmic contractions of stomach wall. Therefore, stomach wall is thick and muscular.

### K. Diagram-based question.

Label the parts 1–10 of human digestive system.

Ans.



### L. Skill-based questions.

1. **Gastric glands secrete hydrochloric acid to kill bacteria which come along with food. It also helps in the digestion of proteins. Why does this acid not damage the stomach wall?**

**Ans.** A lot of mucus is secreted by the mucous glands of the stomach wall. It forms a thick protective coat over mucous membrane of stomach wall and protects its cells from the action of hydrochloric acid.

2. **What happens during vomiting?**

**Ans.** During vomiting, cardiac reflux occurs. The peristaltic movements of stomach wall start operating in the opposite direction.

3. **Why do doctors keep a patient on glucose drip after operation?**

**Ans.** After operation, due to the effect of anaesthesia, patient feels nausea and cannot be given oral food and water. Glucose drip provides the patient instant energy.

4. **Why is oral rehydration solution (ORS) a must to a person suffering from diarrhoea?**

**Ans.** ORS is a must to a person suffering from diarrhoea to compensate for the excessive loss of water and salts which are lost due to frequent stools.

### M. Activity/Project–Do as directed.

**How does a starfish feed and digest its food. Prepare a project report on it.**

**Ans.** Do it yourself.

### Think Zone

1. **Under which conditions is glucose given to a patient by the doctor?**

**Ans.** Glucose is the source of instant energy. A glucose drip is given to the patient when the patient has lost excessive water and salts, and needs immediate replenishment.

**2. No food is absorbed in stomach. Why?**

**Ans.** In stomach, the food is partially digested. Digestion is completed in the small intestine. Since only final products of digestion are absorbed, there is no absorption in the stomach.

**3. We cannot digest cellulose. Why?**

**Ans.** Cellulose-digesting bacteria that are found in the caecum of ruminants are absent in human beings and the caecum is also very small and nonfunctional. Due to this reason, we cannot digest cellulose.

## ANSWERS

Check Point 1

1. What is the removal of hair from sheep called?

Ans. Shearing

2. Which type of wool fibre is strong and smooth to touch?

Ans. Long fibre

3. What feature determines the quality of wool?

Ans. Length of fibres, number of crimps or curls per centimetre and tensile strength.

4. Name the country that tops in wool production.

Ans. Australia

5. Name the organisation which confers woolmark logo.

Ans. IWS (International Wool Secretariat)

Check Point 2

Fill in the blanks.

1. Silk is obtained from cocoons of silk moth.

2. Silk fibre is formed of two strands of protein fibroin.

3. Silk fibre is secreted by the salivary gland of caterpillar of a silk moth.

4. Silkworm feeds on mulberry leaves.

5. Breeding and management of silk moths for production of silk is called sericulture.

PRACTICE TIME

A. MCQs—Choose the correct answers.

1. People prefer to wear clothes during winter made of

(a) wool  (b) silk (c) cotton (d) nylon

2. In sericulture, silkworm is fed on the leaves of

(a) peepal (b) neem  
(c) mulberry  (d) mango

3. Which of the following fibres is fine and light?

(a) cotton (b) silk  (c) jute (d) wool

4. People working in wool industry are at risk of
  - (a) ringworm
  - (b) sorter's disease
  - (c) influenza
  - (d) malaria
5. To obtain fleece by shaving sheep's body is called
  - (a) dyeing
  - (b) sorting
  - (c) shearing
  - (d) spinning
6. This is the strongest fibre of all natural fibres.
  - (a) wool
  - (b) silk
  - (c) cotton
  - (d) jute
7. Silk fibres are formed of
  - (a) protein keratin
  - (b) protein sericin
  - (c) protein elastin
  - (d) chitin

**B. Fill in the blanks.**

1. The wool and silk are fibres of animal origin.
2. Wool is natural fibre, whereas nylon is synthetic fibre.
3. Alpaca and llama are bred in South America for obtaining wool.
4. The small fluffy fibres of sheep are called burrs.
5. Cocoons are immersed in hot water which loosens the silk filament.

**C. Match the columns.**

- | Column A           | Column B                 |
|--------------------|--------------------------|
| 1. Yak             | (a) Food of silkworm     |
| 2. Cocoon          | (b) Wool-yielding animal |
| 3. Tassar          | (c) Removal of fleece    |
| 4. Mulberry leaves | (d) Cover of pupa        |
| 5. Shearing        | (e) Type of silk         |

**D. Write True or False against each statement.**

1. India is the second largest producer of wool in the world. False
2. Synthetic clothes are made from hair of animals. False
3. Worsted yarn is durable than woollen yarn. True
4. Merino is a type of silk. False

**E. Answer in one word.**

1. Removal of fleece from the sheep. Shearing
2. Washing fleece in tanks to remove dust and grease. Scouring
3. The larva of silk moth. Caterpillar
4. The covering around a caterpillar. Cocoon
5. Breed of sheep that gives best quality of wool. Merino

**F. Define these terms.**

**1. Scouring**

**Ans.** The process of washing sheared hair of sheep in a series of tubs containing soapy water to remove grease, dust and dirt is called scouring.

## 2. Sericulture

**Ans.** The rearing of silk moth for obtaining silk is called sericulture.

### G. Answer these questions.

#### 1. Which chemicals are used in the manufacture of synthetic fibres?

**Ans.** Synthetic fibres are made from petrochemicals.

#### 2. State the factors which determine the quality of wool extracted from a sheep.

**Ans.** Length of fibres, number of crimps or curls per centimetre and tensile strength.

#### 3. What do you mean by occupational hazard?

**Ans.** A risk faced or experienced by a worker at the workplace is called occupational hazard.

#### 4. Explain sorter's disease.

**Ans.** Sorter's disease is anthrax which is caused by anthrax bacteria mostly to the people working in the sorting department of wool factory.

#### 5. Name different stages in the life cycle of silk moth.

**Ans.** Stages in the life cycle of silk moth are eggs, larva, pupa and adult.

#### 6. Write the steps involved in the production of silk and also name the discoverer of silk.

**Ans.** Following steps are involved in the production of silk:

- (a) The eggs of silk moth are stored on strips of cloth or paper and are sold to silkworm farmers.
- (b) The eggs are reared in hygienic conditions at suitable temperature and humidity till the larvae come out.
- (c) The silk moth larvae are then fed on mulberry leaves under controlled conditions.
- (d) Fully grown cocoons are sorted out according to their colour, size, shape and texture.
- (e) The sorted cocoons are immersed in boiled water or exposed to steam. This kills the pupae inside the cocoons.
- (f) The cocoons are then passed through a series of hot and cold immersions for softening the silk fibre.
- (g) The silk fibres are unwound from the cocoons to get long continuous fibres. The process is called reeling the filament.
- (h) The silk fibres are spun into silk threads.

Silk was discovered by Xi-Chung-Shih, the bride of Chinese emperor Hunang Di.

### H. Give reasons for the following.

#### 1. Why do we wear different types of clothes in different weathers?

**Ans.** We wear different types of clothes in different weathers to protect our body from weather conditions like the heat, cold, rain, etc.

#### 2. Why are sheep with thick coat selected for wool yielding?

**Ans.** Sheep with thick coat are selected for wool yielding because they have more fibres to produce good quality wool.



**3. Why is merino wool considered to be the best variety of wool?**

**Ans.** Merino wool is considered to be the best variety because its fibres have 30-40 curls per centimetre. These curls provide holding ability to the fibres.

**4. Why is worsted woollen cloth better than the ordinary woollen cloth?**

**Ans.** Worsted woollen cloth is better because it is made of long fibres, has smooth finish and is extremely durable.

**5. Why does shearing not hurt the sheep?**

**Ans.** Shearing does not hurt the sheep because sheep hair are dead structures.

**6. Why is cocoon of silk moth immersed into hot water?**

**Ans.** Cocoon is immersed into hot water to kill the pupa inside it otherwise pupa will cut the silk thread into small pieces to come out of cocoon.

**I. Encircle the odd-one out. Give reasons for your choice.**

**1. Camel, sheep, silk moth**

**Ans.** Silk moth; Camel and sheep provide wool, whereas silk moth provides silk.

**2. Reeling, shearing, scouring**

**Ans.** Reeling; It is related to silk while others are related to wool.

**3. Angora, merino, tassar**

**Ans.** Tassar; It is a type of silk while others are types of wool.

**4. Cotton, wool, silk**

**Ans.** Cotton; It is a plant fibre while others are animal fibres.

**5. Nali, lohi, cashmere**

**Ans.** Cashmere; It is a breed of goat while others are breeds of sheep.

**6. Fibroin, sericin, angora**

**Ans.** Angora; It is a breed of goat while others are related to silk thread.

**J. Skill-based questions.**

**1. Why do workers of sericulture industry often develop asthma, chronic bronchitis and difficulty in breathing?**

**Ans.** The workers of sericulture industry often develop asthma, chronic bronchitis and difficulty in breathing because of inhalation of vapour arising from cocoons while being boiled and reeled.

**2. It is necessary to kill the pupae by boiling cocoons in water at right time. Why?**

**Ans.** If pupae are not killed by boiling of cocoons, the young moths cut the cocoons to come out. Thus, a single fibre of silk is cut into several small pieces which cannot be spun into silk thread.

**3. Why is a shorn sheep dipped in an antiseptic solution soon after shearing?**

**Ans.** After shaving, the shorn sheep is dipped into an antiseptic solution to protect it from bacterial skin infection.

**K. Activity/Project–Do as directed.**

**Perform an activity to show the burning and smelling properties of silk, wool and cotton.**

**Ans.** Do it yourself.

**Think Zone**

**1. Sheep fed on protein-rich diet have fine, curly and shiny hairs. Why?**

**Ans.** Hair that form wool are protein structure. Proteins provide them lustre and strength.

**2. Shearing of sheep is done only once a year. Why?**

**Ans.** Shearing of sheep is done only once a year so as to have a good growth of hair on the sheep's body.

# Heat and Temperature

## ANSWERS

### Check Point 1

#### 1. Fill in the blanks.

- (a) Substances which produce a very large amount of heat on burning are called fuels.
- (b) Very low temperature decreases the rate of growth and reproduction of bacteria.
- (c) Degree of hotness of a body is called its temperature.
- (d) Hotness or coldness are comparative terms, and not absolute.
- (e) Change of state can be caused by heating or cooling a substance.

#### 2. What energy transformations take place in the following?

- (a) In a thermal power station
- (b) In a nuclear power station

**Ans.** (a) Heat energy into electrical energy

- (b) Nuclear energy into heat energy and then into electrical energy

### Check Point 2

#### 1. Fill in the blanks.

- (a) Thermometer is a device used to measure temperature.
- (b) The most commonly used scale to measure temperature is the Celsius scale.
- (c) In Celsius scale, the freezing point of water is 0°C.
- (d) Lab thermometers can measure temperatures safely from -10°C to 110°C.
- (e) The average normal human body temperature is 37°C.

#### 2. Answer these questions.

- (a) Does every human being have exactly the same normal body temperature?
- (b) What is the range of a clinical thermometer?
- (c) Why doesn't a clinical thermometer contain markings above 42°C?

**Ans.** (a) No, only healthy human being has exactly the same normal body temperature.

- (b) 35°C to 42°C

(c) Because clinical thermometer is used to measure human body temperature ranging from 35°C to 42°C. As we know, human body cannot survive with a body temperature above 42°C, there is no need to have markings above 42°C on a clinical thermometer.

## PRACTICE TIME

### A. MCQs—Choose the correct answers.

- This scale is used to measure temperature most commonly.  
(a) Fahrenheit      (b) Celsius       (c) Kelvin      (d) none of these
- This thermometer is used to measure human body temperature.  
(a) clinical       (b) laboratory  
(c) both (a) and (b)      (d) none of these
- The highest reading on a clinical thermometer is  
(a) 40°C      (b) 50°C      (c) 45°C      (d) 42°C
- In a thermal power station, this type of energy is transformed into electrical energy.  
(a) light      (b) heat       (c) mechanical      (d) nuclear
- By rubbing your palms, you transform mechanical energy into this type of energy.  
(a) light      (b) heat       (c) electrical      (d) nuclear
- A laboratory thermometer is generally graduated from  
(a) 0°C to 100°C      (b) 10°C to 50°C  
(c) 20°C to 50°C      (d) -10°C to 110°C

### B. Fill in the blanks.

- In a nuclear power plant, nuclear energy is first converted into heat energy.
- Heat energy is converted into electrical energy in a thermal power plant.
- An object expands on heating and contracts on cooling.
- The heating can cause change of state in an object.

### C. Write True or False against each statement.

- A clinical thermometer can read temperature up to 120°C. False
- A laboratory thermometer has a kink in its capillary tube. False
- The degree of hotness of a body cannot be estimated correctly by touching and feeling. True
- Disposing a broken thermometer in common trash is harmful to the environment. True

### D. Answer in one word.

- Degree of hotness of a body. Temperature
- Device used to measure temperature. Thermometer
- This thermometer ranges from -10°C to 110°C. Laboratory thermometer
- This thermometer ranges from 35°C to 42°C. Clinical thermometer

### E. Define these terms.

#### 1. Temperature

**Ans.** Temperature is the degree of hotness or coldness of a body.

#### 2. Clinical thermometer

**Ans.** Clinical thermometer is a device used to measure human body temperature.

**F. Answer these questions.**

**1. Why touching and feeling the hotness of a body is not sufficient to measure temperature?**

**Ans.** Touching and feeling the hotness of a body do not give the accurate degree of hotness. Therefore, they are not sufficient to measure temperature.

**2. State two phenomena from your surroundings which involve transformation of heat energy.**

**Ans.** In a thermal power plant, heat energy is transformed into electrical energy. In a steam engine, heat energy is transformed into mechanical energy.

**3. How is the life of bacteria affected by heat?**

**Ans.** Many bacteria get killed on heating.

**4. State the precautions to be followed while using a clinical thermometer.**

**Ans.** Following precautions should be taken while using a clinical thermometer:

(a) Thermometer should be washed with antiseptic lotion or clean water and dried with clean cloth before every use.

(b) The thermometer should be given two or three soft jerks carefully to bring the mercury below  $35^{\circ}\text{C}$ .

(c) While the thermometer is inside in mouth, one should not laugh, talk or yawn to prevent its breakage and release of mercury in the body.

(d) Thermometer should never be hold by the bulb while reading it.

**5. State the precautions to be followed while using a laboratory thermometer.**

**Ans.** The following precautions must be taken while using a laboratory thermometer.

(a) While the temperature is being taken, the bulb of the thermometer should be properly in contact with the object whose temperature is to be measured.

(b) The reading of temperature should be taken without removing the thermometer from its position.

(c) The eye of the observer should be at the same vertical level as that of the mercury in the capillary tube.

(d) The thermometer should not be used to measure temperatures below its lowest marking or above its highest marking.

**G. Give reasons for the following.**

**1. A lab thermometer cannot be used to measure the body temperature of a human being.**

**Ans.** A lab thermometer cannot be used to measure the body temperature of a human being because it has a straight capillary, whereas the capillary of a clinical thermometer has a kink just above the bulb to prevent the falling of mercury level on its own when the thermometer is taken out of mouth.

**2. There is a kink provided in the capillary of a clinical thermometer.**

**Ans.** The kink in the capillary of clinical thermometer prevents the falling of mercury level when the thermometer is taken out of mouth.

**3. The drinking water is recommended to be boiled and filtered.**

**Ans.** As boiling kills bacteria present in water, it is recommended to boil and filter water to make it safe for drinking.

## H. Draw and label the following diagrams.

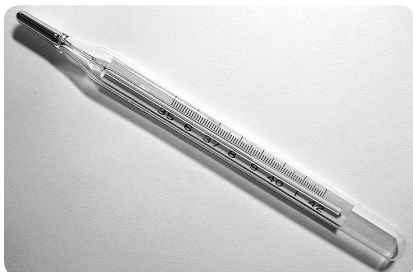
### 1. A laboratory thermometer

Ans.



### 2. A clinical thermometer

Ans.



## I. Skill-based questions.

### 1. Why are the bottles containing packed liquids in them left with some space above the level of the liquids?

Ans. Bottles containing packed liquid are left with some space above the level of the liquid so as to prevent them from bursting due to pressure created by the expansion of liquid because of heat (high temperature).

### 2. Why are the huge bridges provided with expansion (flexible) joints?

Ans. Huge bridges are provided with expansion (flexible) joints so as to accommodate the increase in length due to thermal expansion during summers.

## J. Activity/Project–Do as directed.

**Perform an activity to measure the temperature of water using lab thermometer.**

Ans. Do it yourself.

## Think Zone

### 1. Can a clinical thermometer be used to measure the temperature of boiling milk? Give reason for your answer.

Ans. No, a clinical thermometer cannot be used to measure the temperature of boiling milk because it measures temperature up to 42°C only, whereas the temperature of boiling milk is much higher than 42°C, which is about 100°C.

### 2. Why is the stem of a thermometer made up of glass?

Ans. The stem of a thermometer is made up of glass so that we can see the mercury thread inside it.

### 3. Paper and dry cotton cloth catch fire easily. Why are they not used as fuels?

Ans. Though paper and dry cotton cloth catch fire easily, they are not used as a fuel because they do not produce large amount of heat on burning.

## ANSWERS

### Check Point 1

#### 1. Fill in the blanks.

- (a) Heat always flows from a body at higher temperature to another at lower temperature.
- (b) Conduction takes place in solids only.
- (c) The particles of solids are very closely packed with each other.
- (d) Fluffed up cotton and woollens are poor conductors of heat because of air present in them.
- (e) The materials which do not allow the heat to flow through them easily are called poor conductors of heat.

#### 2. Define the following.

- (a) Conduction of heat
- (b) Good conductors of heat

- Ans.** (a) Conduction of heat is the mode of transfer of heat from one particle to another in solids.
- (b) The materials which conduct heat easily through them are called good conductors of heat.

### Check Point 2

#### 1. Fill in the blanks.

- (a) The convection takes place due to the actual movement of the heated particles within a fluid.
- (b) Heat cannot be transferred due to convection in solids.
- (c) Due to convection, the hot particles move upwards while the cold particles move downwards.
- (d) During the day, the land is heated more than ocean water.
- (e) Movement of air from land towards ocean at night is called land breeze.

#### 2. Define the following.

- (a) Convection
- (b) Sea breeze

- Ans.** (a) Convection is the mode of heat transfer by the actual movement of the heated particles, especially in liquids and gases.

- (b) Sea breeze is caused by the movement of convection current from the land to the ocean.

### Check Point 3

**1. Fill in the blanks.**

- (a) Thermal radiation can travel through vacuum also.  
(b) All hot objects give out thermal radiation.  
(c) Black colour is a good absorber of heat radiations.  
(d) Good absorbers of heat are good radiators also.

**2. Define radiation. Give two examples of good radiators.**

**Ans.** Transfer of heat from a hot body to a cold body directly without any contact or medium between them is called radiation. For example, pipes of solar heaters and bottoms of cooking utensils are good radiators.

### PRACTICE TIME

**A. MCQs–Choose the correct answers.**

1. An umbrella to be used to prevent direct exposure from the sun should be  
(a) white  (b) black  
(c) dark-brown (d) any colour
2. In hot desert areas, which of the following material should be used to make a rooftop?  
(a) aluminium (b) iron (c) asbestos  (d) all of these
3. Cooking vessels cannot be made of  
(a) aluminium (b) steel (c) iron (d) wood
4. The following is not one of the modes of transfer of heat.  
(a) radiation (b) conduction  
(c) convection (d) motion of object
5. Ocean currents are caused due to this present in ocean water.  
(a) convection  (b) radiation  
(c) conduction (d) large volume of it
6. Conduction of heat can take place through only  
(a) vacuum (b) solids  (c) liquids (d) gases
7. Which colour absorbs minimum radiation?  
(a) white  (b) black (c) yellow (d) silver

**B. Fill in the blanks.**

1. Conduction cannot take place in liquids and gases.  
2. Woollens prevent the warmth to flow out to the cold surroundings.  
3. Air is a bad conductor of heat.  
4. The mode of transfer of heat which requires no contact or medium is known as radiation.  
5. Heat cannot travel through convection in solids.



**C. Write *True* or *False* against each statement.**

1. Heat flows from a body at higher temperature to another, when the two are in contact. True
2. Woollens are helpful in keeping us warm because they have air enclosed in them. True
3. Metals are poor conductors of heat. False
4. Convection currents can occur in solids. False
5. Black colour absorbs maximum of thermal radiation. True

**D. Answer in one word.**

1. The mode of transfer of heat from one particle to another in solids. Conduction
2. The transfer of heat due to actual movement of the heated particles within the medium. Convection
3. The heat transfer from the source to a cold object, without contact or medium between them. Radiation

**E. Define these terms.**

**1. Conduction**

**Ans.** Conduction is the mode of transfer of heat from one particle to another in solids.

**2. Convection**

**Ans.** Convection is the transfer of heat due to actual movement of the heated particles within the medium (liquids and gases).

**3. Radiation**

**Ans.** Radiation is heat transfer from the source to cold object without contact or medium between them.

**F. Answer these questions.**

**1. Why do we feel hot when we sit under the sun directly?**

**Ans.** We feel hot when we sit under the sun directly because we receive thermal radiation from the sun.

**2. Why are freezers placed at the top of refrigerators?**

**Ans.** Freezers are placed at the top of refrigerators so as to easily circulate the cold air downwards as cold air is heavier than warm air. This keeps the refrigerators cool.

**3. Two identical cups of cocoa are kept on a table. One has a metal spoon in it and the other does not. After 5 minutes, which cocoa cup will be cooler?**

**Ans.** The cocoa cup having a metal spoon will be cooler because metals are good conductors of heat.

**4. Several days after the end of a snowstorm, the roof of a house gets completely covered with snow. Another house has no snow on its roof. Which house is better insulated?**

**Ans.** The house with roof covered with snow is better insulated as snow prevents heat from escaping out.

**5. Why are the tumblers, used to sip hot drinks, not made of metals?**

**Ans.** As metals are good conductors of heat, tumblers made of metals will allow heat to escape and the drink will cool down easily.

**G. Give reasons for the following.**

**1. The radiators of cars are painted black.**

**Ans.** The radiators of cars are painted black to radiate more heat easily as black colour is a good radiator of heat.

**2. Black and dark-coloured clothes are preferred in winter days.**

**Ans.** Black and dark-coloured clothes are preferred in winter days because they absorb more heat from the surroundings during the daytime.

**3. During nights, cold air moves from land to ocean.**

**Ans.** During nights, the air on ocean water is comparatively hotter and lighter which rises up creating space over water. Hence, cold air from above the land moves to ocean to take the place vacated by hot air.

**4. The presence of a hot object can be felt without any contact.**

**Ans.** Hot objects radiate heat energy which reaches us and we can feel the presence of hot object without any contact.

**5. Handles of cooking utensils are made of wood, plastics or bakelite.**

**Ans.** Handles of cooking utensils are made of wood, plastics or bakelite because they are bad conductors of heat and do not get heated.

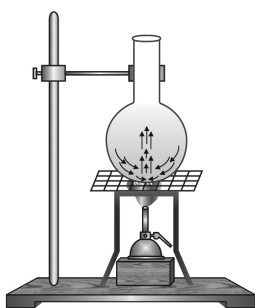
**6. Conduction cannot take place in liquids and gases.**

**Ans.** In liquids and gases, particles can move freely and hence can convey heat by the way of convection. Therefore, conduction is not possible in liquids and gases.

**H. Draw and label the diagram.**

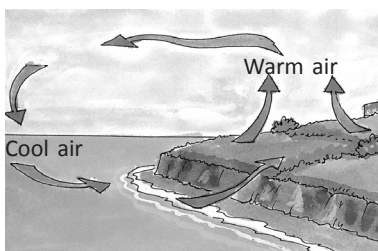
**1. The direction of movement of particles, when water is heated in a container.**

**Ans.**



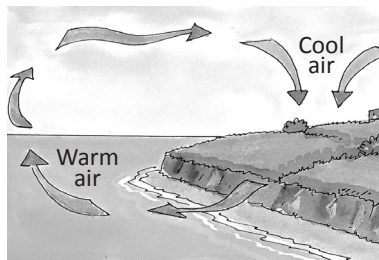
**2. Direction of air during a sea breeze.**

**Ans.**



### 3. Direction of air during a land breeze.

Ans.



#### I. Skill-based questions.

1. The outer body of the inner bottle of a thermos flask is made silver in colour. Why?

Ans. The outer body of the inner bottle of a thermos flask is made silver in colour to prevent the loss of heat by radiation. It is because shiny surfaces are poor radiators.

2. How do aquatic animals survive in the lakes and oceans, even when the surface of the water body is frozen in extreme winters?

Ans. In extreme winters, the surface of lakes and oceans freezes but the water under it remains liquid and warm. So, aquatic animals survive in water.

3. Most of the mines evolve out flammable gases. The miners working deep inside them carry a lantern with them, which has its flame surrounded by a copper wire mesh. The lantern produces light safely, without burning the flammable surroundings. Give reason.

Ans. The lantern used in mines is called Davy Lamp. It has a fine copper wire mesh which has very fine holes that allow air and gases to enter the flame but does not allow flame to pass through the mesh to ignite the gases outside. Hence, the fine mesh acts as a flame arrestor.

#### J. Activity/Project—Do as directed.

Perform an activity to show that heat is transferred by conduction in solids.

Ans. Do it yourself.

### Think Zone

1. Two containers of same size and material, one painted white and the other black from outside, are filled with water at  $90^{\circ}\text{C}$  in equal quantities. The two are kept in a shady area. In which container, will the water cool faster? Why?

Ans. The water will cool faster in the container painted black from outside. It is because black surfaces are good radiators of heat.

2. In USA, a lack of snowfall allowed the ground to freeze to a depth of about 1 m, causing buried water pipes to freeze and burst. Why did a lack of snow lead to this situation?

Ans. The snow forms an insulating layer over the land and prevents the heat loss from it. When there is no snow, the heat of land is lost and the land becomes very cold causing water in pipes to freeze and pipes to burst.

**ANSWERS****Check Point 1**

1. Name the acids present in the following:

- (a) unripe green apples
- (b) vinegar
- (c) tea
- (d) sour milk
- (e) orange juice

**Ans.** (a) Maleic acid (b) Acetic acid (c) Tannic acid (d) Lactic acid (e) Citric acid

2. What is an indicator?

**Ans.** An indicator is a substance that changes colour in acids and bases.

3. Give the names of any two natural indicators.

**Ans.** Litmus and Turmeric

4. Give the colour change of the following indicators with acids and bases:

- (a) blue litmus paper
- (b) phenolphthalein

**Ans.** (a) Blue litmus paper turns red in acids and remains blue in bases.

(b) Phenolphthalein remains colourless in acids and changes to pink colour in bases.

5. Should we use taste as a method of testing whether a substance is an acid or a base?

**Ans.** No, because some acids and bases are corrosive and can cause great harm to us.

**Check Point 2**

1. What is a neutralisation reaction?

**Ans.** A reaction in which an acid combines with a base to form salt and water is called a neutralisation reaction.

2. What does wasp sting contain?

**Ans.** A wasp's sting contains a base.

3. Why are factory wastes treated with bases before discharging?

**Ans.** 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. So to neutralise acids, factory wastes are usually treated with bases.

## PRACTICE TIME

### A. MCQs—Choose the correct answers.

- The acid present in sour milk is  
(a) acetic acid  
(b) lactic acid   
(c) formic acid  
(d) hydrochloric acid
- The acid present in our stomach that helps in digestion of food is  
(a) nitric acid  
(b) acetic acid  
(c) hydrochloric acid   
(d) sulphuric acid
- The colour of methyl orange in acids is  
(a) yellow  
(b) pink  
(c) red   
(d) orange
- Acidic soil can be neutralised by adding  
(a) quicklime   
(b) vinegar  
(c) nitric acid  
(d) formic acid
- The sting of an ant contains  
(a) acetic acid  
(b) formic acid   
(c) lactic acid  
(d) hydrochloric acid
- Milk of magnesia contains a base called  
(a) calcium hydroxide  
(b) sodium hydroxide  
(c) magnesium hydroxide   
(d) potassium hydroxide
- Which acid is called the king of chemicals?  
(a) hydrochloric acid  
(b) nitric acid  
(c) sulphuric acid   
(d) lactic acid
- The sting of a wasp is  
(a) acidic  
(b) neutral  
(c) basic   
(d) none of these

### B. Fill in the blanks.

- Acids are sour in taste, whereas bases are bitter in taste.
- Acids turn blue litmus to red, whereas bases turn red litmus to blue.
- When an acid reacts with a base, salt is formed along with water.
- Turmeric is an example of a natural indicator.
- Litmus is a dye which is extracted from lichens.
- Substances that are neither acidic nor basic are called neutral.
- Phenolphthalein changes to pink colour with bases.
- Baking soda and sodium hydroxide are basic in nature.
- Sugar solution and common salt solution are neutral solutions.

**C. Match the columns.**

**Column A**

1. Wasp sting
2. Ant sting
3. Antacid
4. Spinach
5. Sulphuric acid

**Column B**

- (a) milk of magnesia
- (b) rubbing vinegar
- (c) king of chemicals
- (d) rubbing sodium bicarbonate solution
- (e) oxalic acid

**D. Write True or False against each statement.**

1. Phenolphthalein changes to pink in acids. False
2. Sulphuric acid is used in car batteries. True
3. Indicators change their state in acids and bases. False
4. China rose indicator turns green in acids. False

**E. Answer in one word.**

1. A substance that changes colour in acidic and basic solutions. Indicator
2. A substance formed when an acid reacts with the base. Salt
3. A reaction in which an acid reacts with a base. Neutralisation

**F. Define these terms.**

**1. Indicator**

**Ans.** An indicator is a substance that changes colour in acids and bases.

**2. Neutralisation**

**Ans.** The reaction between an acid and a base in which they neutralise each other and form salt and water is called neutralisation reaction.

**G. Answer these questions.**

**1. What do you understand by an acid?**

**Ans.** An acid is a substance which is sour in taste and turns blue litmus red.

**2. What do you understand by a base?**

**Ans.** A base is a substance which is bitter in taste, soapy to touch and turns red litmus blue.

**3. Give three examples of everyday materials which contain (a) an acid (b) a base.**

**Ans.** (a) Curd, spinach and tea contain acids.

(b) Indigestion tablets, soaps and window cleaners contain bases.

**4. Give the colour changes, if any, of the following indicators with acids and bases.**

(a) phenolphthalein (b) methyl orange (c) turmeric.

**Ans.** (a) Phenolphthalein remains colourless in acids and changes to pink colour in bases.

(b) Methyl orange turns red in acids and yellow in bases.

(c) Turmeric turns reddish-brown in bases but shows no change with acids.

5. Name the acid present in an ant sting. Give any two uses of acids.

**Ans.** Ant sting contains formic acid.

Two uses of acids are as follows:

- (i) Sulphuric acid is used in car batteries.
- (ii) Acetic acid present in vinegar is used as food preservative.

6. All acids are not corrosive. Justify the statement.

**Ans.** Mineral acids are corrosive, whereas organic acids found in living beings are not corrosive. Also acids like acetic acid, lactic acid, citric acid, tartaric acid, etc. are found in some food items.

7. What is neutralisation? How does neutralisation help to prevent tooth decay?

**Ans.** The reaction between an acid and a base in which they neutralise each other and form salt and water is called neutralisation reaction.

Tooth decay is caused due to acid produced by mouth bacteria. Tooth pastes used for cleaning teeth are basic in nature. They neutralise the acid formed by mouth bacteria and, thus, help to prevent tooth decay.

8. Why is it wise to neutralise the factory wastes before disposing them into rivers or lakes?

**Ans.** The factory wastes should be neutralised before disposing them into rivers or lakes because they contain harmful acids. If they are allowed to flow directly into rivers or lakes, they will harm the aquatic life.

H. Give reasons for the following.

1. Vinegar is sour.

**Ans.** Vinegar is sour because it contains acetic acid.

2. We should not use taste as a method of testing whether a substance is an acid or a base.

**Ans.** We should not use taste as a method of testing because many acids and bases are corrosive which can harm us.

3. Indigestion tablet relieves the uneasiness you might experience if you eat too many unripe mangoes.

**Ans.** The indigestion tablet contains a base called magnesium hydroxide which neutralises the excess of acid formed by eating too many unripe mangoes and thus, helps in getting relief from uneasiness.

4. The pain caused due to an ant sting can be relieved by rubbing baking soda solution at the place of sting.

**Ans.** As ant sting contains formic acid, its effect is neutralised by baking soda solution which is a base.

I. Encircle the odd-one out. Give reasons for your choice.

1. Tamarind, grapes, vinegar, sodium bicarbonate solution

**Ans.** Sodium bicarbonate solution; It contains a base while others contain acids.

2. Milk of magnesia, sodium bicarbonate solution, soap solution, sugar solution

**Ans.** Sugar solution; It is acidic while others are basic in nature.

## J. Skill-based questions.

1. Why does a turmeric stain on a white shirt turn red when washed with soap?

**Ans.** Soap is basic in nature. When a turmeric stain on a white shirt is washed with soap, it turns red as turmeric turns red in basic solutions.

2. Five solutions have been labelled as A, B, C, D and E. They have been tested with four indicators – methyl orange, phenolphthalein, blue litmus paper and red litmus paper. The observations have been recorded in the following table. Think and answer the questions that follow:

Solution	Methyl orange	Phenolphthalein	Blue Litmus	Red Litmus
A	red	colourless	red	red
B	red	colourless	red	red
C	yellow	pink	blue	blue
D	orange	colourless	blue	red
E	red	colourless	red	red

(a) Which solution is a base? Which solution is neutral? How many acids have been tested?

(b) What would be the colour of turmeric paper indicator in solution C?

(c) Which of the following solutions can be used for neutralisation?

- (i) A and B      (ii) C and B  
(iii) C and D    (iv) D and E?

**Ans.** (a) ● Solution C is a base.  
● Solution D is neutral.  
● Three acids – A, B and E have been tested.

(b) Red

(c) (ii) C and B

## K. Activity/Project–Do as directed.

Perform an activity to show that an acid neutralises the property of a base.

**Ans.** Do it yourself.

## Think Zone

1. One day, Ritu got a wasp sting. Her mother advised her to apply some vinegar on the affected area. Why?

**Ans.** This is because the sting of a wasp is basic in nature. On applying vinegar (which is acidic in nature), the basic effect of wasp sting is neutralised and hence, the pain gets relieved.

2. Doctors advise to take antacid tablets in indigestion. Why?

**Ans.** If a person overeats, too much acid is produced in the stomach. This causes indigestion. Doctors advise to take antacid tablets to neutralise the excess acid formed in the stomach as antacid tablets contain a base.



# Physical and Chemical Changes

# 7

## ANSWERS

### Check Point 1

**1. What do you understand by a physical change?**

**Ans.** A change in which no new substance is formed is called a physical change. A physical change is usually a reversible change.

**2. Give three examples of physical changes, other than those studied in the chapter.**

**Ans.** (a) Breaking of a glass  
(b) Melting of wax  
(c) Beating aluminium to make aluminium foil

**3. What do you understand by a chemical change?**

**Ans.** A change in which a new substance is formed is called a chemical change. A chemical change is usually an irreversible change.

**4. Give three examples of chemical changes, other than those studied in this chapter.**

**Ans.** (a) Digestion of food  
(b) Photosynthesis  
(c) Burning of dry leaves

**5. Classify the following changes as physical or a chemical change.**

**Burning of a magnesium ribbon, dissolving sugar in water, burning sugar, melting of butter, breaking of a glass bottle, clothes being ironed, wool being knitted into a sweater, souring of milk, drying of wet hair**

**Ans. Physical changes:** Dissolving sugar in water, melting of butter, breaking of a glass bottle, clothes being ironed, wool being knitted into a sweater, drying of wet hair

**Chemical changes:** Burning of a magnesium ribbon, burning sugar, souring of milk

### Check Point 2

**1. Write the equation of the reaction taking place between baking soda and vinegar.**

**Ans.** 
$$\text{NaHCO}_3 + \text{CH}_3\text{COOH} \longrightarrow \text{CO}_2 + \text{CH}_3\text{COONa} + \text{H}_2\text{O}$$
  
Baking soda                  vinegar                  carbon dioxide                  sodium acetate                  water

**2. What is rust?**

**Ans.** Rust is a reddish-brown substance that appears on the surface of iron articles when they are left exposed to moist air.

### 3. What is an alloy?

**Ans.** An alloy is a mixture of metals (or metals and a nonmetal).

### 4. How are crystals formed?

**Ans.** Crystals of pure substances can be formed by cooling their saturated solutions. This process is called crystallisation.

## PRACTICE TIME

### A. MCQs—Choose the correct answers.

- Which of the following is a chemical change?  
(a) melting of ice cream (b) ironing of clothes  
(c) burning of petrol  (d) drying of hair
- Which of these cannot prevent rusting of iron?  
(a) galvanisation (b) alloying (c) cooking  (d) greasing
- The gas produced when zinc reacts with dilute hydrochloric acid is  
(a) carbon dioxide (b) hydrogen   
(c) oxygen (d) none of these
- Most physical changes are  
(a) irreversible (b) permanent (c) reversible  (d) none of these
- Which elements are used in making iron sulphide?  
(a) iron (b) sulphur  
(c) both (a) and (b)  (d) none of these

### B. Fill in the blanks.

- Most chemical changes are irreversible, whereas most physical changes are reversible.
- Mixing of iron and sulphur is a physical change, whereas heating of iron and sulphur is a chemical change.
- Magnesium hydroxide is formed when magnesium oxide is dissolved in water.
- Rusting of iron is a chemical change, whereas boiling of milk is a physical change.
- Carbon dioxide gas turns limewater milky. A chemical change takes place.

### C. Write True or False against each statement.

- The process of depositing a layer of iron on zinc article is called galvanisation. False
- Only dry air is needed for rusting to take place. False
- Rusting of iron is a physical change. False
- Stainless steel does not rust. True
- Burning of a substance is a chemical change. True

### D. Answer in one word.

- The kind of change in burning of a substance. Chemical
- The kind of change in rusting of iron. Chemical
- A metal which burns with a dazzling white flame. Magnesium
- One method which can prevent rusting. Galvanisation

**E. Define these terms.**

**1. Physical change**

**Ans.** A change in which a substance undergoes a change in shape, size or state without the formation of a new substance and is usually reversible is called a physical change.

**2. Chemical change**

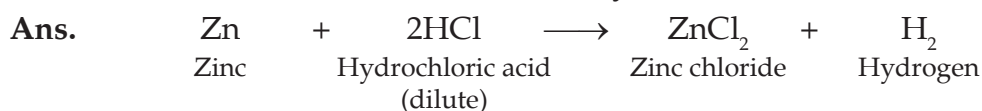
**Ans.** A change in which a new substance is formed and is usually irreversible is called a chemical change.

**3. Galvanisation**

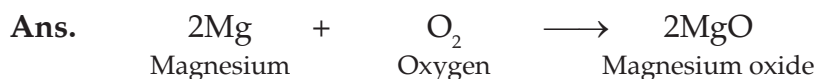
**Ans.** Galvanisation is the process of depositing a layer of zinc metal on iron to prevent it from rusting.

**F. Represent the following changes in the form of an equation.**

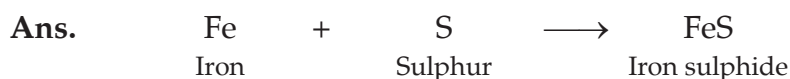
**1. Reaction between zinc and dilute hydrochloric acid**



**2. Burning of magnesium ribbon**



**3. Reaction between iron filings and sulphur**



**4. Reaction between copper sulphate solution and an iron nail**



**G. Answer these questions.**

**1. Write two differences between a physical change and a chemical change.**

**Ans.** Physical and chemical changes have following differences:

Physical change	Chemical change
1. No new substance is formed in a physical change.	1. A new substance is formed in a chemical change.
2. It is usually accompanied by a change in shape, size or state.	2. It is usually accompanied by a change in colour, release or absorption of heat or light, evolution of a gas, production of sound or change in smell.

**2. What is the need for alloying?**

**Ans.** Alloying is done to prevent rusting. Articles like scissors, blades and utensils are made by alloying.

**3. Define rust. Explain any three methods by which rusting can be prevented.**

**Ans.** Rust is a reddish-brown substance that appears on the surface of iron articles when they are left exposed to moist air.

Rusting can be prevented by the following methods:

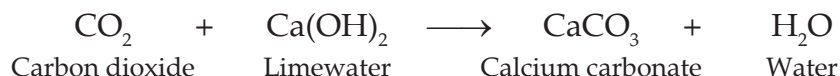
- (a) **Coating with paint:** Paint on iron articles prevents them from coming in contact with air and moisture and thus, saves from rusting.
- (b) **Coating with grease:** Applying a coat of grease on an iron article cuts off its contact with air and moisture and hence, prevents it from rusting.
- (c) **Galvanisation:** It is the process of depositing a layer of zinc on iron articles. The zinc coating does not allow the iron article to come in contact with air and moisture and hence, prevents it from rusting.

**4. What are the conditions necessary for rusting to take place?**

**Ans.** Presence of air and moisture is essential for rusting to take place.

**5. Write the kind of change between carbon dioxide and limewater with equation.**

**Ans.** The change between carbon dioxide and limewater is a chemical change.



**H. Give reasons for the following.**

**1. Iron articles are often coated with paint.**

**Ans.** Paint on iron articles prevents them from coming in contact with air and moisture and thus, saves from rusting.

**2. Carbon dioxide gas is used in fire extinguishers.**

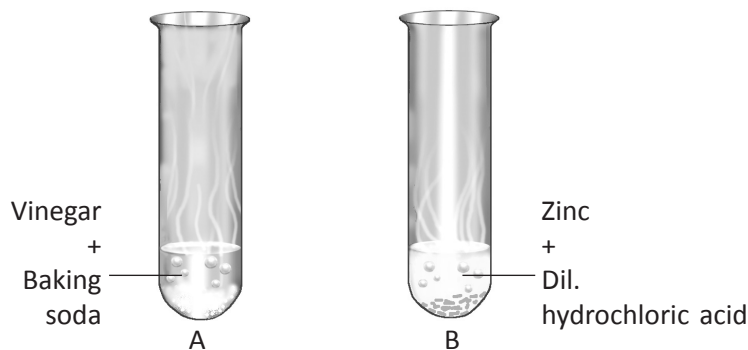
**Ans.** Carbon dioxide gas extinguishes fire, so it is used in fire extinguishers.

**I. Skill-based questions.**

**1. Teena saw that the volume of perfume in her bottle has become less after a few days. Probably, the perfume had evaporated. Is the evaporation of perfume a physical or a chemical change?**

**Ans.** Evaporation of perfume is a physical change.

**2. Both of the following chemical changes release a gas.**



**(a) Which gas is released in (i) test tube A? (ii) test tube B?**

**(b) What tests will you perform to identify these gases?**

**Ans.**(a) (i) Carbon dioxide gas is released in test tube A.

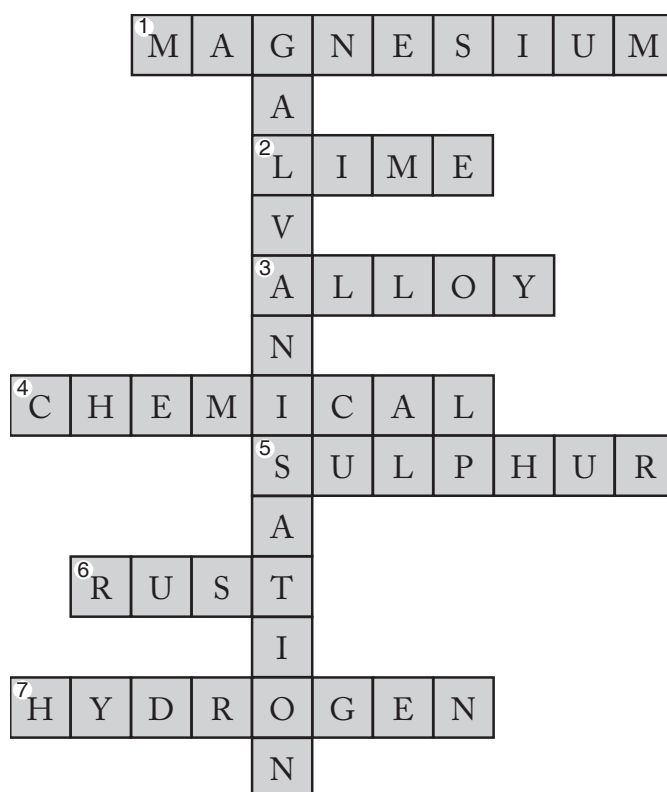
(ii) Hydrogen gas is released in test tube B.

(b) We will pass the gas evolved in test tube A into a test tube containing limewater. We will observe that limewater turns milky.

We will bring a burning matchstick or a candle near the mouth of test tube B. We will observe that the gas evolved burns with a 'POP' sound.

**J. Complete the word puzzle given here:**

1. A metal that burns with a dazzling white flame.
2. Chemically represented as CaO.
3. A substance formed by mixing metals.
4. A change in which a new substance is formed.
5. A yellow-coloured nonmetal which is mixed with rubber to harden it.
6. A reddish-brown substance formed on iron articles on exposure to moist air.
7. A gas that produces a 'pop' sound.



**K. Activity/Project—Do as directed.**

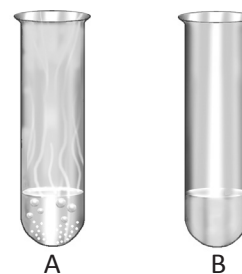
**Perform an activity to show the conditions that are necessary for rusting.**

**Ans.** Do it yourself.

**Think Zone**

1. In which of the test tubes A or B, do you think a chemical change is taking place? Why do you think so?

**Ans.** A chemical change is taking place in test tube A. This is because we can see the formation of bubbles and evolution of a gas from test tube A.



2. Before burning magnesium ribbon, we clean it with a sandpaper. Can you think of the reason?

**Ans.** We clean magnesium ribbon with a sand paper before burning to remove the oxide layer which is formed on the magnesium ribbon due to contact with oxygen present in air.

**ANSWERS****Check Point 1****1. Who are meteorologists?**

**Ans.** People who study and record weather are called meteorologists.

**2. What is the study of weather called?**

**Ans.** The study of weather is called meteorology.

**3. What is weather forecasting?**

**Ans.** The prediction or estimation of weather conditions, by a weatherman, that are likely to occur in the near future is called weather forecasting.

**4. Give any one use of weather forecasting.**

**Ans.** Weather forecasting helps people to prepare and plan their activities against bad weather.

**5. When do you find maximum temperature during the day – early morning, in afternoon or in the night?**

**Ans.** In afternoon

**Check Point 2****Fill in the blanks.**

1. Climate varies from place to place.
2. Climate of desert is hot and dry.
3. Temperature at the equator is maximum.
4. An imaginary line around the middle of the earth which divides it into two equal halves is called equator.
5. As we move above the sea level, the temperature gradually decreases.
6. The polar regions receive least amount of heat.

**PRACTICE TIME****A. MCQs–Choose the correct answers.**

1. The minimum temperature of a day is calculated during the period of  
(a) afternoon                      (b) evening                      (c) morning                       (d) noon
2. Which one of these is not a greenhouse gas?  
(a) oxygen                       (b) carbon dioxide                      (c) methane                      (d) sulphur dioxide

3. The amount of water vapour present in the air is called  
 (a) weather                      (b) climate                      (c) humidity                       (d) none of these
4. Weather is the state of the atmosphere in terms of  
 (a) humidity                      (b) temperature                      (c) wind                      (d) all of these

**B. Fill in the blanks.**

1. People who study and record temperature are called meteorologists.
2. Climate is defined as the average weather conditions at a particular place over a long period.
3. The act of predicting weather is called weather forecasting.

**C. Write True or False against each statement.**

1. Carbon dioxide is responsible for global warming. True
2. The study of weather is called geology. False
3. Oxygen is also responsible for global warming. False

**D. Answer in one word.**

1. The study of weather.

Ans. Meteorology

2. The amount of water vapour present in the air.

Ans. Humidity

**E. Define these terms.**

1. Climate

Ans. Climate of a place is defined as the average weather conditions of that place over a long period of time, say 25–30 years or more.

2. Weather

Ans. Weather is defined as the state (or condition) of the atmosphere of a particular place at a particular time in terms of humidity, cloudiness, temperature, wind, etc.

3. Meteorologists

Ans. The people who study and record the weather are called meteorologists.

**F. Answer these questions.**

1. Weather is an important part of our lives. Justify the statement.

Ans. Weather affects our life in many ways. We wear clothes and eat food according to the weather. In hot weather, we feel comfort in wearing light-coloured cotton clothes and eat ice-cream, etc., whereas in cold weather, we wear warm clothes and take hot food and drinks. Weather also controls our life activities. We plan our day according to weather. During rain, cold or hot weather, we prefer to stay indoor while in pleasant weather, we are more energetic and go outdoor to play or for doing everyday life activities.

2. What are the effects caused due to bad weather?

Ans. Bad weather has following effects:

- (a) Shipwrecks may occur due to stormy weather.
- (b) Crops may get destroyed when the weather is too hot or too cold.
- (c) Droughts and floods may cause great loss to crops, life and property.

**3. What is the difference between weather and climate?**

**Ans.** Weather is the state (or condition) of the atmosphere of a particular place at a particular time in terms of humidity, cloudiness, temperature, wind, etc. On the other hand, climate is the average weather conditions at a particular place over a long period of time, say 25–30 years or more.

**4. List any three ways by which weather forecasting can be helpful.**

**Ans.** (a) Weather forecasting allows people to prepare for bad weather.  
(b) It is helpful to protect life and property.  
(c) It is helpful to plan activities and events.

**5. How does the weather of a place affect the lives of people?**

**Ans.** The weather of a place affects the lives of people in many ways. It affects the choice of food, clothes and life style of people. For example, in cold weather, people wear woollen clothes, eat nuts, etc., drink hot beverages and prefer to stay indoor, whereas in pleasant weather, they eat all types of food, wear cotton clothes and mostly plan outdoor activities.

**G. Give reasons for the following.**

**Weather forecasting is very useful to people.**

**Ans.** Weather forecasting is very useful to people because it helps them to plan activities and events. It is helpful in protecting life and property.

**H. Skill-based questions.**

**The more carbon dioxide in the atmosphere, more is the temperature of the earth. Do you think deforestation can be a cause of increased level of carbon dioxide in the air?**

**Ans.** Yes, deforestation is a cause of increased level of carbon dioxide in the air because green plants absorb carbon dioxide from the air for the process of photosynthesis.

**I. Activity/Project–Do as directed.**

**Prepare a project report on the accuracy of weather forecast for at least a week that is forecasted through radio and TV.**

**Ans.** Do it yourself.

**Think Zone**

**1. Can deforestation lead to change in weather?**

**Ans.** Yes, deforestation can lead to change in weather. It increases carbon dioxide level in the air. Carbon dioxide gas in air traps the heat causes greenhouse effect which results in warm weather and climate change.

**2. Humidity is very high in the coastal areas. Can you think, why?**

**Ans.** In coastal areas, the sea breeze brings moisture with it. So, there is very high humidity in these areas.

**3. Does weather affect the growing of crops? How?**

**Ans.** Yes, dry and hot weather causes wilting of plants, whereas very cold weather reduces the activity of plant cells which results in reduced growth.



# Adaptations of Animals to Climate

9

## ANSWERS

### Check Point 1

**1. What are adaptations?**

**Ans.** Adaptations are modifications in living organisms that enable them to survive in changed environment.

**2. Why does a camel have padded limbs?**

**Ans.** Camel has large pads on its limbs which help it to walk easily on hot and loose sand.

**3. What makes the body of a penguin waterproof?**

**Ans.** Penguins have short and thick feathers which make their body waterproof.

**4. What do you understand by migration?**

**Ans.** The mass movement of birds or animals in groups from their native place to another, during harsh environment, for food and reproduction and back to their native place when harsh environmental conditions are over is called migration.

### Check Point 2

**Fill in the blanks.**

1. Tropical rainforests are located around the equator.
2. Animals living on trees are called arboreal.
3. Some animals have ability to camouflage with their environment.
4. Ears of elephant help in regulating body temperature.

### PRACTICE TIME

**A. MCQs—Choose the correct answers.**

1. The elephant lives in  
(a) tundra region (b) hilly forests  
(c) Indian forests  (d) deserts
2. Penguins are adapted to live in the region of  
(a) equatorial (b) rainforests (c) antarctic  (d) desert climate
3. Streamlined body and webbed feet are adaptations for  
(a) swimming  (b) running (c) flying (d) climbing

4. Destination of migratory birds in north India includes
  - (a) Bharatpur
  - (b) Bharatpur and Sultanpur
  - (c) Bharatpur and Chandigarh
  - (d) Sultanpur and Jodhpur
5. Bird 'toucan' possesses long and large
  - (a) hand
  - (b) beak
  - (c) leg
  - (d) none of these
6. The maximum distance travelled by migratory birds is recorded to be
  - (a) 15,000 km
  - (b) 12,000 km
  - (c) 8,500 km
  - (d) 9,000 km
7. Animals living in this geographical region have fur and a layer of fat below skin.
  - (a) polar
  - (b) desert
  - (c) evergreen forest
  - (d) grasslands
8. 'The ship of desert' is
  - (a) horse
  - (b) camel
  - (c) cat
  - (d) elephant

**B. Fill in the blanks.**

1. Two regions on the earth with extreme climatic conditions are north pole and south pole.
2. Camel's skin is without sweat glands.
3. Furry skin is found in polar animals.
4. Animals living on trees show arboreal adaptations.

**C. Match the columns.**

- | Column A                | Column B                |
|-------------------------|-------------------------|
| 1. Kangaroo rat         | (a) Tropical rainforest |
| 2. Polar bear           | (b) Polar animals       |
| 3. Thick vegetation     | (c) Broad paw           |
| 4. Flap on the nostrils | (d) Desert areas        |
| 5. Subcutaneous fat     | (e) Camel               |

**D. Write True or False against each statement.**

1. Monkeys have a long nose and a short tail. False
2. Tiger has stripes on the back to camouflage with the dry grass. True
3. Thick fur in polar birds like penguins protects the bird from severe winter. False
4. Animals of tropical forests need to conserve water. False
5. Polar bears have wide paws to swim. False

**E. Answer in one word.**

1. Animals that become active and feed at night. Nocturnal
2. The animal that preys on some other animals. Predator
3. Movement of animals or birds in groups for feeding or reproductive grounds. Migration
4. Habitats having large variety of plants and animals and rain throughout the year. Tropical rainforests
5. Hands and feet that are adapted to holding tree twigs. Grasping limbs

**F. Define these terms.**

**1. Adaptation**

**Ans.** Adaptations are modifications in living organisms that enable them to survive in changed environment.

**2. Migration**

**Ans.** The mass movement of birds or animals in groups from their native place to another, during harsh environment, for food and reproduction and back to their native place when harsh environmental conditions are over is called migration.

**G. Answer these questions.**

**1. What are tropical rainforests? Name two forest animals from India.**

**Ans.** Tropical rainforests are the hot and humid forests where rainfall occurs in plenty round the year. They are located around the equator. The temperature in these forests during summer is above 40°C and in winter is around 15°C.

Monkey and snakes are common animals found here.

**2. Define camouflaging. What is its use to animals?**

**Ans.** Camouflaging is the merging of body colour of an organism with its surroundings. It enables a predator animal to locate its prey without being noticed while protects a prey from its predator by not being spotted out easily.

**3. Mention adaptations to desert life in camels.**

**Ans.** Camels have following adaptations for desert life:

- (a) Limbs of camel have large pads which help it to walk easily on hot and loose sand.
- (b) It has a hump that stores food in the form of fat. Therefore, camel can survive without food for long.
- (c) Camel drinks large quantity of water (up to 40 litres at one time) and stores it in the water cells of stomach wall.
- (d) The nostrils of camel have flaps which close the nostrils during a dust storm.
- (e) Camel can adjust its body temperature according to the surrounding air.

**4. Describe arboreal adaptations in any two animals.**

**Ans.** (a) **Arboreal adaptations in monkeys:** Monkeys have a long and coiled prehensile tail for grasping tree branches. Their hands and feet are also modified to hold on to the branches, i.e., they have grasping feet with opposable thumb.

(b) **Arboreal adaptations in Red-eyed frog:** Red-eyed frogs have sticky pads on the tips of digits. These pads help them to cling and climb on the trees.

**5. How is polar bear adapted to live in arctic region?**

**Ans.** A polar bear has following adaptations to live in arctic region:

- (a) Thick fur on the body and a thick layer of fat under the skin insulate its body and protect it from extreme cold.
- (b) Its large wide paws with claws help it to walk on snow, dig snow, hold the prey and in self-defence.

- (c) White fur protects polar bear from its enemies and helps in catching prey by camouflaging.
- (d) It has keen sense of smell to locate its enemy and prey.
- (e) During winter, it sleeps in its den and survives on stored body fat until spring.

#### **H. Give reasons for the following.**

##### **1. Desert plants are spiny and succulent.**

**Ans.** Desert climate is hot and dry. Therefore, to prevent water loss, the leaves of most desert plants become spiny. The leaves, roots and stem of some desert plants store water and become succulent.

##### **2. Camel has a big hump.**

**Ans.** The hump of a camel stores fat. It gives energy to camel when food is not available. Thus, it helps camel survive without food for long.

##### **3. Desert animals remain buried in sand.**

**Ans.** Desert animals remain buried in sand during daytime to protect themselves from scorching heat of the sun.

##### **4. Monkeys have a long prehensile tail.**

**Ans.** Monkeys are arboreal animals. They have to move through branches of trees in search of food, shelter, etc. A long and prehensile tail helps them grasping tree branches and acts as an additional hand.

##### **5. Some frogs have sticky pads on the digits.**

**Ans.** Sticky pads on the digits of some frogs help them to cling and climb on the trees.

##### **6. Birds from arctic region migrate during winter.**

**Ans.** Birds in arctic region cannot tolerate extreme cold of winter. They do not find their food during winter. Therefore, they migrate to warmer regions where they get plenty of food and are protected from severe winter.

#### **I. Skill-based questions.**

##### **1. Why are desert animals nocturnal?**

**Ans.** Deserts are very hot. So, animals remain inactive and hidden in the burrows during daytime to avoid scorching sun and become active at night when it is cool. Therefore, they are nocturnal.

##### **2. Frogs, snakes and lizards disappear during winter. Why?**

**Ans.** Frogs, snakes and lizards are cold-blooded animals. Their body temperature changes with the atmospheric temperature. Therefore, during winter they undergo hibernation, i.e., they hide themselves in moist and comparatively warmer places.

##### **3. Why do birds from Siberia and Arctic region come to warmer places like India during the months of December and January?**

**Ans.** Birds living in Siberia and Arctic region are unable to tolerate extreme cold of winter. Also, they do not find their food in winter. Therefore, they migrate southward to warmer regions where they get plenty of food and are protected from severe winter.

**J. Activity/Project–Do as directed.**

**Prepare a project report on animals living in tropical rainforests.**

**Ans.** Do it yourself.

**Think Zone**

**1. Penguins live in groups. Why?**

**Ans.** Living in groups and being huddled together keeps penguins warm in severe cold and prevents heat loss from the body.

**2. Skin of camel is without hair. Why?**

**Ans.** Hair or fur coating develops as heat insulator to prevent the loss of body heat and is more developed in animals living in colder regions. Camel lives in warm deserts. It does not need hair to conserve heat loss. Hence, hair are not found on camel's skin.

**3. Arboreal animals have long and prehensile tail. Why?**

**Ans.** In arboreal animals, the long and prehensile tail is used to grasp tree branches. Thus, it acts as an additional hand.

## ANSWERS

Check Point 1

## Fill in the blanks.

1. The envelope of air surrounding the earth is called atmosphere.
2. Moving air lowers the pressure of the area it occupies.
3. Air expands on heating.
4. The movement of air takes place due to convection currents.

Check Point 2

## 1. Answer the following questions.

- (a) What are monsoon winds?
- (b) What causes lightning during a thunderstorm?
- (c) What is a cyclone?
- (d) What is a typhoon?

- Ans.
- (a) Winds that carry a lot of moisture are called monsoon winds.
  - (b) The movement of rapidly rising warm air and the falling droplets of water creates lightning during a thunderstorm.
  - (c) A cyclone is a violent storm with an intense spiral, accompanied by strong winds and heavy rains.
  - (d) In Japan, a cyclone is called a typhoon.

## 2. Fill in the blanks.

- (a) Moisture-laden winds are called monsoon winds.
- (b) Cyclones are generally accompanied by strong winds and heavy rains.

PRACTICE TIME

## A. MCQs—Choose the correct answers.

1. Which of the following is not a characteristic of air?
 

(a) air exerts pressure	(b) air contracts on heating <input checked="" type="checkbox"/>
(c) warm air is lighter than cold air	(d) air has weight
2. Which of the following plays a major role in the formation of a thunderstorm?
 

(a) conduction	(b) convection <input checked="" type="checkbox"/>	(c) radiation	(d) none of these
----------------	--	---------------	-------------------

3. Which of the following should not be done during a thunderstorm?
  - (a) getting into a car
  - (b) getting out of water and going inside a building
  - (c) taking shelter under an umbrella with a metallic end
  - (d) shutting windows and doors tightly
4. The direction of the wind depends on the
  - (a) temperature
  - (b) air pressure
  - (c) volume
  - (d) both (a) and (b)
5. Moving air lowers the pressure of
  - (a) area
  - (b) volume
  - (c) temperature
  - (d) none of these
6. When the air becomes warm, it becomes
  - (a) heavier
  - (b) neutral
  - (c) lighter
  - (d) none of these
7. Cyclones are accompanied by
  - (a) strong winds
  - (b) heavy rains
  - (c) both of these
  - (d) none of these

**B. Fill in the blanks.**

1. Winds always move from a region of high pressure to a region of low pressure.
2. Moving air is called wind.
3. The land near the equator becomes warm faster than the water in the ocean in summer.
4. Winds that carry a lot of moisture are called monsoon winds.
5. High speed winds are accompanied by reduced air pressure.
6. A thunderstorm is a storm accompanied by lightning and thunder.
7. The centre of the cyclone is a cloudless, calm area called the eye.
8. Storm surges cause an abnormal rise in the level of sea water in the coastal areas.

**C. Write True or False against each statement.**

1. It is easier to fly kite when the wind is blowing from behind you. True
2. Winds are caused due to change in temperature and pressure in the air. True
3. The region where air pressure is low is called anticyclone. False
4. Cyclones are known as typhoons in Japan. True

**D. Answer in one word.**

1. The envelope of the air that surrounds our earth. Atmosphere
2. This is caused by weight of air acting on a surface. Air pressure
3. They are accompanied by reduced air pressure. Winds
4. This is a violent, dark and funnel-shaped cloud. Tornado

**E. Define these terms.**

**1. Tornado**

**Ans.** A tornado is a violent, dark funnel-shaped cloud extending from a thunderstorm that reaches the ground from the sky.

**2. Thunderstorm**

**Ans.** A storm accompanied by lightning and thunder is called a thunderstorm.

**F. Answer these questions.**

**1. Give an activity to demonstrate that air exerts pressure.**

**Ans.** Activity to demonstrate that air exerts pressure:

Take a glass and fill water up to its brim. Place a piece of cardboard over the top of the glass. Now, holding the cardboard in place, turn the glass upside down. Remove your hand gently away from the cardboard. You will observe that water stays in the glass. This shows that air exerts pressure.

**2. Suggest an activity to demonstrate that moving air lowers the pressure of the area it occupies.**

**Ans.** Activity to show that moving air lowers the pressure of the area it occupies:

Take two ping-pong balls and hang them about 10 cm away from each other with the help of a thread. Blow air between the two balls. When air is blown, the air pressure between the balls is reduced and the balls come close to each other. This proves that moving air lowers the pressure of the area it occupies.

**3. How can you show that air expands on heating?**

**Ans.** Air expands on heating can be shown by following activity:

Take a small glass bottle and tie a balloon tightly on its neck. Place this bottle in a container having hot water for some time. You will observe that the balloon blows up.

This is because the air inside the bottle gets heated up by the hot water. It becomes lighter and less dense, i.e., expands. As a result, it gets filled in the balloon.

**4. What precautions will you take during a thunderstorm if you are inside your house?**

**Ans.** Following precautions should be taken during a thunderstorm when inside home:

- (a) Close the windows and doors tightly.
- (b) Do not touch electrical equipments or telephones.
- (c) Keep listening to a battery operated radio for the latest information.

**5. Define cyclones. How are they caused?**

**Ans.** A cyclone is a violent storm with an intense spiral which is accompanied by heavy rains. Cyclones are caused by strong winds blowing around a central area having low atmospheric pressure.

**6. What do you understand by the eye of a cyclone?**

**Ans.** The centre of a cyclone which is a cloudless calm area is called eye of the cyclone.

**7. What are the dangers associated with cyclones?**

**Ans.** Following dangers are associated with cyclones:

- (a) Cyclones can uproot trees, collapse houses and buildings and topple electric poles. Hence, they can destroy life and property.
- (b) They can cause storm surge which would result in loss of property, human lives, livestock and destruction of vegetation.
- (c) They can cause prolonged heavy rains which may lead to floods.
- (d) The rail and road transport may remain blocked by flood water even after cyclone is over.



**8. What safety measures should be taken to prevent cyclone disaster?**

**Ans.** Following safety measures should be taken to prevent cyclone disaster:

- (a) Construction of storm shelters.
- (b) Afforestation, i.e., planting trees on a large-scale.
- (c) Connecting roads help in evacuating people quickly to safer areas.
- (d) Warnings should be given rapidly and repeatedly to general public, fishermen, etc. through cyclone forecast services.
- (e) Generating public awareness through informative brochures, pamphlets, talk shows, etc. on media.

**G. Give reasons for the following.**

**1. The ping-pong balls are pushed towards each other when blowing between these balls.**

**Ans.** When you blew between the ping-pong balls, the air pressure between them gets reduced. The air pressure outside the balls is higher. This pushes the balls towards each other.

**2. When you put bag just above the candle, it pushes bag upwards.**

**Ans.** The warm air is lighter and tends to rise up. When we put a paper bag just above the candle, the warm air over the candle flame pushes the bag upwards.

**H. Skill-based questions.**

**1. How does a vacuum cleaner work?**

**Ans.** A vacuum cleaner works on the principle of air pressure. The air pressure outside the vacuum cleaner is higher than the air pressure inside it. This helps the vacuum to suck air containing dirt into it.

**2. Look at the following picture, and answer the questions that follow:**

**(a) How is the boy able to drink water with the help of a straw?**

**(Hint: When you suck through the straw, the air inside the straw gets removed.)**



**(b) The girl is finding it difficult to drink with the straw as the straw has a small hole in it. Can you explain, why?**

**Ans.** (a) When the boy sucks through the straw, the air inside the straw gets removed causing air pressure inside the straw to be reduced. The air pressure over the water in the bottle continues to be exerted. Since this air pressure is more than the air pressure in the straw, the pressure difference causes the water to move in the upward direction and pushes it up into the mouth of the boy.

(b) If the straw has a hole in it, no air pressure imbalance is created. As a result, upward force on the water column is not exerted and the water is not pushed into the mouth of the girl.

**I. Activity/Project–Do as directed.**

- 1. Perform an activity to show that air expands on heating.**
- 2. Perform an activity to show that direction of wind depends on the temperature and the air pressure.**

**Ans.** Do yourself.

**Think Zone**

- 1. Thunder is always accompanied by lightning. But we see the lightning first and hear the thunder later. Can you think, why is it so?**

**Ans.** We see lightning first and hear the thunder later because the speed of light is greater than the speed of sound.

- 2. Can you tell the direction of wind by watching the smoke that comes out from the tall chimneys of factories?**

**Ans.** Yes, the smoke always moves in the direction of wind.

- 3. Can you guess the direction of wind by watching the movement of clouds in the sky?**

**Ans.** Yes, the clouds move in the direction of wind.

- 4. Does air pressure help the birds to fly? How?**

**Ans.** Yes, the special shape of the bird's wings causes the air pressure above the wings to be lower than the air pressure below the wings. This difference in air pressure helps the birds to fly.

- 5. Aeroplanes do not flap their wings like birds. How do they lift up?**

**Ans.** The air above the wings of an aeroplane moves faster than the air below the wings. The faster the air moves, the lower its pressure becomes. So, the faster moving air above the wings has less pressure than the slower moving air below the wings. This difference in air pressure above and below the wings creates a lifting force on the wings. This is how the aeroplanes lift up.

## ANSWERS

Check Point 1

## 1. Match the following.

- |               |   |  |
|---------------|---|--|
| (a) Soil      | — | dead and decaying organic matter present in soil |
| (b) Humus     | — | natural habitat for many plants and animals      |
| (c) Earthworm | — | lighter in colour                                |
| (d) B-horizon | — | rich in humus                                    |
| (e) A-horizon | — | friends of farmers                               |

## 2. Give one word for the following.

- |  |                             |
|--|-----------------------------|
| (a) Dead and rotting remains of plants and animals                   | <u>Humus</u>                |
| (b) Parent rock  | <u>Bedrock</u>              |
| (c) The darkest layer of soil  | <u>Topsoil or A-horizon</u> |
| (d) An organism that lives in soil                                   | <u>Earthworm</u>            |
| (e) Breaking down of small particles by the action of water and wind | <u>Weathering</u>           |

Check Point 2

## Name the following.

- |   |                    |
|---|--------------------|
| 1. Soil that can hold much water but is not well-aerated.                 | <u>Clayey soil</u> |
| 2. Soil that has the right water holding capacity and has sufficient air. | <u>Loamy soil</u>  |
| 3. Soil that is well-aerated but cannot hold much water.                  | <u>Sandy soil</u>  |
| 4. Soil that is considered the most fertile.                              | <u>Loamy soil</u>  |
| 5. Soil that is difficult to plough.                                      | <u>Clayey soil</u> |

Check Point 3

## Fill in the blanks.

- Topsoil is very fertile.
- Removal of topsoil is called soil erosion.
- Overgrazing removes vegetation cover from the topsoil.
- Cutting down trees on a large-scale is called deforestation.

## PRACTICE TIME

### A. MCQs—Choose the correct answers.

- Which of these soil particles contain the largest rock particles?  
(a) silt (b) clay (c) sand (d) gravel
- The darkest layer of soil is  
(a) subsoil (b) bedrock (c) C-horizon (d) topsoil
- Which of the following soils is the best for growing crops?  
(a) sandy (b) clayey  
(c) loamy  (d) none of these
- Which soil contains sand, silt and clay in right proportions?  
(a) sandy (b) loamy   
(c) clayey (d) none of these
- Which of these soil particles contains smallest rock particles?  
(a) sand (b) clay  (c) gravel (d) silt
- This soil is well-aerated.  
(a) sandy  (b) loamy (c) clayey (d) none of these
- This soil has the largest space between their particles.  
(a) clayey (b) sandy  (c) loamy (d) none of these

### B. Fill in the blanks.

- B-horizon is lighter in colour because of the presence of less amount of humus.
- Sandy soil cannot hold much water.
- Clayey soil is not well-aerated.
- Soil has many pores which allow water to flow down.
- The removal of topsoil by either strong winds, flowing river water or rain is called soil erosion.
- The cutting down of trees on a large-scale is called deforestation.
- Loamy soil is the most fertile soil.

### C. Write True or False against each statement.

- C-horizon is the layer of soil which is rich in humus. False
- The subsoil (B-horizon) is darker than topsoil (A-horizon). False
- Humus makes the soil fertile. True
- Loamy soil has the right water holding capacity. True

### D. Answer in one word.

- This is the topmost layer of the soil. Topsoil (A-horizon)
- This layer of soil is called the parent rock. Bedrock
- This is the dead and decaying remains of plants and animals present in the soil. Humus
- This can lead to floods, famines and landslides. Soil erosion

**E. Define these terms.**

**1. Soil**

**Ans.** Soil is the natural resource present on the uppermost layer of the earth's surface which is capable of supporting life.

**2. Humus**

**Ans.** The dead and decaying organic matter present in the soil is called humus.

**3. Weathering**

**Ans.** The process of breakdown of rocks into fine particles by the action of water and wind is called weathering.

**4. Soil erosion**

**Ans.** The removal of topsoil by either strong winds, flowing river water or rain is called soil erosion.

**F. Differentiate between the following.**

**1. Sandy soil and clayey soil**

**Ans.** Differences between sandy soil and clayey soil:

Property	Sandy soil	Clayey soil
1. Main constituent	Large-sized sand particles	Small-sized clay particles
2. Space between particles	Quite large	Quite less
3. Presence of air	Well-aerated	Can hold sufficient air
4. Water holding capacity	Cannot hold much water	Can hold much water
5. Nutrients	Cannot hold nutrients	Can hold nutrients
6. Ploughing	Easy to plough	Difficult to plough

**2. Clayey soil and loamy soil**

**Ans.** Differences between clayey soil and loamy soil:

Property	Clayey soil	Loamy soil
1. Main constituent	Small-sized clay particles	Clay, sand and silt present in right proportions
2. Space between particles	Quite less	Sufficient
3. Presence of air	Can hold sufficient air	Well-aerated
4. Water holding capacity	Can hold much water	Right water holding capacity
5. Nutrients	Can hold nutrients	Can hold nutrients
6. Ploughing	Difficult to plough	Easy to plough

**G. Give reasons for the following.**

**1. Humus is important for the soil.**

**Ans.** Humus is important for the soil because it contains all the nutrients required by plants. It improves water-holding capacity of the soil and provides food to soil organisms such as earthworms, beetles, millipedes, etc.

**2. We should look after the soil.**

**Ans.** We should look after the soil because of the following reasons:

- (a) Soil is a natural resource which supports life on the earth.
- (b) We get food from the plants which grow in the soil.
- (c) It is a home for millions of organisms.
- (d) It takes millions of years to the soil to get formed and we cannot replace it in our lifetime.

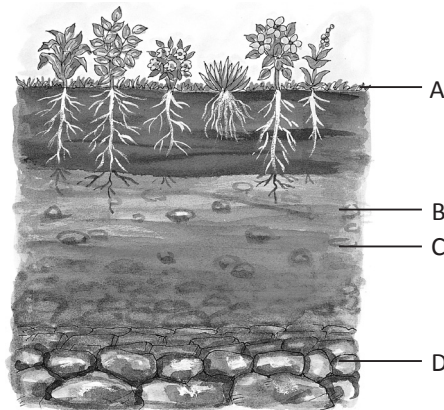
**3. Sandy soil is well-aerated.**

**Ans.** Sandy soil has large gaps between its particles which are filled with air. Therefore, sandy soil is well-aerated.

**4. Air is an important part of soil.**

**Ans.** Air is an important part of soil because the roots of plants and the organisms living in the soil use the air present between the soil particles for respiration.

**H. Look at the following diagram and answer the questions.**



**1. Label the parts A, B, C and D.**

**Ans.** A–Topsoil or A-horizon, B–Subsoil or B-horizon, C–Weathered parent rock or C-horizon, D–Bedrock

**2. Which layer is a home for living organisms – A or C?**

**Ans.** Layer A, i.e., topsoil is a home for living organisms.

**3. Which layer is the darkest?**

**Ans.** Topsoil is the darkest layer of the soil.

**4. Which layer is made of small lumps of rocks – C or D?**

**Ans.** Layer C, i.e., C-horizon is made of small lumps of rocks.

## I. Answer these questions.

### 1. What is the importance of soil? How can we say that soil contains water?

**Ans.** Importance of soil:

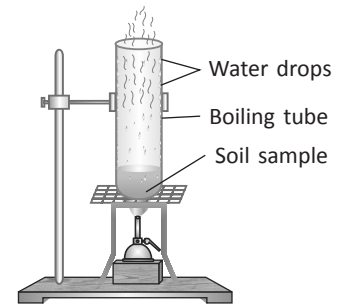
- (a) Soil provides plants a surface to grow.
- (b) It provides nutrients required by plants to grow.
- (c) It gives surface to roots of plants for anchorage.
- (d) It is a habitat for millions of organisms.

Soil contains water can be shown by the following activity:

Take a boiling tube. Put two spoonfuls of soil in it. Heat the boiling tube on a flame and observe.

On heating, water in the soil evaporates and condenses on the inner walls of the boiling tube on the upper side.

This shows that soil contains water.



### 2. What is the importance of humus?

**Ans.** Humus makes the soil fertile as it contains all the nutrients required by the plants to grow.

### 3. How can we say that air is present in soil?

**Ans.** If we pour some water over the soil, some air bubbles are seen coming out of it. This shows that air is present in soil.

### 4. Write the characteristics of A-horizon and B-horizon.

**Ans.** (a) **Characteristics of A-horizon:**

- It is rich in humus.
- It is rich in minerals needed by plants for their growth.
- It is soft and porous.
- It is darker than other layers.
- A-horizon is the home of many living organisms like insects and worms. The roots of plants grow in this layer of soil.

(b) **Characteristics of B-horizon:**

- B-horizon has a very small population of living organisms and is less fertile as compared to A-horizon.
- It contains comparatively less amount of humus.
- It is rich in minerals.
- It is generally harder and more compact than topsoil.
- It is lighter in colour because of the presence of less amount of humus.

### 5. What is soil erosion? What are the factors that lead to soil erosion?

**Ans.** The removal of topsoil by either strong winds, flowing water or rain is called soil erosion. Following factors lead to soil erosion:

- (a) A bare land which is not covered by trees or grass leads to soil erosion.
- (b) Overgrazing, excessive ploughing and deforestation lead to soil erosion.

**6. Why is loamy soil considered as the most fertile soil?**

**Ans.** Loamy soil is considered the most fertile soil because it has following features:

- (a) Loamy soil contains clay, sand and silt in right proportions.
- (b) It has adequate air spaces between its particles, required for the growth of plants.
- (c) It has the right water holding capacity.
- (d) It can be ploughed easily.
- (e) It has necessary nutrients required for the growth of plants.

**7. How can you calculate the rate of percolation of a soil sample?**

**Ans.** The rate of percolation of a soil sample can be calculated by using the following formula:

$$\text{Percolation rate of soil} = \frac{\text{Volume of water percolated (mL)}}{\text{Percolation time (min)}}$$

**8. A soil sample takes 45 minutes to percolate 900 mL water. Find the rate of percolation of it.**

**Ans.** Given that,

$$\text{percolation time of soil sample} = 45 \text{ min}$$

$$\text{Volume of water percolated} = 900 \text{ mL}$$

$$\begin{aligned} \therefore \text{The rate of percolation of soil} &= \frac{900}{45} \\ &= 20 \text{ mL per min} \end{aligned}$$

**J. Skill-based questions.**

**1. Gardeners prefer soils that are easy to plough, contain a good balance of sand, clay and silt along with plenty of humus. What type of soil is ideal for them?**

**Ans.** Gardeners prefer loamy soil.

**2. Fertilisers contain certain minerals that are important for the proper growth of plants. But, excessive use of fertilisers is not advisable. Why?**

**Ans.** Excessive use of fertilisers damages the soil. It can change the soil chemistry by increasing the acidity or alkalinity of soil. Fertilisers are water soluble. They can leach out rapidly and can lead to soil and water pollution.

**3. Is there any alternative for fertilisers?**

**Ans.** Yes, these days crops are being produced by the method of organic farming, which does not make use of fertilisers. This method uses manure instead of fertilisers.

**4. Water drains out very quickly from sandy soil. Why this would be a disadvantage for farmers trying to grow plants in sandy soil?**

**Ans.** Since water drains out very quickly from sandy soil, it cannot hold nutrients which are essential for the growth of plants. This is a disadvantage for farmers trying to grow plants in sandy soil.



K. Find out as many terms used in the chapters as you can from the following word-maze. (There are nine in all). Also, write a few lines about them.

Ans.

H	J	L	R	N	F	Z	K	T	N
U	O	P	T	O	P	S	O	I	L
M	S	R	S	B	C	D	I	C	O
U	J	F	U	A	N	B	U	I	A
S	Q	P	B	A	O	C	A	T	M
F	T	R	S	O	I	L	N	K	Y
E	R	C	O	N	D	A	M	V	Z
G	N	S	I	L	T	Y	S	L	Y
D	P	J	L	K	T	I	J	K	N
B	E	D	R	O	C	K	H	J	W

Write about them yourself.

L. Activity/Project-Do as directed.

Perform an activity to show that different layers are present in the soil.

Ans. Do it yourself.

### Think Zone

1. We know that soil contains water. Think about the various uses which plants make of this water.

Ans. The minerals present in the soil dissolve in water. This water containing dissolved minerals is used by plants for their proper growth. Water is also utilised by plants for photosynthesis. Water present in the soil helps in the germination of seeds.

2. Soil is rich in nutrients. What are the most important nutrients required by the plants for their growth?

Ans. Plants require many nutrients for their growth. Nitrogen, phosphorus, potassium, calcium, magnesium and sulphur are required by plants in large amounts. Iron, manganese, copper, zinc, boron, molybdenum and chlorine are required by plants in small amounts.

3. How can we prevent soil erosion?

Ans. We can prevent soil erosion by the following methods:

- By afforestation
- By preventing overgrazing by cattle
- By avoiding excessive ploughing of fields.

## ANSWERS

Check Point 1

## 1. Define respiration.

**Ans.** Respiration is a process that involves intake of oxygen from environment, oxidation of food with the help of oxygen taken in, release of energy and carbon dioxide and elimination of carbon dioxide.

## 2. Which substrate is used by cells for producing energy?

**Ans.** Glucose

## 3. Give the overall reaction of respiration.

**Ans.** Glucose  $\xrightarrow[\text{of oxygen}]{\text{in the presence}}$  Carbon dioxide + Water + Energy

## 4. Why do we feel muscle cramps after a fast running?

**Ans.** During fast running, more energy is needed. This increases demand for oxygen, but supply of oxygen remains unchanged. Under shortage of oxygen, muscles respire anaerobically and glucose breaks down into lactic acid. The accumulation of lactic acid in muscles causes muscle cramps.

## 5. Give one example of an anaerobic plant and an anaerobic animal.

**Ans.** Anaerobic plant — yeast. Anaerobic animal — roundworm.

## 6. What is the end product of anaerobic respiration in skeletal muscles?

**Ans.** Lactic acid

Check Point 2

## Fill in the blanks.

1. The diaphragm is lowered during inhalation.
2. Breathing is a mechanical process.
3. Carbon dioxide turns limewater milky.
4. Exhaled air has 4.4 % of carbon dioxide and 16.4 % of oxygen.
5. Thoracic cavity is also called chest cavity.
6. During inhalation, we take fresh air into lungs.

### Check Point 3

#### Fill in the blanks.

1. Insects have tracheae as respiratory organs.
2. For respiration in earthworm, skin is moist and vascular.
3. Fishes have gills for breathing.
4. Gills are an extension of skin.

### PRACTICE TIME

#### A. MCQs—Choose the correct answers.

1. During inhalation, diaphragm and rib muscles  
(a) relaxes and contract respectively (b) both relax  
(c) contracts and relax respectively (d) both contract
2. Which of the following is not associated with respiration?  
(a) lungs (b) pharynx  (c) gills (d) tracheae
3. Exhaled air contains more  
(a) oxygen (b) carbon dioxide   
(c) nitrogen (d) none of these
4. Breathing rate per minute in humans under normal conditions is  
(a) 16–18 times  (b) 20–25 times (c) 30–32 times (d) 18–20 times
5. Which of the following respire only anaerobically?  
(a) cockroach (b) yeast  (c) fungi (d) all bacteria
6. Exchange of gases in lungs between air and blood is called  
(a) respiration (b) transpiration  
(c) external respiration  (d) internal respiration

#### B. Fill in the blanks.

1. End products of aerobic respiration are carbon dioxide, water and energy.
2. Anaerobic respiration occurs in the absence of oxygen.
3. Under normal conditions, a person breathes 16–18 times per minute.
4. Ribs and diaphragm help in the breathing movements.
5. Air gets filled in alveoli inside our lungs.
6. Chest increases in size during inhalation and decreases during exhalation.
7. Animals like cows, buffaloes, dogs, cats and birds have lungs for respiration.
8. Frogs respire through lungs and skin.
9. Aquatic animals breathe through gills.

#### C. Write True or False against each statement.

1. Plants absorb water through stomata. False
2. The air we breathe out is rich in oxygen and moisture. False
3. During fast running or heavy exercise, we breathe slowly and irregularly. False

4. Whales and dolphins have lungs but breathe through their skin. False
5. Tracheae have large surface area for gas exchange. True
6. Plants carry out photosynthesis only during daytime and respiration only at night. False

**D. Match the columns.**

- | Column A               | Column B                  |
|------------------------|---------------------------|
| 1. Opening of tracheae | (a) Old stem              |
| 2. Moist skin          | (b) Oxygen from soil      |
| 3. Lactic acid         | (c) Trachea               |
| 4. Lenticel            | (d) Green leaves          |
| 5. Gills               | (e) Muscle fatigue        |
| 6. Windpipe            | (f) Spiracle              |
| 7. Root hair           | (g) Oxygen from water     |
| 8. Stomata             | (h) Cutaneous respiration |

**E. Answer in one word.**

1. The tubes that carry air from outside to lungs. Trachea
2. The air sacs in the lungs. Alveoli
3. The muscular partition between thoracic cavity and abdominal cavity. Diaphragm
4. The exchange of gases between blood and tissue cells. Internal respiration
5. The gas which turns limewater milky. Carbon dioxide
6. The air tubes of insects. Tracheae
7. The apertures on the sides of insect body. Spiracles
8. Respiratory organs of fish. Gills
9. Tiny pores on the surface of leaves. Stomata

**F. Define these terms.**

**1. Fermentation**

**Ans.** The anaerobic breakdown of sugars into ethyl alcohol and carbon dioxide is called fermentation.

**2. Spiracles**

**Ans.** The small apertures on the sides of insect body are called spiracles.

**3. Inhalation**

**Ans.** Taking in air rich in oxygen into the lungs is called inhalation.

**4. Exhalation**

**Ans.** Giving out air rich in carbon dioxide from the lungs is called exhalation.

**G. Differentiate between the following.**

**1. Respiration in animals and plants**

**Ans.** Animals have special respiratory organs through which they exchange gases. They take oxygen and give out carbon dioxide all the time. On the other hand, plants do not have

respiratory organs. Each part of a plant can independently take in oxygen from the surrounding air and give out carbon dioxide. Also, plants neither take oxygen from air nor release carbon dioxide into the air during daytime because carbon dioxide formed during respiration is used for photosynthesis and oxygen produced during photosynthesis is utilised for respiration.

## 2. Aerobic and anaerobic respiration

**Ans.** Aerobic and anaerobic respiration have following differences:

Aerobic respiration	Anaerobic respiration
1. Occurs in the presence of oxygen.	1. Occurs in the absence of oxygen.
2. Glucose is oxidised completely.	2. Glucose is oxidised incompletely.
3. End products are carbon dioxide and water.	3. End products are either ethyl alcohol and carbon dioxide or lactic acid.
4. More energy is produced.	4. Very little energy is produced.
5. Occurs in most of the plants and animals.	5. Occurs in few organisms like yeast, some bacteria and some parasitic worms.

## 3. External and internal respiration

**Ans.** Exchange of gases between air and blood in the lungs is called external respiration, whereas exchange of gases between blood and body cells is called internal respiration.

## 4. Breathing and respiration

**Ans.** Breathing is a mechanical process of pumping air in and out of the lungs. On the other hand, respiration is a chemical process of exchange of oxygen and carbon dioxide between the outside air and body cells, and the oxidation of glucose to release energy.

## H. Answer these questions.

### 1. Under what conditions does anaerobic respiration occur?

**Ans.** Anaerobic respiration occurs in the absence of oxygen.

### 2. State the role of diaphragm and rib muscles in breathing.

**Ans.** The diaphragm and rib muscles play important role in breathing. During inhalation, they contract and increase the volume of thoracic cavity to reduce air pressure inside the lungs so that air from outside enters the lungs. During exhalation, both of them relax and attain their normal positions. This reduces the volume of thoracic cavity and increases air pressure inside the lungs so that the used air from the lungs is pushed out.

### 3. Explain the mechanism of breathing in humans.

**Ans.** The mechanism of breathing in humans involves inhalation and exhalation which are as follows:

#### (a) Inhalation:

(i) The ribs move upwards and outwards while diaphragm moves downwards.

(ii) The volume of thoracic cavity and lungs increases.

(iii) The air pressure inside the lungs decreases.

(iv) The atmospheric air from outside having higher pressure rushes into the lungs through nostrils and air passages.

**(b) Exhalation:**

- (i) The ribs move downwards and inwards while diaphragm moves upwards.
- (ii) The volume of thoracic cavity and lungs decreases.
- (iii) The air pressure inside the lungs increases.
- (iv) The air from the lungs is pushed out and expelled through air passages and nostrils.

**4. Describe the process of inhalation of air into the lungs.**

**Ans.** The process of inhalation involves movements of ribs and diaphragm as follows:

- (a) The ribs move upwards and outwards while diaphragm moves downwards.
- (b) The volume of thoracic cavity and lungs increases.
- (c) The air pressure inside the lungs decreases.
- (d) The atmospheric air from outside having higher pressure rushes into the lungs.

**5. How does exchange of gases take place in human body?**

**Ans.** In human body, exchange of gases occurs by external and internal respiration. Oxygen that enters the blood from alveoli during external respiration combines with haemoglobin of blood and forms oxyhaemoglobin. On reaching tissue cells, oxyhaemoglobin releases oxygen that enters the cells.

**6. Give differences in the composition of air being inhaled and exhaled.**

**Ans.** The inhaled and exhaled air have following differences:

Inhaled air		Exhaled air	
1. Oxygen	21%	1. Oxygen	16.4%
2. Carbon dioxide	0.03%	2. Carbon dioxide	4.4%

**7. What is the use of oxygen supplied to the cells of living organisms?**

**Ans.** The oxygen supplied to the cells of living organisms is used for the oxidation of food to release energy. This energy is used for life processes taking place in the body.

**8. What material is used during respiration? Describe respiration in plants.**

**Ans.** Glucose is used during respiration. Plants do not have respiratory organs to obtain oxygen from atmosphere. Each part of a plant can independently take in oxygen from the surrounding air and give out carbon dioxide. Also, plants neither take oxygen from air nor release carbon dioxide into the air during daytime because carbon dioxide formed during respiration is used for photosynthesis and oxygen produced during photosynthesis is utilised for respiration.

**9. How does exchange of gases occur in fishes?**

**Ans.** The respiratory organs in fishes are gills which have a network of fine blood capillaries. The oxygen dissolved in water enters the blood capillaries and the carbon dioxide present in blood is released into the water.

**10. Name the structures of respiration in**

- (a) Fish (b) Frog (c) Earthworm (d) Cockroach

**Ans.** (a) Gills (b) Lungs, Skin (c) Skin (d) Tracheae

**I. Give reasons for the following.**

**1. We need more oxygen during heavy exercise.**

**Ans.** During heavy exercise, more energy is needed. This increases demand for oxygen for the breakdown of glucose.

**2. We need to breathe.**

**Ans.** We need to breathe for following reasons:

(a) to get oxygen from atmosphere for oxidation of food.

(b) to give out carbon dioxide produced during oxidation of food.

**3. We cannot survive in water, whereas a fish can.**

**Ans.** We have lungs for respiration which are formed to take oxygen from air only, while gills which are respiratory organs of fish can take oxygen dissolved in water. Therefore, a fish can survive in water, but we cannot.

**4. A fish dies when taken out of water.**

**Ans.** A fish dies when taken out of water because its respiratory organs, i.e., gills can take oxygen only dissolved in water. Outside water, they dry up and collapse.

**J. Encircle the odd-one out. Give reasons for your choice.**

**1. Glucose, ethyl alcohol, lactic acid, anaerobic respiration, fermentation**

**Ans.** Glucose; It is a substrate of respiration while rest are products of respiration and names of respiratory processes.

**2. Thoracic cavity, abdominal cavity, diaphragm, ribcage**

**Ans.** Abdominal cavity; It encloses the organs of lower parts of body while rest structures participate in breathing.

**3. Cellular respiration, internal respiration, external respiration, fermentation**

**Ans.** Fermentation; It is a kind of respiration which occurs in the absence of oxygen while rest are steps of aerobic respiration.

**4. Gills, lungs, skin, tracheae, nasal passages**

**Ans.** Nasal passages; These are the organs of breathing while rest are the main respiratory organs of different animals.

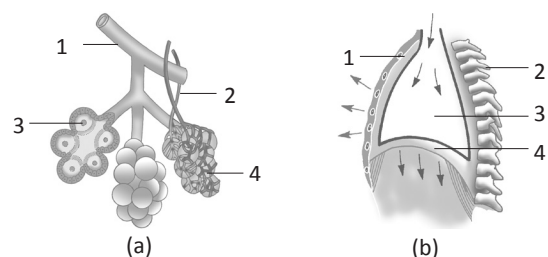
**5. Spiracles, stomata, nostrils, yeast cells**

**Ans.** Yeast cells; Yeast is a single-celled organism in which all life processes including cellular respiration take place while rest are openings in the body of some living beings through which air enters their body.

**K. Look at the following diagrams and answer the questions.**

**1. Label the parts 1–4 of internal structure of lungs (fig. a).**

**Ans.** 1. Bronchiole 2. Pulmonary artery  
3. Alveolar cavity 4. Blood capillaries





**2. Label the parts 1–4 of the process of inhalation (fig. b).**

**(a) Write the changes that occur in these structures during exhalation.**

**(b) Give the differences in inhaled and exhaled air.**

**Ans.** 1. Pleural membrane 2. Vertebral column 3. Lung 4. Diaphragm

(a) During exhalation, ribs move downward and inward, diaphragm moves upward, decreasing the volume of the lungs.

(b) The inhaled air contains 21% oxygen and 0.03% carbon dioxide, whereas in exhaled air, oxygen is 16.4% and carbon dioxide is 4.4%.

#### **L. Skill-based questions.**

**1. Why do muscles in legs develop cramps when we run fast in a race?**

**Ans.** In fast running, muscles need more energy. In the absence of required oxygen for oxidation of more glucose, the muscle cells respire anaerobically and produce lactic acid. This lactic acid gets accumulated in the muscles causing cramps and muscle fatigue.

**2. Why does cockroach die when put in water?**

**Ans.** When a cockroach is put in water, its spiracles, through which air enters the tracheal system, are blocked and tracheal tubes get filled with water and hence the cockroach fails to get fresh air for respiration and dies.

#### **M. Activity/Project–Do as directed.**

**Perform an activity to show that the air we breathe out contains carbon dioxide.**

**Ans.** Do it yourself.

#### **Think Zone**

**1. We should breathe through nose only and not through mouth. Why?**

**Ans.** When we breathe through nose, the unwanted particles and dust particles are trapped by the hairs present in nasal passages. Thus, only clean air enters the lungs. It is not so when we breathe through our mouth.

**2. An athlete breathes faster and deeper. Why?**

**Ans.** While running or exercising, an athlete needs more energy and hence, more oxygen. Therefore, he takes deep breaths and breathes faster so that more air gets into the lungs and more energy is released in the body cells due to fast respiration.



## ANSWERS

### Check Point 1

1. Name two functions of plasma.

- Ans. (a) Plasma transports dissolved food to cells.  
(b) It removes carbon dioxide and wastes from the cells.

2. What is the lifespan of RBCs?

- Ans. 90 to 120 days

3. When does the WBC count go up?

- Ans. The WBC count goes up when there is an infection in the body.

4. What are the functions of circulatory system?

- Ans. Circulatory system takes away waste products from the body cells. It provides body cells with food and oxygen.

5. What is haemoglobin?

- Ans. Haemoglobin is a pigment dissolved in RBCs and gives them red colour. It carries oxygen to the cells.

6. Which blood cells help in blood clotting?

- Ans. Blood platelets

### Check Point 2

Name the following.

1. The blood vessels that carry blood from heart to other parts of the body. Arteries
2. The valve that guards the opening of right atrium into ventricle. Tricuspid valve
3. The scientist who discovered circulation of blood. William Harvey
4. The blood vessel that receives blood from left ventricle. Aorta
5. The instrument which is used to hear heartbeat. Stethoscope

### Check Point 3

Fill in the blanks.

1. Bean-shaped organ that removes nitrogenous wastes is called kidney.
2. Urea and uric acid are nitrogenous wastes.

- The structural unit of kidney is nephron.
- Artificial filtration of blood is carried out to remove nitrogenous wastes.

### **Check Point 4**

State terms for the following.

- Transport of food from leaves to nongreen parts of a plant. Translocation
- Loss of water as water vapour from aerial parts of a plant. Transpiration
- The vessels that transport water from root to the leaves. Xylem
- The structures that absorb water from soil. Root hair

### **PRACTICE TIME**

**A. MCQs—Choose the correct answers.**

- Blood cells which transport oxygen are
 

(a) platelets	(b) WBCs
(c) RBCs <input checked="" type="checkbox"/>	(d) thrombocytes
- Human kidneys are
 

(a) bean-shaped <input checked="" type="checkbox"/>	(b) oval
(c) irregular	(d) flattened
- Food prepared by leaves is translocated by
 

(a) xylem	(b) phloem <input checked="" type="checkbox"/>	(c) leucocytes	(d) mesophyll
-----------	--	----------------	---------------
- This process occurs through stomata.
 

(a) translocation	(b) transpiration <input checked="" type="checkbox"/>
(c) transportation	(d) none of these
- Human heart is
 

(a) two-chambered	(b) three-chambered
(c) four-chambered <input checked="" type="checkbox"/>	(d) five-chambered
- The vascular tissue in leaves is located
 

(a) only in stalk	(b) only in lamina
(c) only in the midrib	(d) only in the midrib and its branches <input checked="" type="checkbox"/>
- Transpiration pull helps in
 

(a) translocation of food	(b) transportation of water <input checked="" type="checkbox"/>
(c) circulation of blood	(d) removal of wastes and excess of water

**B. Fill in the blanks.**

- The red blood cells have red colour due to the presence of haemoglobin.
- WBCs are called soldiers of the body.
- Pulmonary veins carry oxygenated blood.
- Arteries have thick walls and narrow lumen.
- Urine contains nitrogenous wastes in the form of urea.
- Skin helps in the excretion of salts and urea.

**C. Match the columns.**

Column A	Column B
1. Cells that fight against germs	(a) Kidney
2. Cells that help in clotting	(b) White blood corpuscles
3. Tissue that translocates food	(c) Stomata
4. Excretion	(d) Phloem
5. Transpiration	(e) Blood platelets

**D. Write True or False against each statement.**

1. Heart muscles are involuntary muscles.	<u>True</u>
2. Impure blood from different parts of the body returns to left auricle.	<u>False</u>
3. Kidneys act as filters to remove waste from the blood.	<u>True</u>
4. Sweat contains salts and water.	<u>True</u>
5. Plants utilise 15% of the total water absorbed per day.	<u>False</u>

**E. Answer in one word.**

1. The valves present on the opening between auricle and ventricle.	<u>Cuspid valves</u>
2. The muscles that form heart walls.	<u>Cardiac muscles</u>
3. The arteries that carry deoxygenated blood.	<u>Pulmonary arteries</u>
4. The organ that stores urine.	<u>Urinary bladder</u>
5. The vessels that connect arteries with veins.	<u>Capillaries</u>
6. The instrument a doctor uses to hear heartbeats.	<u>Stethoscope</u>
7. Number of heartbeats per minute.	<u>72</u>

**F. Define these terms.**

**1. Excretion**

**Ans.** The process of removing toxic wastes from the body is called excretion.

**2. Transpiration**

**Ans.** The loss of water as water vapour from aerial parts of a plant is called transpiration.

**3. Artery**

**Ans.** The blood vessel which carries blood from heart to different body parts is called artery.

**4. Vein**

**Ans.** The blood vessel which carries blood from different body parts to heart is called vein.

**G. Differentiate between the following.**

**1. Blood and plasma**

**Ans.** Blood is a fluid connective tissue. It is a red-coloured viscous (thick and sticky) fluid that flows in the blood vessels. On the other hand, plasma is one of the components of the blood. It is a nonliving, yellowish fluid which makes up more than half of blood volume.

**2. Xylem and phloem**

**Ans.** Xylem are the cells of vascular system of plants which transport water and dissolved minerals upwards from roots to the tips of leaves against the force of gravity. On the other

hand, phloem are the cells of vascular system of plants which carry food synthesised by the leaves downwards to all the parts of a plant.

### 3. Circulatory and vascular systems

**Ans.** Circulatory system is a transport system in animals which provides body cells with food and oxygen and takes away waste products from the cells. It is formed of blood vessels, blood and heart. On the other hand, vascular system is a transport system in plants which transports water and minerals from roots to all the aerial parts of the plant and food formed in leaves to all parts of plant up to the roots. It is formed of xylem and phloem vessels.

## H. Answer these questions.

### 1. Who discovered the mechanism of circulation of blood in human body?

**Ans.** William Harvey

### 2. What is heartbeat?

**Ans.** The rhythmic contraction and relaxation of auricles and ventricles of the heart is called heartbeat.

### 3. What are the functions of circulatory system in animal body?

**Ans.** The circulatory system has following functions in animal body:

- (a) It takes away waste products from the body cells.
- (b) It provides body cells with food and oxygen.

### 4. What is meant by ascent of sap? How does transpiration help in the ascent of sap?

**Ans.** The upward movement of water and minerals from roots to the tips of leaves against gravity through xylem vessels is called ascent of sap.

Transpiration helps in ascent of sap by building a suction force in the xylem vessels. This force helps to pull water and dissolved minerals up to the top of a tree.

### 5. Discuss the importance of transpiration in plants.

**Ans.** Transpiration builds a suction force in the xylem vessels. This force helps to pull water up to the top of a tree.

### 6. What is the role of septum in heart? Why does heart make lub-dub sounds?

**Ans.** The septum in the heart acts as a demarcating wall which prevents mixing of deoxygenated and oxygenated blood present in the right and left halves of the heart respectively.

The lub-dub are two sounds of heart made during a heartbeat. The lub sound is produced by the closure of cuspid valves while the dub sound is produced by the closure of semilunar valves.

### 7. Describe the function of RBCs. How is oxygen transported by blood in animals?

**Ans.** The function of RBCs is to transport oxygen to the body cells. A pigment called haemoglobin is found in RBCs. It combines with oxygen and forms a compound called oxyhaemoglobin which is transported to all body cells. On reaching the body cells, oxyhaemoglobin breaks down and oxygen is released into the cells.

8. Why is excretion very essential?

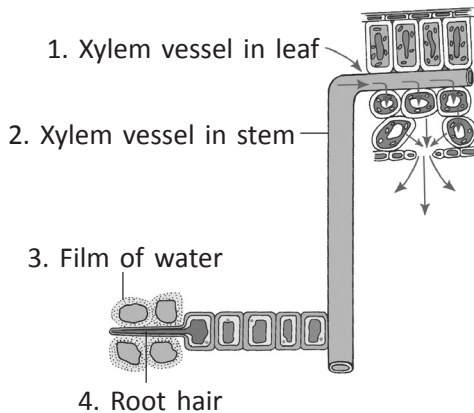
OR

Why is it necessary to remove waste products from the body?

**Ans.** Waste products like carbon dioxide, ammonia, urea, etc. are necessary to remove from the body because if they accumulate in the body, they may prove to be toxic. Therefore, excretion is very essential to stay healthy.

9. Look at the diagram given below. Label the parts numbered 1–4.

**Ans.**



I. Give reasons for the following.

1. Ventricles have thicker walls than auricles.

**Ans.** Ventricles have thicker walls than auricles because they are the distributing chambers of the heart. They have to pump blood forcibly to the whole body, whereas auricles are the receiving chambers. They only push blood into the ventricles.

2. Openings of auricles into ventricles are guarded by valves.

**Ans.** The openings of auricles into ventricles are guarded by valves to make the blood flow in one direction from auricles to ventricles only and prevent its backflow into auricles.

3. White blood corpuscles are called soldiers of our body.

**Ans.** White blood corpuscles fight against germs entering the body. They provide immunity against infections. Therefore, they are called soldiers of our body.

4. Upward movement of water and dissolved minerals in plants.

**Ans.** The water and dissolved minerals in plants are taken from the soil through roots. They are transported against gravity through xylem from roots to the tips of leaves to be used by leaves and other parts of the plant. Transpiration helps in this process by building a suction force in the xylem vessels which pulls water up to the top of a tree.

J. Encircle the odd-one out. Give reasons for your choice.

1. Blood, urine, water, plasma

**Ans.** Water; It is universal solvent while rest are body fluids.

2. Ventricles, lungs, kidneys, skin

**Ans.** Ventricles; They are the heart chambers while rest are the excretory organs.

**3. Arteries, veins, capillaries, ureters**

**Ans.** Ureters; They are a part of excretory system while rest are the parts of circulatory system.

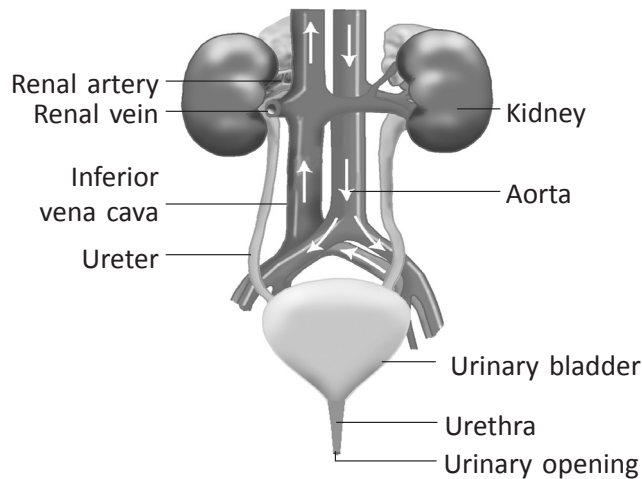
**4. Xylem, phloem, stomata**

**Ans.** Stomata; They are the pores on the leaves for gaseous exchange while rest are the cells of vascular system.

**K. Draw and label the diagram.**

**Draw the figure of human excretory system and label its various parts.**

**Ans.**



**L. Skill-based questions.**

**1. Which half of heart has oxygenated blood and which half has deoxygenated blood?**

**Ans.** Left half of human heart has oxygenated blood and right half has deoxygenated blood.

**2. What makes water to rise in tall trees several metres high?**

**Ans.** Transpiration pull in xylem vessels created due to constant evaporation of water from leaves pulls the water several metres high in tall trees.

**3. In summer, why do we feel cool on standing under a fan while sweating?**

**Ans.** When sweat evaporates, it needs heat for evaporation which is drawn from the body. Hence, we feel cool when sweat evaporates.

**M. Activity/Project–Do as directed.**

**Perform an activity to show that water evaporates from the leaves of green plants.**

**Ans.** Do it yourself.

**Think Zone**

**1. Why are veins in old persons more prominent?**

**Ans.** Veins in old persons become more prominent because their walls become thicker with age due to an increase in connective tissue and deposition of calcium.

**2. Why do veins have valves but not the arteries?**

**Ans.** In arteries blood flows with force from heart to various parts of the body. Therefore, direction of blood flow is maintained by pressure generated by the contraction of

ventricles. In veins, blood flows from body parts to heart against the force of gravity. Valves in the veins open in one direction and maintain flow of blood towards the heart. They prevent backward flow of blood.

**3. What does lub-dub sound in heartbeat indicate?**

**Ans.** The lub sound indicates the closure of cuspid valves at the beginning of ventricular contraction (systole) and the dub sound indicates the closure of semilunar valves at the beginning of ventricular relaxation (ventricular diastole).

**4. We sweat in summer but not in winter. Why?**

**Ans.** In summer when atmospheric temperature is high and body becomes hot, sweat glands produce sweat which accumulates on the skin surface. When it evaporates, body heat comes out causing a cooling effect.

## ANSWERS

Check Point 1

## 1. Fill in the blanks.

- (a) There are primarily two modes of reproduction: asexual and sexual.
- (b) The process of reproduction in living organisms ensures continuity of life.
- (c) Yeast multiplies by budding.

## 2. Identify the method of artificial propagation in the following.

- (a) Twig of one plant tied to the cut stem of another. Grafting
- (b) Young branch put into moist soil. Stem cutting
- (c) Tissue from growing tip is grown under controlled conditions in the laboratory. Tissue culture or micropropagation

Check Point 2

## 1. Name the male and female reproductive parts of a flower.

**Ans.** Stamen are male parts and pistil is female reproductive part of a flower.

## 2. What are unisexual plants?

**Ans.** Plants in which flowers contain either only stamens or pistil are called unisexual plants.

## 3. Define the term pollination.

**Ans.** Transfer of pollen grains from the anthers to the stigma of pistil is known as pollination.

## 4. Name the means of pollination.

**Ans.** The means of pollination are insects, mammals, birds, wind and water.

## 5. What is the difference between self and cross-pollination?

**Ans.** In self-pollination, pollen lands on the stigma of the same flower or of a different flower of the same plant, whereas in cross-pollination, pollen lands on the stigma of a flower borne on a different plant of the same kind.

## 6. Give a structural modification found in insect-pollinated flowers.

**Ans.** Insect pollinated flowers usually have nectaries that produce nectar and are brightly coloured.



## PRACTICE TIME

### A. MCQs—Choose the correct answers.

- Pollen grains are  
(a) haploid male gametes  (b) diploid male gametes  
(c) haploid female gametes (d) diploid female gametes
- The process of fusion of male and female gametes is called  
(a) pollination (b) germination (c) fertilisation  (d) propagation
- Self-pollination is the transfer of pollen grains  
(a) from anthers to stigma of any flower (b) on the stigma of same flower  
(c) on the stigma of a flower on the same plant  
(d) both (b) and (c)
- Which step involves in sexual reproduction of plants?  
(a) pollination (b) fertilisation  
(c) formation of seed (d) all of these
- Reproduction by budding is found in  
(a) yeast  (b) *Rhizopus* (c) *Spirogyra* (d) bacteria
- The number of organisms formed by binary fission is  
(a) two  (b) four (c) many (d) eight
- Presence of nectaries and coloured petals are the characteristics of flowers that are pollinated by  
(a) wind (b) water (c) insects  (d) both (a) and (c)
- Fruits develop from  
(a) thalamus of flower (b) ovary of flower   
(c) ovule of flower (d) none of these
- Pistil is the female reproductive part consisting of  
(a) stigma (b) style (c) ovary (d) all of these

### B. Fill in the blanks.

- Roots, stem and leaves are vegetative parts of a plant.
- Flowers are the reproductive parts of a plant.
- Propagation of new plants by stem cutting is an example of vegetative propagation.
- The male gametes in plants are formed within pollen grains.
- The spores are asexual reproductive bodies.
- In Bryophyllum, buds present in the margin of leaves grow into new plants. This is called vegetative reproduction.
- New yeast cells form a chain like structure.
- The plants produced by vegetative propagation from one parent plant are all alike.
- Pineapple and banana are produced by vegetative propagation.
- Sugarcane plants are grown by stem cutting.

**C. Match the columns.**

Column A	Column B
1. Rose	(a) Fragmentation
2. Tuber	(b) Budding
3. Yeast	(c) <i>Bryophyllum</i>
4. Bread mould	(d) Cutting
5. <i>Spirogyra</i>	(e) Spore formation
6. Leaf bud	(f) Potato

**D. Write *True* or *False* against each statement.**

1. Grape plants are grown by fragmentation. False
2. Spores are thin-walled asexual bodies formed during favourable condition. False
3. In plants, male and female reproductive organs are always found on separate plants. False
4. Flowers are reproductive parts of a plant. True
5. Butterflies help in cross-pollination. True
6. The ovary in a pollinated flower develops into a seed. False

**E. Answer in one word.**

1. Formation of new organisms from one parent only. Asexual reproduction
2. Mode of reproduction in which male and female gametes are formed. Sexual reproduction
3. Single cell formed by the fusion of male and female gametes. Zygote
4. Growing of new plants from a few cells in culture medium. Micropropagation
5. Joining of stem cutting from a desired plant into the shoot of another plant. Grafting
6. The buds of potatoes that grow into new plants. Vegetative buds
7. The fusion of male and female gametes to produce zygote. Fertilisation
8. The common method of reproduction in yeast. Budding
9. Method of asexual reproduction in *Rhizopus*. Spore formation
10. The part of embryo that grows into shoot. Plumule

**F. Define these terms.**

**1. Radicle**

**Ans.** The root-forming part of embryo in a seed is called radicle.

**2. Plumule**

**Ans.** The shoot-forming part of embryo in a seed is called plumule.

**3. Scion**

**Ans.** Scion is a cutting of stem having a bud which is grafted on the cut stem of another plant.

**4. Stock**

**Ans.** Stock is the cut stem of a plant to which the scion is grafted.

### G. Differentiate between the following.

#### 1. Unisexual and bisexual flowers

**Ans.** The flowers which contain either stamens or pistil are called unisexual flowers, e.g., maize, papaya, cucumber, etc. On the other hand, the flowers which contain both the stamen and pistil, i.e., male and female reproductive organs are called bisexual flowers, e.g., rose, mustard, *Petunia*, etc.

#### 2. Stamens and carpels

**Ans.** Stamens are male reproductive organs of a flower, whereas carpels, also called pistils, are female reproductive organs of a flower.

#### 3. Self and cross-pollinations

**Ans.** In self-pollination, pollen lands on the stigma of the same flower or of a different flower of the same plant, whereas in cross-pollination, pollen lands on the stigma of a flower borne on a different plant of the same kind.

### H. Answer these questions.

#### 1. Name the method of reproduction found in *Rhizopus* and yeast.

**Ans.** *Rhizopus*: Spore formation, Yeast: Budding

#### 2. What is meant by fragmentation?

**Ans.** Fragmentation is a form of asexual reproduction in which an organism breaks into two or more fragments (parts) and each fragment grows into a new individual. It is found in the alga *Spirogyra* (pond scum), liverworts and mosses.

#### 3. Mention the significance of vegetative propagation.

**Ans.** Vegetative propagation in plants has following significance:

- It is a rapid, easier and cheaper method of plant propagation than raising the plants by seeds.
- The new plants are exact copies of the parent plant as they are produced from single parent.
- It produces a large number of plants in a short time.
- Plants grown vegetatively usually need less attention in the early stages than the plants grown from seeds.
- Plants like banana, seedless grapes, roses, pineapples and dahlias which do not produce viable seeds can only be grown vegetatively.

#### 4. What is meant by sexual reproduction?

**Ans.** Sexual reproduction is a mode of reproduction which involves fusion of male and female gametes formed by male and female parents respectively.

#### 5. What is the importance of flower for a plant?

**Ans.** Flower is the reproductive part of a plant. It bears male or female reproductive organs or both and helps in sexual reproduction in plants.

#### 6. What is the main adaptation in the flowers for self and cross-pollination?

**Ans.** In a self-pollinated flower, stamens are located at a higher level than stigma to ensure that when anthers rupture, pollen fall on its stigma.

In a cross-pollinated flower, pistil is long so that its stigma extends beyond the stamens to avoid the pollens reaching its own stigma.

**7. Name various agents of cross-pollination.**

**Ans.** The various agents of cross-pollination are wind, water, insects, birds, mammals, etc.

**8. What structural modifications are found in insect-pollinated flowers?**

**Ans.** Insect-pollinated flowers are brightly coloured or scented or have nectaries which produce nectar to attract insects for pollination.

**9. Why are some fruits fleshy?**

**Ans.** Man, animals and birds eat the pulp or the edible part of fleshy fruits and throw away their seeds. This helps in seed dispersal.

**10. Name various methods of asexual reproduction in plants.**

**Ans.** The various methods of asexual reproduction in plants are budding, fission, fragmentation, spore formation or sporulation and vegetative propagation.

**11. Label the parts of the potato and answer the following.**

(a) What is potato?

(b) Why is it swollen?

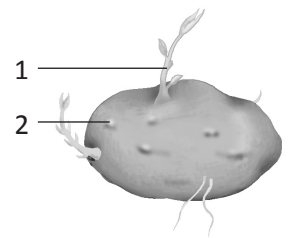
(c) Write the use of eyes in a potato.

**Ans.** 1. Germinating bud 2. Eye

(a) Potato is an underground stem called tuber.

(b) It is swollen due to food stored in it.

(c) The eyes in a potato have vegetative buds which give rise to new plants.



**I. Give reasons for the following.**

**1. Yeast cells form a long chain.**

**Ans.** In yeast, sometimes during the process of budding, the bud does not detach from the parent cell and continues to form new cells. This forms a long chain of cells in yeast.

**2. Spores are covered with a hard covering.**

**Ans.** Spores cover long distances and remain in the air for a long time. Therefore, to withstand unfavourable conditions of high temperature and drought, they are covered with a hard covering.

**3. Insect-pollinated flowers are brightly coloured or scented.**

**Ans.** Insect-pollinated flowers are brightly coloured or scented to attract insects for pollination.

**4. Wind-pollinated flowers produce large amount of pollen grains.**

**Ans.** In wind pollination, most pollen grains get damaged during the way before reaching the stigma of female flower. Therefore, to ensure pollination, wind-pollinated flowers produce large amount of pollen grains.

**5. Seeds and fruits dispersed by water are large and spongy.**

**Ans.** Seeds and fruits dispersed by water are large and spongy so that they can float easily on water surface to far off places with water currents.

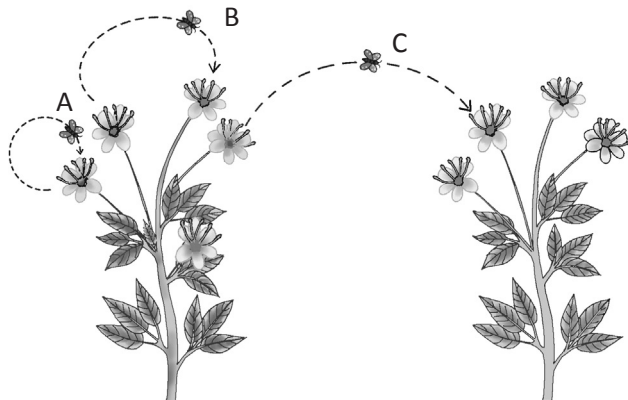
6. **Hooks or spines are present on the seeds and fruits dispersed by insects and animals.**

**Ans.** The seeds and fruits dispersed by insects and animals have spines or hooks to cling to the body of animals. This feature helps in seed dispersal.

**J. Draw and label the diagram.**

**Draw a diagram to show the difference between self and cross-pollination.**

**Ans.**



Self-pollination (A and B), Cross-pollination (C)

**K. Skill-based questions.**

1. **Why do the seeds dispersed by animals have spines and hooks?**

**Ans.** The spines and hooks on seeds cling to the body of animals and help in their dispersal.

2. **How are sugarcane plants grown?**

**Ans.** Sugarcane plants are grown by stem cuttings.

3. **The stagnant waterbodies develop slimy green cover. What does that represent?**

**Ans.** Green slimy cover on stagnant water surface is formed by the excessive growth of algae.

**L. Activity/Project–Do as directed.**

**Perform an activity to show that budding process occurs in yeast.**

**Ans.** Do it yourself.

### **Think Zone**

1. **A moist slice of bread left in open gets spores of bread mould. How?**

**Ans.** Spores of many fungi remain floating in the air. They settle at the moist slice of bread left in open.

2. **How is mint grown?**

**Ans.** Mint is grown by vegetative propagation from its subaerial stem.

3. **How can you know whether a flower is adapted for self-pollination or cross-pollination?**

**Ans.** In a self-pollinated flower, stamens are located at a higher level than stigma, whereas in a cross-pollinated flower, pistil is long and its stigma extends beyond the stamens.

4. **A flower is white but scented. Can you tell how it is pollinated?**

**Ans.** Flowers pollinated by moths are white and scented because moths are nocturnal and cannot differentiate colours at night. They, however, have well developed sense of smell.

## ANSWERS

**Check Point 1****1. Fill in the blanks.**

- (a) A sundial uses the shadow of a tall object to tell time.
- (b) The device used to measure time is known as a clock.
- (c) There are 3600 seconds in an hour.
- (d) Atomic clock is the most accurate clock.
- (e) Small time intervals are measured by a stop watch.

**2. Name two phenomena in nature which repeat at regular time intervals.**

- Ans.** (a) Wilting of the leaves of plants during autumn  
(b) Flowering and fruit bearing of plants

**Check Point 2****1. Fill in the blanks.**

- (a) Distance travelled in unit time is defined as speed.
- (b) The SI unit of speed is metre per second (m/s).
- (c) The unit used for expressing the speed of vehicles is kilometre per hour km/h.
- (d) The ratio of total distance travelled to the total time taken is known as average speed.

**2. Define (a) speed, (b) average speed.**

- Ans.** (a) Distance travelled by an object in unit time is called speed.  
(b) The ratio of total distance travelled by an object to the total time taken is called average speed.

**Check Point 3****1. Fill in the blanks.**

- (a) The resting position of the bob of a pendulum is known as its mean position.
- (b) The point beyond which a pendulum does not move towards sides, is known as extreme position.
- (c) The time taken to complete one oscillation by a pendulum is known as time period.
- (d) The time period of a pendulum does not depend upon its displacement.
- (e) The time period of a pendulum depends upon its length.

## 2. Define (a) time period (b) a pendulum.

- Ans. (a) The time taken by a bob to complete one oscillation is called time period.  
(b) A heavy mass suspended from a rigid support with a unstretchable string such that it can swing freely is called a pendulum.

### Check Point 4

#### Fill in the blanks.

1. The graph is a diagrammatic presentation of two interrelated quantities.
2. The distance-time graph of a body in a uniform motion is always a sloping straight line.
3. The distance-time graph of a body in nonuniform motion is a curved line.
4. A body covering unequal distances in equal intervals of time is said to be in nonuniform motion.
5. The distance-time graph of a body with zero speed is a line parallel to time axis.

### PRACTICE TIME

#### A. MCQs—Choose the correct answers.

1. The time period of a pendulum depends upon  
(a) the mass of the bob  
(b) the material of the bob  
(c) the length of the pendulum   
(d) the size of the bob
2. The most accurate clock is  
(a) a digital clock  
(b) an atomic clock   
(c) an alarm clock  
(d) a wall clock
3. Which of the following is periodic?  
(a) wilting of leaves  
(b) ripening of fruits  
(c) swinging of a pendulum   
(d) writing on a paper
4. Which of these is not a unit of time?  
(a) hour  
(b) minute  
(c) second  
(d) metre/second
5. Which of the following is not a unit of speed?  
(a) km/h  
(b) cm/s  
(c) m/s  
(d) h/km
6. The SI unit of speed is  
(a) km/h  
(b) cm/s  
(c) m/min  
(d) m/s
7. The time period of a pendulum depends upon its  
(a) length   
(b) breadth  
(c) height  
(d) none of these

#### B. Fill in the blanks.

1. An atomic clock is the most accurate clock.
2. The SI unit of time is second.
3. The distance-time graph for a uniform motion is a sloping straight line.
4. The time-period of a pendulum depends upon its length.



5. The time gap between two successive sunrises is called a day.

6. The time-period of a pendulum is expressed in seconds.

**C. Write True or False against each statement.**

1. A pendulum cannot be used for time keeping. False

2. A uniform motion appears as a curved line on a distance-time graph. False

3. The SI unit of speed is km/h. False

4. The origin of graph is the common point where the two perpendicular axes of a graph meet. True

5. The resting position of the bob of a pendulum is known as extreme position. False

**D. Answer in one word.**

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 body covering unequal distances in equal intervals of time. Nonuniform motion

4. A diagrammatic representation of the interrelation of two quantities. Graph

**E. Define these terms.**

**1. Uniform motion**

**Ans.** If an object covers equal distances in equal intervals of time, the object is said to be in uniform motion.

**2. Nonuniform motion**

**Ans.** When an object covers unequal distances in equal intervals of time, it is said to have a nonuniform motion.

**F. Answer these questions.**

**1. Why do we need to measure time?**

**Ans.** Measurement of time is very important in our everyday life and for scientific purposes. We plan our activities and events by knowing the time. For example, to attend an event at some place, we have to know when the event will be held and how much time it will take to reach that place and we start our journey accordingly. Also, to carry out scientific experiments, time measurement is very important. Thus, to carry out all our plans in an organised way, we need to measure time.

**2. What is a sundial?**

**Ans.** A sundial is a device used to know the time of the day when there is sunlight. It measures the time by the position of the sun in the sky.

**3. Define speed. Write its SI unit.**

**Ans.** The distance travelled by an object in unit time is called speed. The SI unit of speed is metre per second (m/s).

**4. How are distance, time and speed of a moving object related to each other?**

**Ans.** The speed of a moving object is the ratio of distance travelled by the object to the time taken.

$$\text{Speed} = \frac{\text{Distance travelled by the object}}{\text{Time taken to travel this distance}}$$



5. A fish swims across the width of an 18 m wide river in 6 s. What is the speed of the fish?

Ans. Given, width of river = Distance = 18 m, time = 6s

$$\begin{aligned}\text{Speed} &= \frac{\text{Distance}}{\text{Time}} \\ &= \frac{18}{6} = 3 \text{ m/s}\end{aligned}$$

6. A maruti car travelled a distance of 120 km in 3 hours, while a zen car travelled a distance of 150 km in 4 hours. Which car was moving faster?

Ans.

$$\begin{aligned}\text{Speed} &= \frac{\text{Distance travelled}}{\text{Time taken}} \\ \text{Speed of Maruti car} &= \frac{120}{3} = 40 \text{ km/hr} \\ \text{Speed of Zen car} &= \frac{150}{4} = 37.5 \text{ km/hr}\end{aligned}$$

As the speed of Maruti car is more than that of the Zen car, the Maruti car was moving faster.

7. Amit, Aman and Neeraj ran a 100 m race. Amit covered the track in 19.5 s, Aman in 18.9 s and Neeraj in 20.5 s. Who won the race? Who got the third position?

Ans. Aman won the race because he took minimum time, i.e., 18.9 s to run a 100 m race. Neeraj got third position because he took the most time to run the same race.

8. An ant walked up a distance of 12 m in 15 s. What was the speed of the ant?

Ans. Given, distance = 12 m, time = 15 s

$$\begin{aligned}\text{Speed} &= \frac{\text{Distance travelled}}{\text{Time taken}} \\ &= \frac{12}{15} = 0.8 \text{ m/s}\end{aligned}$$

9. A police dog runs after the scent of a thief at a speed of 5 m/s. How long would it take to reach the thief, if he is hiding at a place 62 m from the starting point of the dog?

Ans. Given, speed = 5 m/s, distance = 62 m

$$\begin{aligned}\text{Time} &= \frac{\text{Distance}}{\text{Speed}} \\ &= \frac{62}{5} = 12.4 \text{ s}\end{aligned}$$

10. What do you understand by the statement, “the speed of a cyclist is 15 km/h”?

Ans. If the speed of a cyclist is 15 km/h, it means the cyclist covers 15 kilometres in one hour.

11. A train is moving at a speed of 90 km/h. What is the speed in m/s?

Ans.

$$\text{Speed} = 90 \text{ km/h} = 90 \times \frac{5}{18} \text{ m/s} = 25 \text{ m/s}$$

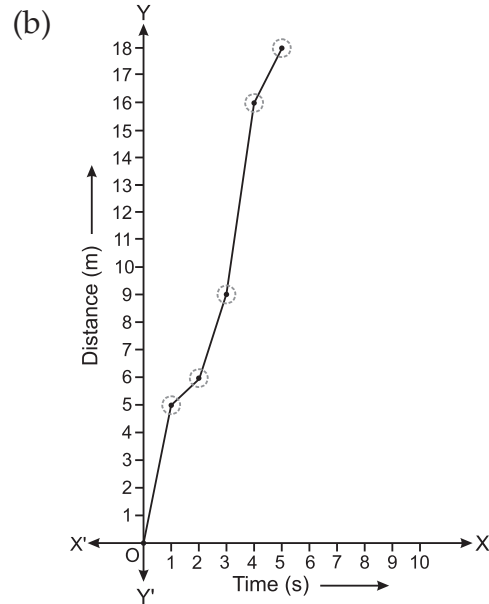
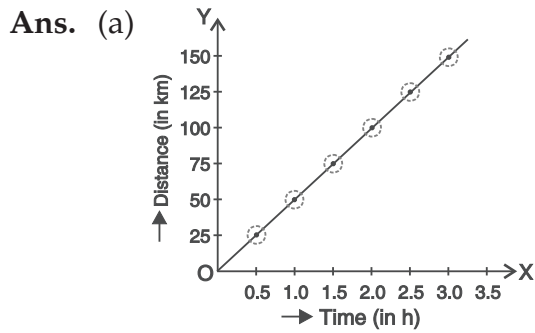
12. Plot distance-time graphs for the given data.

(a)

Time taken	Distance travelled
0.5 h	25 km
1.0 h	50 km
1.5 h	75 km
2.0 h	100 km
2.5 h	125 km
3.0 h	150 km

(b)

Time taken	Distance travelled
0 s	0 m
1 s	5 m
2 s	6 m
3 s	9 m
4 s	16 m
5 s	18 m



G. Give reasons for the following.

1. A bee to collect nectar from flowers is considered to be in a nonuniform motion.

Ans. A bee while collecting nectar from flowers is in nonuniform motion because it does not cover same distance from one flower to other in the same time.

2. The bird flying at a speed of 30 km/h is considered to be in a uniform motion.

Ans. A bird flying at a speed of 30 km/h is in uniform motion because it covers same distance each hour.

H. Skill-based questions.

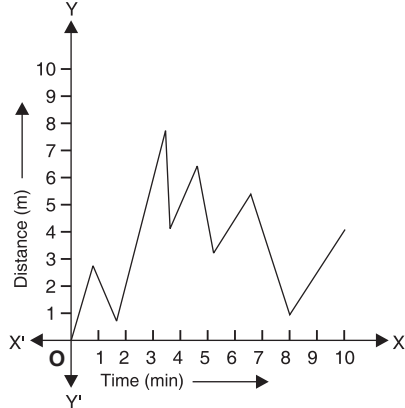
1. Mr. Sharma takes 25 minutes to reach his office from home by car. If he travels with a speed of 60 km/h, calculate the distance between his office and home. Calculate this distance in kilometres and metres.

Ans.  $t = 25 \text{ min} = 1500 \text{ s}; \quad v = 60 \text{ km/h} = 60 \times \frac{5}{18} \text{ m/s} = \frac{300}{18} \text{ m/s}$

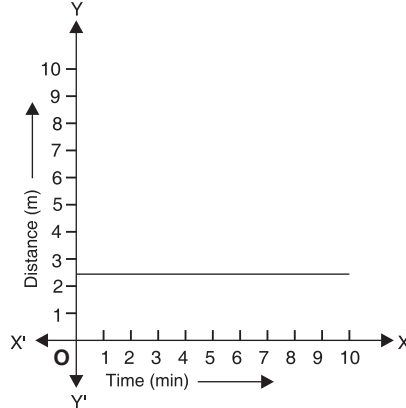
Now,  $s = v \times t = \frac{300}{18} \times 1500 = 25000 \text{ m or } 25 \text{ km}$

2. Show the distance-time graph for a honey bee moving around flowers and a train on a platform for 10 minutes.

Ans. Distance-time graph for honeybee



Distance-time graph for train



3. An ant is moving with a constant speed of 2 m/min. What distance will it travel in 45 seconds? Calculate the distance in m, cm and km.

Ans.  $s = v \times t = \frac{2}{60} \times 45 = 1.5 \text{ m or } 150 \text{ cm or } 0.0015 \text{ km}$

I. Activity/Project–Do as directed.

Perform an activity to show how to measure the time period of a pendulum.

Ans. Do it yourself.

### Think Zone

1. A stone is dropped from a height of 10 m above the ground. Will it have a uniform or a nonuniform speed, as it moves towards the ground?

Ans. The stone will have nonuniform motion as it starts moving from rest and attains the maximum velocity just before striking the ground because of the acceleration due to gravity.

2. How will the time period of a pendulum be affected, if its metallic bob is replaced by a stone of an equal mass, keeping all other parameters of the pendulum unchanged?

Ans. The time period of the pendulum will not be affected in this case because time period is independent of the material of the bob.

## ANSWERS

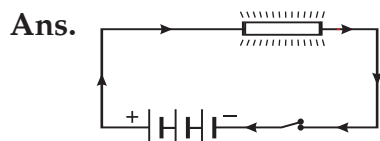
Check Point 1

1. Draw symbols to represent:

- (a) a battery with two cells
- (b) an open switch
- (c) a battery with four cells
- (d) a closed switch

Ans. (a)  $\begin{array}{c} + \\ | \\ | \\ | \\ - \end{array}$  (b)  $\text{---} \text{S} \text{---}$  (c)  $\begin{array}{c} + \\ | \\ | \\ | \\ | \\ - \end{array}$  (d)  $\text{---} \text{---} \text{---}$

2. Draw a circuit diagram required to light a tubelight using a battery of three cells, in working condition.

Check Point 2

1. Fill in the blanks.

- (a) If the amount of current is increased in a circuit, the amount of heat produced will increase.
- (b) The amount of heat produced in the circuit depends upon the amount of current and the amount of time, for which it flows.
- (c) A fuse is a safety device, made of tin or an alloy of tin and copper.

2. State the three factors on which the amount of heat produced in a circuit depends.

Ans. The amount of heat produced in a circuit depends on: (a) the time for which the current flows, (b) the amount of current flow (c) the nature of material of the wire/component/device.

Check Point 3

1. Fill in the blanks.

- (a) Under normal conditions, a magnetic compass needle always comes to rest in North-South direction.
- (b) The magnetic effect of current was first observed by Hans Christian Oersted.

- (c) An electromagnet is a temporary magnet.  
 (d) An electromagnet remains a magnet as long as current flows through it.  
 (e) If the amount of current through the coil of an electromagnet is decreased, the strength of the electromagnet will decrease.

**2. Name three important parts of an electric bell.**

**Ans.** An electromagnet, armature and gong.

**3. State two uses of electromagnets.**


**Ans.** (a) Electromagnets are used to separate iron scrap from the junk in industries.  
 (b) Electromagnets are used in the receivers of telephones.

**PRACTICE TIME**

**A. MCQs—Choose the correct answers.**


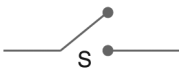


- The name of a safety device in electric circuits is  
 (a) switch (b) fuse  (c) cell (d) electric wires
- The electric bell makes use of  
 (a) a U-shaped electromagnet  (b) a bar-shaped electromagnet  
 (c) a ring-shaped electromagnet (d) no electromagnet
- In an electric circuit, the current starts from  
 (a) negative terminal of the battery  
 (b) positive terminal of the battery   
 (c) either of the terminals of the battery  
 (d) none of the terminals of the battery
- The strength of an electromagnet does not depend upon the  
 (a) current flowing through the coil (b) number of turns of the coil  
 (c) insulating material of the coil  (d) length of the electromagnet
- This metal is the best conductor of electricity.  
 (a) iron (b) silver  (c) copper (d) gold
- This is a good conductor of electricity.  
 (a) paper (b) bakelite (c) plastic (d) copper
- The glowing part of a bulb is called a  
 (a) fuse (b) switch (c) filament  (d) battery
- This is a soft iron strip.  
 (a) electromagnet (b) hammer  
 (c) armature  (d) gong

**B. Fill in the blanks.**

- A fuse is made of a wire which has a low melting point.
- The heating coil of an electric geyser is made up of nichrome.
- The symbol of an electric bulb is .

- To make a battery, the negative terminal of a cell should be connected to positive terminal of the second cell.
- The melting point of a fuse is lower than the melting point of remaining circuit.

**C. Match the columns.**

Column A	Column B
1. Bulb	(a) _____
2. Cell	(b) 
3. Battery	(c) 
4. Wire	(d) 
5. Open switch	(e) 

**D. Write *True* or *False* against each statement.**

- A fuse is an application of the magnetic effect of current. False
- In an electromagnet, the wire to make the coil should be insulated. True
- In the symbol of electric cell, three parallel and vertical lines are drawn. False
- Electromagnets are permanent magnets. False
- Nichrome is a material which can withstand high temperature. True

**E. Answer in one word.**

- A device which uses the heating effect of current. Heater
- The filament of a bulb is made of this metal. Tungsten
- Two or more cells combined together to provide more electric current. Battery
- This is a thin small wire made of tin or an alloy of tin and copper. Fuse

**F. Define these terms.**

**1. Magnetic effect of current**

**Ans.** A conductor of electricity behaves as a magnet when current flows through it. It is called magnetic effect of current.

**2. Heating effect of current**

**Ans.** The production of heat in a conductor of electricity due to passage of current is called heating effect of current.

**G. Differentiate between the following.**

**1. A cell and a battery**

**Ans.** A cell is a source of electrical energy, whereas two or more cells combined together to provide more electric current is called a battery.

**2. An open switch and a closed switch**

**Ans.** The switch which breaks the circuit is called an open switch, whereas the switch which completes the circuit is called a closed switch.

## H. Answer these questions.

1. Which material is used to make the heating coils of electrical heating devices and why?

**Ans.** Nichrome is used to make the heating coils of electrical devices such as electric iron, electric kettle, geyser, heater, etc. This is because nichrome can withstand very high temperature without melting.

2. What is an electric fuse made up of? How does it function to prevent a circuit from burning?

**Ans.** An electric fuse is made up of a thin wire of tin or an alloy of tin and copper.

When a circuit is overheated due to short-circuiting or overloading, the fuse wire melts a little before any other part of the circuit could, and the circuit is broken. This stops the flow of current and burning of circuit is prevented.

3. Explain the working of an electric bell.

**Ans.** An electric bell works on the principle of magnetic effect of current as follows:

(a) When the switch is pushed 'On', the current flows through the coil of U-shaped electromagnet placed in the electric bell.

(b) The magnetised electromagnet attracts the armature which is connected to hammer.

(c) The hammer hits the gong and the sound is produced.

4. State five applications of heating effect of current.

**Ans.** The heating effect of electric current is used in electric fuse, electric iron, electric kettle, room heater and geyser to produce heat for various purposes.

5. State the factors on which the amount of heat produced in a circuit depends.

**Ans.** There are three factors on which the amount of heat produced in a circuit depends. These are: (a) the time for which the current flows, (b) the amount of current flow, and (c) the nature of material of the wire, component or device.

6. State five uses of electromagnets.

**Ans.** (a) Electromagnets are used in the picture tubes of television and computer screens. They help in image formation.

(b) Doctors use electromagnets to remove iron dust from a patient's eyes.

(c) Electromagnets are used to separate iron scrap from the junk in industries.

(d) Electromagnets are used in the receivers of telephones.

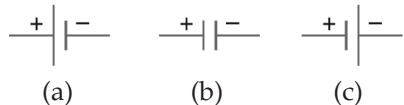
(e) Electromagnets are used in electric motors.

7. What are the factors on which the strength of an electromagnet depends?

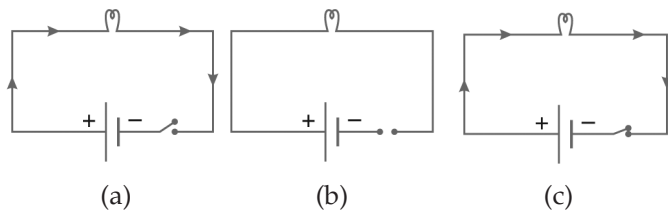
**Ans.** The strength of an electromagnet depends directly on the amount of current flowing through coil and the number of turns in the coil. It depends inversely upon the length of the electromagnet.

8. Look at the following diagram and answer the questions.

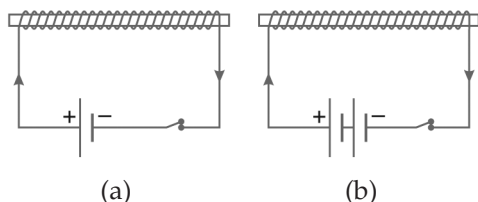
(a) Which of these is a correct symbol of a cell?



(b) In which of the following circuits, the bulb is going to light?



(c) Which of the following is a stronger electromagnet? Why?



Ans. (a) (a)

(b) (c)

(c) (b). This is because the amount of current flowing through the coil is more than that in case (a).

I. Give reasons for the following.

1. The melting point of a fuse is kept low.

Ans. The melting point of a fuse is kept low so that in case of short-circuiting or overloading, it can melt little before any other part of the circuit to save the circuit from burning.

2. Electromagnets are also called temporary magnets.

Ans. Electromagnets are called temporary magnets because as soon as the current through the coil is switched off, they lose their magnetism.

J. Encircle the odd-one out. Give reasons for your choice.

1. Electric toaster, electric geyser, electric bell, electric heater

Ans. Electric bell; This device is based on the magnetic effect of electric current while rest are based on the heating effect of electric current.

2. Electric iron, telephone receiver, TV picture tube, relay switch

Ans. Electric iron; This device is based on the heating effect of electric current while rest are based on the magnetic effect of electric current.

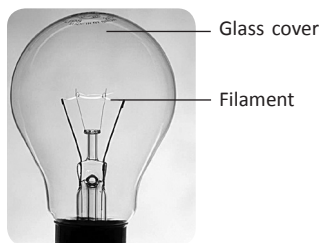
3. Gong, hammer, armature, push button, tungsten filament

Ans. Tungsten filament; It is a part of an electric bulb while rest are the parts of an electric bell.

K. Draw and label the diagram.

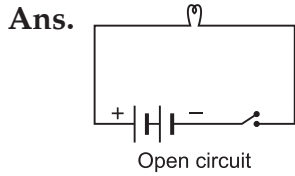
1. Electric bulb

Ans.





2. A circuit showing connection of a torch bulb, an open switch and a battery of two cells, so that the bulb may glow when the switch is closed.



#### L. Skill-based questions.

1. A simple connecting wire has got its two free ends tied to each other to complete the circuit. Do you think the current will flow in this wire? Give reason for your answer.

Ans. No. The current will not flow in this wire because it is not connected to a source of current.

2. Why are the electric bulbs filled with a gas like argon?

Ans. Argon is a nonreactive (inert) gas and it does not allow the filament to burn. Hence, bulbs are filled with inert gas like argon to prevent the burning of filament.

3. Electromagnets are used for transporting heavy iron machinery in industries. Why are the permanent magnets not used for this purpose?

Ans. Electromagnets are very strong and can be demagnetised whenever required by switching off the electric supply, while permanent magnets cannot be demagnetised instantly.

4. A bird can enjoy sitting on an electric line easily. But if a monkey swings on it so that it touches the other parallel line, it gets killed instantly. Justify.

Ans. The body of a bird sitting on an electric line does not touch any other wire and thus is not earthed while the body of a monkey on touching the other parallel line gets earthed and hence, it gets an electric shock.

5. What will happen if a fuse wire is made up of a metal of high melting point?

Ans. If a fuse wire is made up of a metal of high melting point then it will not blow up in case of short-circuit or overloading and the electric appliances as well as wiring may get damaged.

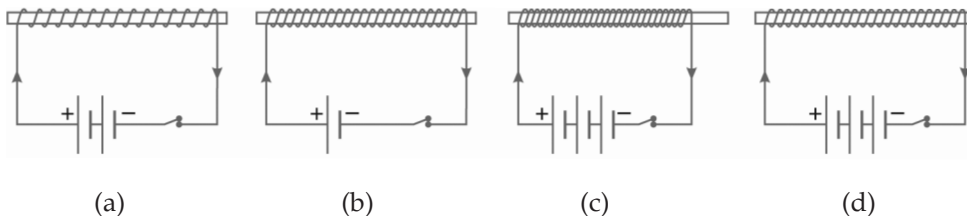
#### M. Activity/Project—Do as directed.

Perform an activity to show that electric current has a magnetic effect.

Ans. Do it yourself.

#### Think Zone

1. Which of the following electromagnets is the strongest? Why?



Ans. The electromagnet shown in Fig. (c) is the strongest because it has the most number of turns in its coil.

**2. Think of maximum number of reasons for which a circuit may not work.**

**Ans.** Possible reasons for not working of a circuit: (a) the switch is not closed, (b) the circuit is broken or connected with an insulator, (c) the bulb is fused, and (d) the cell is old or discharged.

**3. Why can't copper wire be used as a fuse wire?**

**Ans.** Copper has low resistance and high melting point, so it cannot be used as a fuse wire.

## ANSWERS

Check Point 1

## 1. Fill in the blanks.

- (a) A plane mirror is made by polishing one of the faces of a glass sheet.  
(b) A narrow path of light shown by a straight line with an arrow is called a ray of light.  
(c) The size of the image formed by a plane mirror is same as the size of the object.  
(d) Interchanging of the left and right sides of the object with respect to its image in a plane mirror is called lateral inversion.  
(e) A broad bundle of rays of light is called a beam of light.

## 2. What is a (a) convergent beam of light, (b) divergent beam of light and (c) parallel beam of light.

- Ans. (a) A convergent beam of light is a beam of light which comes from a broad source of light and gathers at a point.  
(b) A divergent beam of light is a beam of light which comes from a small source and spreads out.  
(c) A parallel beam of light is a beam of light where all the light rays are parallel to each other (have same distance between them).

Check Point 2

## 1. Fill in the blanks.

- (a) Concave mirrors are used as reflectors in torches.  
(b) Concave mirrors are also called converging mirrors.  
(c) If an object is kept between F and C, in front of a concave mirror, the position of the image formed is beyond C.  
(d) The distance between the centre of curvature and the pole of a spherical mirror is called its radius of curvature.

## 2. Define.

- (a) pole (b) centre of curvature (c) a spherical mirror

- Ans. (a) Pole is the geometric centre of the spherical mirror. It is denoted by P.  
(b) The centre of the hollow sphere, from which the mirror has been taken out, is called its centre of curvature. It is denoted by C.

- (c) A slice taken out from a hollow sphere of glass and polished silver on one side is called a spherical mirror.

### Check Point 3

**1. Fill in the blanks.**

- (a) White light is made up of seven colours.  
(b) Concave lenses are also known as diverging lenses.  
(c) Convex lenses are used in microscopes.  
(d) Convex lenses can focus light at a point.

**2. Define.**

- (a) **Dispersion**  
(b) **Spectrum**

- Ans.** (a) The splitting of white light into its seven constituent colours is called dispersion.  
(b) The band of seven colours obtained on screen as a result of dispersion of white light is called spectrum.

### PRACTICE TIME

**A. MCQs—Choose the correct answers.**

1. A convex mirror is also called a  
(a) diverging mirror  (b) plane mirror  
(c) converging mirror (d) none of the above
2. Following is not a feature of a concave lens.  
(a) it is a diverging lens  
(b) it is thick at edges and thin at the centre  
(c) it is used in spectacles to see distant objects clearly  
(d) it is used in spectacles to see nearby objects clearly
3. Which of the following is not a characteristic of the image formed by a plane mirror?  
(a) virtual (b) erect  
(c) enlarged  (d) laterally inverted
4. A curved mirror can be a  
(a) concave mirror (b) convex mirror  
(c) both (a) and (b)  (d) none of the above
5. This mirror is used in microscopes.  
(a) plane (b) concave  (c) convex (d) none of these
6. White light is made up of  
(a) five colours (b) eight colours  
(c) seven colours  (d) nine colours
7. Dentists use this type of mirror.  
(a) plane (b) convex (c) concave  (d) none of these

8. This mirror is polished silver on its inner surface.  
 (a) plane (b) convex  (c) concave (d) none of these
9. The geometric centre of spherical mirror is called  
 (a) focus (b) pole  (c) principal axis (d) focal length
10. An image formed when an object is kept in front of a convex mirror is  
 (a) virtual (b) erect (c) diminished (d) all of these

**B. Fill in the blanks.**

- Light travels in a straight line.
- The narrow path of light, represented by a straight line is called a ray of light.
- A bundle of light rays coming from a broad source and converging at a point is called a convergent beam of light.
- The image formed by a plane mirror is as far behind the mirror, as the object is in front of it.
- A concave lens in spectacles, helps people to see distant objects clearly.
- A ray of light, incident on a concave mirror, passing through its focus, will have its corresponding reflected ray parallel to the principal axis.
- A convex mirror is used as a rear view mirror in vehicles.
- If an object is kept at infinity, in front of a concave mirror, an image is formed at the focus of the mirror.
- A convex mirror always forms a virtual and erect image.
- A convex lens is used as a magnifying glass.
- A ray of light moving towards a mirror from an object is called an incident ray.

**C. Write True or False against each statement.**

- A converging lens is a concave lens. False
- A plane mirror produces real image. False
- An image produced by a plane mirror is laterally inverted. True
- Concave lenses are used in microscopes. False
- A rainbow is formed by dispersion of light from the air molecules. False

**D. Answer in one word.**

- Geometrical centre of a spherical mirror. Pole
- Centre of the hollow sphere of which the mirror is a part. Centre of curvature
- The distance between the pole and the focus of a spherical mirror. Focal length
- The splitting of white light into seven component colours, after passing through a prism. Dispersion
- A band of seven colours obtained on a screen, after dispersion of white light from a prism. Spectrum
- A ray of light travelling out from the mirror, from the point of incidence. Reflected ray

**E. Define these terms.**

**1. Pole of a mirror**

**Ans.** The geometric centre of a spherical mirror is called its pole.

**2. Divergent beam**

**Ans.** A divergent beam of light is a beam of light which comes from a small source and spreads out.

**3. Focus of a convex mirror**

**Ans.** The mid-point between the pole and the centre of curvature of a convex mirror is called its focus. In convex mirror, it lies behind the mirror.

**4. Convergent lens**

**Ans.** A lens which converges, i.e., gathers the rays of light falling on it is called convergent lens. A convex lens is called a convergent lens.

**5. Real image**

**Ans.** The image formed by actual meeting of reflected rays is called a real image. It is always inverted and can be obtained on a screen.

**6. Focal length of a curved mirror**

**Ans.** The distance between the pole (P) and the focus (F) of a spherical mirror is called the focal length of a curved mirror. It is denoted by small ' $f$ '.

**7. Dispersion**

**Ans.** The splitting of white light into seven colours is called dispersion.

**8. Spectrum**

**Ans.** The band of seven colours obtained on screen as a result of dispersion of white light is called spectrum.

**F. Differentiate between the following.**

**1. A convergent beam and a divergent beam**

**Ans.** A convergent beam of light is a beam of light which comes from a broad source of light and gathers at a point, whereas a divergent beam of light is a beam of light which comes from a small source and spreads out.

**2. A concave mirror and a convex mirror**

**Ans.** When the outer surface of the slice taken from a hollow sphere of glass is polished silver and the inner surface behaves as a reflecting surface, it is called a concave mirror, whereas if the inner surface of the slice is polished and outer surface acts as a reflecting surface, it is called a convex mirror.

**3. A concave lens and a convex lens**

**Ans.** A lens which diverges, i.e., spreads out the rays of light falling on it is called a concave lens. It is thin at the centre and thick towards the edges. On the other hand, a lens which converges, i.e., gathers the rays of light falling on it is called a convex lens. It is bulged at the centre and narrow towards the edges.

## G. Answer these questions.

### 1. Give common uses of convex lenses.

**Ans.** Convex lenses are used in

- (a) cameras, except pinhole camera.
- (b) microscopes and telescopes.
- (c) spectacles to help people see nearby objects clearly.

### 2. Why is a convex mirror used as a rear view mirror?

**Ans.** Convex mirror is a diverging mirror. It can form images of objects spread over a large area by capturing larger view area. Also, it always forms erect and small-sized image of an object. This helps the driver to view the traffic or any other object behind the vehicle easily.

### 3. What is meant by lateral inversion in a plane mirror?

**Ans.** The interchanging of left and right sides of an object with its image is called lateral inversion. Due to lateral inversion, the left side of the object appears right side of the image and right side of the object appears left side of the image.

### 4. State the characteristics of the image formed by a plane mirror.

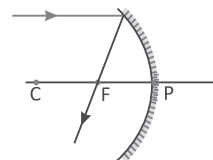
**Ans.** The image formed by a plane mirror has following characteristics:

- (a) The size of the image is equal to the size of the object.
- (b) The image formed is virtual and erect.
- (c) The image is laterally inverted.
- (d) The image is formed at the same distance behind the mirror as the object is placed in front of it.

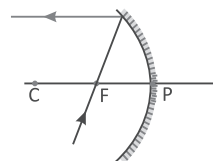
### 5. Write the rules to draw the ray diagrams for concave mirrors. Represent each rule with the help of a diagram.

**Ans.** Following rules are followed to draw ray diagrams for concave mirrors:

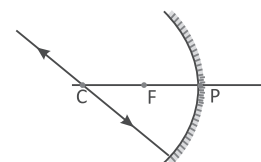
**Rule 1.** If the incident ray goes parallel to the principal axis, its corresponding reflected ray passes through the focus of the concave mirror.



**Rule 2.** If the incident ray passes through the focus, its corresponding reflected ray goes parallel to the principal axis of the mirror.



**Rule 3.** If the incident ray passes through the centre of curvature, its corresponding reflected ray goes back in the same direction without showing any change in its path.



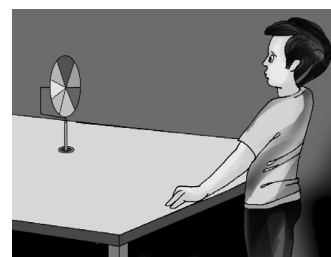
### 6. A person finds difficulty in viewing distant objects, while the nearby objects are clearly visible to him. Which type of lens should he use in his spectacles?

**Ans.** Concave lens

7. Describe an activity to show that white light is made of seven colours.

**Ans.** Activity to show that white light is made of seven colours:

Take a circular disc of cardboard of about 8 inches in diameter. Cover it with a white paper. Divide the disc into seven equal parts and colour each part as shown in the figure. Make a small hole at the centre of the disc, using the tip of a compass. Take out a motor from an old or waste toy car. Fix the motor at the hole. Connect the motor with a dry cell to rotate the disc. As the rotation of the disc becomes fast, the colours on the disc merge into each other and the disc appears white.



This proves that white light is made of seven colours.

H. Give reasons for the following.

1. A convex lens can be used to burn a piece of paper using the sunlight.

**Ans.** A convex lens can focus a broad beam of light at a small area or a small sharp point. So, it focuses sunlight at a point which burns the piece of paper.

2. Lemons kept in a glass of water appear to be enlarged.

**Ans.** Lemons kept in a glass of water appear to be enlarged because water kept in a transparent circular container behaves as a convex lens and makes objects kept in it appear larger.

3. The word 'AMBULANCE' is written inverted on the concerned vehicles.

**Ans.** The word 'AMBULANCE' is written inverted on the concerned vehicles so that the driver of the vehicle going ahead can read it straight in his rear view mirror which forms inverted image of it.

4. The image formed by a plane mirror cannot be obtained on a screen.

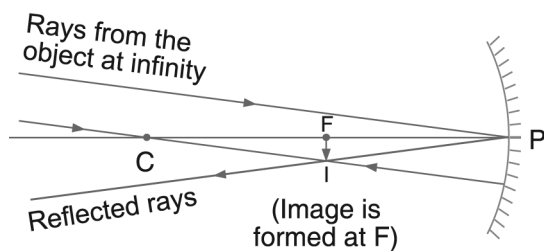
**Ans.** The image formed by a plane mirror is a virtual image. A virtual image cannot be obtained on a screen.

I. Draw and label the diagrams.

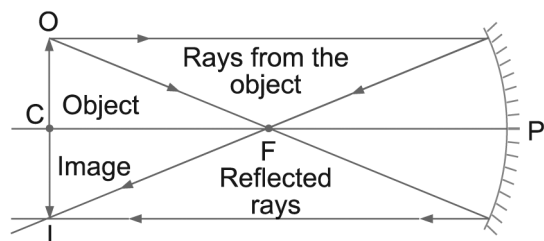
1. Draw the ray diagram for an object placed at

- (a) infinity                      (b) at C  
(c) between F and C, for a concave mirror

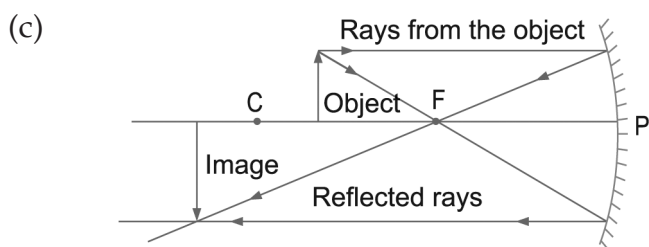
**Ans.** (a)



(b)

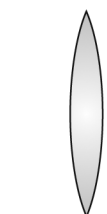






## 2. Concave lens, convex lens and convergent beam

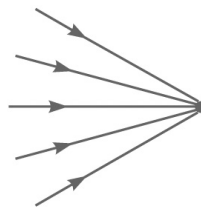
Ans.



Convex lens



Concave lens



Convergent beam

### J. Skill-based questions.

1. If a flash light has low battery, how far will its light travel?

Ans. If the battery of a flash light is low, its light will travel a lesser distance and also its intensity will be less.

2. Can light be concentrated using mirrors? Can it be amplified using mirrors? Give reasons for both of your answers.

Ans. Yes, light can be concentrated by using mirrors. This is done by converging the light rays at a point. On the other hand, light cannot be amplified because on amplification, the rays get diffused.

3. You are given a concave mirror and a convex mirror. How can you differentiate between the two, without touching them?

Ans. In a concave mirror, the image formed can be smaller, equal or larger than the object depending on the distance of object from the mirror while in a convex mirror, the image formed is always smaller than the object.

### H. Activity/Project—Do as directed.

Perform an activity to show that white light is made up of seven colours.

Ans. Do it yourself.

### Think Zone

1. What will be the colour visible on rotation of a Newton's disc, if the portion of red colour in it is more than other colours?

Ans. Light pink

2. The presence of all seven colours of light makes white light. What will be the result of absence of all colours of light?

Ans. Darkness

## ANSWERS

**Check Point 1**

Fill in the blanks.

1. About 1.6% of the water on the earth is present in glaciers and polar ice caps.
2. The problem of water shortage is increasing day-by-day.
3. The process of seeping of water into the ground is called infiltration.
4. Rain is the ultimate source of water.
5. Toxic substances can lead to contamination of water.

**Check Point 2**

1. **What is water conservation?**

**Ans.** Wise and careful use of water without its wastage is called water conservation.

2. **What is an aquifer?**

**Ans.** The groundwater collects between the layers of hard rock. This is known as an aquifer.

3. **What do you understand by rainwater harvesting?**

**Ans.** Rainwater harvesting is a method of collecting and storing rainwater to be used in the future.

4. **When is World Water Day celebrated?**

**Ans.** World Water Day is celebrated on 22nd March.

**PRACTICE TIME**

**A. MCQs—Choose the correct answers.**

1. Water present beneath the earth's surface is
 

(a) aquifer	(b) infiltration
(c) groundwater <input checked="" type="checkbox"/>	(d) water cycle
2. How much per cent of total water is present in oceans on the earth's surface?
 

(a) 95%	(b) 94%	(c) 98% <input checked="" type="checkbox"/>	(d) 92%
---------	---------	---	---------
3. The process of seeping of water into the ground is called
 

(a) water cycle	(b) water table
(c) infiltration <input checked="" type="checkbox"/>	(d) rainwater harvesting

4. 'World Water Day' is celebrated on
 

(a) 22nd March <input checked="" type="checkbox"/>	(b) 23rd March
(c) 25th March	(d) 24th March
5. Water on the earth is found in this state.
 

(a) solid	(b) gas
(c) liquid	(d) all of these <input checked="" type="checkbox"/>
6. The level of water under the ground is called
 

(a) groundwater	(b) infiltration
(c) water table <input checked="" type="checkbox"/>	(d) none of these
7. This is the ultimate source of water.
 

(a) rainwater <input checked="" type="checkbox"/>	(b) aquifer
(c) groundwater	(d) none of these
8. Ice is this state of water.
 

(a) solid <input checked="" type="checkbox"/>	(b) gas
(c) liquid	(d) none of these

**B. Fill in the blanks.**

1. Cholera and typhoid are waterborne diseases.
2. Ground water is present beneath the earth's surface.
3. The seeped water collects between the layers of hard rock. This is called an aquifer.
4. Increase in population has increased the demand for groundwater.
5. Conservation of water is the best way to fulfil our demand for water.
6. We should dispose off toxic/hazardous materials properly.
7. Rainwater harvesting is the method of collecting rainwater for future use.

**C. Write True or False against each statement.**

- |   |              |
|---|--------------|
| 1. Ocean water can be used for drinking and irrigation.                         | <u>False</u> |
| 2. We do not need to conserve water as it is present in abundance.              | <u>False</u> |
| 3. Many parts of our country are facing acute water shortage.                   | <u>True</u>  |
| 4. The water that is present beneath the earth's surface is called water table. | <u>False</u> |
| 5. We should dispose off hazardous material properly.                           | <u>True</u>  |

**D. Answer in one word.**

- |   |                     |
|---|---------------------|
| 1. Constant circulation of water on the earth.                | <u>Water cycle</u>  |
| 2. Water present beneath the earth's surface.                 | <u>Groundwater</u>  |
| 3. The process of seeping of water into the ground.           | <u>Infiltration</u> |
| 4. The level of water under the ground.                       | <u>Water table</u>  |
| 5. Huge underground lakes from which water can be pumped out. | <u>Aquifer</u>      |

### E. Answer these questions.

1. **How can we say that the water on the earth is found in all the three states? Explain.**

**Ans.** The water on the earth is found in all the three states as follows:

- (a) In the liquid state, water is present in oceans, rivers, seas, lakes, ponds, etc.
- (b) In the solid state, water is found as ice and snow on high mountains, glaciers and at the poles.
- (c) In the gaseous state, water is present as water vapour in air.

2. **How is water distributed on the earth?**

**Ans.** On the earth, water is not equally distributed. About 98% of the total water is present in oceans, 1.6% as ice in glaciers and polar ice caps, 0.36% as underground water, 0.036% water as surface water in lakes, streams and rivers and some amount is present as water vapour in air.

3. **List any three problems caused due to water scarcity.**

**Ans.** Following problems are caused due to water scarcity:

- (a) Crop production is affected leading to insufficient supply of food.
- (b) People have to walk miles to fetch water.
- (c) People have to stand in long queues to get their daily water.

4. **Where does underground water come from?**

**Ans.** Underground water comes from rainwater which seeps through the soil to reach the bedrock. Water from lakes, rivers and ponds also seeps into the ground and contributes to underground water.

5. **What is an aquifer? How can you draw water from an aquifer?**

**Ans.** The groundwater collected between the layers of hard rocks is known as aquifer. Tubewells and handpumps are used to draw water from an aquifer.

6. **What are the major causes of groundwater depletion? Discuss.**

**Ans.** Following are the major causes of groundwater depletion:

- (a) **Rapidly rising population and changing lifestyles of people:** This has increased the demand for water due to which groundwater is being extracted excessively for household, agricultural and industrial needs.
- (b) **Agricultural activities:** To cater to the food demand of rising population, there is need to increase crop production. It has led to drilling of a large number of wells and tubewells for irrigation purpose.
- (c) **Reduced forest cover:** A large number of forests have been removed to clear land for agriculture and construction of houses and other buildings. This led to less chances of infiltration of rainwater causing lowering of water table.

7. **How do you think putting a layer of mulch helps in increasing the water table?**

**Ans.** Putting mulch around the plants and trees slows down evaporation of water from the soil. This allows more water to seep underground and helps in increasing the water table.

## F. Give reasons for the following.

### 1. We should conserve water.

**Ans.** Although, a large part of the earth is covered with water but very small amount of it is available for our various uses. We cannot use sea water for drinking, cooking, etc. and water from lakes and rivers is not fit for drinking. Many parts of our country are facing problem of water shortage and people have to walk long distances to fetch water. At some places, they have to stand in long queues or buy water at high prices. If we use water at a faster rate than it is replenished by rain, soon we will run out of water. So, it is demand of time that we should conserve water.

### 2. We should not dispose off hazardous things in waterbodies.

**Ans.** Disposing off hazardous things in waterbodies contaminates water. Consuming contaminated water leads to various diseases such as diarrhoea, typhoid, hepatitis, etc.

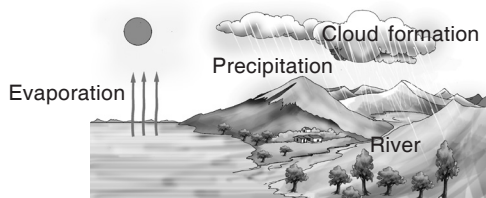
### 3. Increase in population has increased demand for groundwater.

**Ans.** Increase in population has increased demand for groundwater because more and more groundwater is being extracted for irrigation of crops, building houses, factories, roads, bridges, etc. This leads to depletion of groundwater.

## G. Draw the following diagrams.

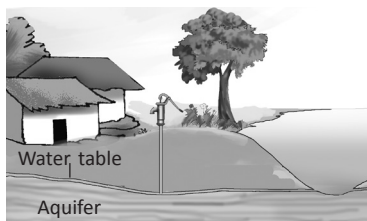
### 1. Water cycle

**Ans.**



### 2. Aquifer and water table

**Ans.**



## H. Skill-based questions.

### 1. What are fog and mist made of?

**Ans.** Fog and mist are made of water vapour and suspended particles.

### 2. In your opinion, which human activities could be stopped during severe water scarcity?

**Ans.** During severe water scarcity, we should stop over watering plants, washing cars and other vehicles, taking bath in bath tubs, using showers, etc.

### 3. The sea level roughly remains the same. Why?

**Ans.** The water on the earth's surface is always on the move. It keeps on circulating from the earth's surface to air and from the air back to the earth's surface. This continuous circulation of water called water cycle which maintains the sea level.

**I. Activity/Project–Do as directed.**

- 1. Prepare a project report on the slogan 'water is precious : save it'.**

**Ans.** Do it yourself.

- 2. Scientists are trying to collect evidences that planet Mars may have water in some form. Collect information on this from newspapers, magazines and internet. Make your own report on this matter and discuss what you think about it in the class.**

**Ans.** Do it yourself.

**Think Zone**

- 1. How is rainwater different from sea water?**

**Ans.** Rainwater is considered the purest form of naturally occurring water, whereas sea water is salty as it contains many salts dissolved in it.

- 2. Why do you think dams are built?**

**Ans.** Dams are built to collect water by blocking the flow of river. This stored water can be used to produce electricity, watering crops, etc.

# Forest – The Green Lifeline

## ANSWERS

### Check Point 1

#### Fill in the blanks.

1. The microbes feed on the bodies of dead and decaying animals and plants.
2. Plants produce food from simple inorganic compounds by the process of photosynthesis.
3. Plants which survive for several years are called perennial.
4. Successful survival of biological community depends upon the interaction of its living organisms and their physical environment.
5. We obtain compounds from plants for preparing ayurvedic medicines.

### Check Point 2

#### Fill in the blanks.

1. Deforestation is the large-scale cutting of trees.
2. Lesser rain causes desertification.
3. About 15 to 20 million hectares of tropical forests are destroyed every year.
4. Under social forestry, wastelands are used to grow trees.
5. Deforestation leads to the spread of deserts.

## PRACTICE TIME

### A. MCQs—Choose the correct answers.

1. Canopy is the topmost layer consisting of
 

(a) leaves and branches of tall trees <input checked="" type="checkbox"/>	(b) shrubs and tall grasses
(c) tall trees and tall grasses	(d) decaying leaves, fruits and seeds
2. The animals found in deeper areas of forests are
 

(a) camels and tigers	(b) whales and seals
(c) polar bear and bats	(d) elephants and bisons <input checked="" type="checkbox"/>
3. Which one of the following is not correct?
 

(a) annuals are plants with a lifespan of one year.
(b) biennials have a lifespan of two years.
(c) perennials have a lifespan of several years.
(d) wheat, maize and cabbage are biennial plants. <input checked="" type="checkbox"/>

4. Forests are called nature's lungs because they
  - (a) release oxygen during photosynthesis
  - (b) take in carbon dioxide during photosynthesis
  - (c) produce food energy during photosynthesis
  - (d) both (a) and (b)
5. Total forest cover in India is
  - (a) 25%
  - (b) 15%
  - (c) 21.54%
  - (d) 30%
6. They obtain their nutrients from the green plants.
  - (a) producers
  - (b) consumers
  - (c) autotrophs
  - (d) none of these
7. Chipko movement was started to save
  - (a) trees
  - (b) waterfalls
  - (c) temples in villages
  - (d) historical monuments
8. Permanent destruction of forests and woodlands is called
  - (a) desertification
  - (b) afforestation
  - (c) deforestation
  - (d) conservation
9. This gas is used in photosynthesis.
  - (a) nitrogen
  - (b) carbon dioxide
  - (c) hydrogen
  - (d) water vapour

**B. Fill in the blanks.**

1. Forests are renewable natural resources.
2. Humus is formed by the action of decomposers on dead and decaying plants and animals.
3. Forest maintains balance of oxygen and carbon dioxide concentration in the atmosphere.
4. Deforestation and fire are major threats to forests.
5. Animals depend on plants for food and oxygen.

**C. Write True or False against each statement.**

1. Animals provide nutrients to plants. True
2. Forests reduce noise. True
3. Forests do not generate any employment. False
4. The forest cover in India is only 10% of its total land area. False
5. Deforestation takes place due to overgrazing. True

**D. Answer in one word.**

1. Using a natural resource without depleting it. Conservation
2. Clearing forest to use the land for housing or industry. Deforestation
3. The topmost layer of leaves and branches of trees in a forest. Canopy
4. Animals living in forests. Wild animals
5. Decaying leaves, dead animals and plants. Forest floor
6. Microorganisms that cause decay of organic matter. Decomposers
7. Human populations that live in forests. Tribes



**E. Define these terms.**

**1. Canopy**

**Ans.** Canopy is the topmost layer of crown formed by the leaves and branches of very tall trees in a forest.

**2. Humus**

**Ans.** Humus is the decomposed organic matter that makes the topsoil rich in nutrients and blackish or brownish in colour.

**3. Decomposers**

**Ans.** The microorganisms like bacteria and fungi that convert remains of dead and decaying animals and plants into humus are called decomposers.

**4. Soil erosion**

**Ans.** The removal of topsoil by wind and water is called soil erosion.

**F. Differentiate between the following.**

**1. Habitat and biodiversity**

**Ans.** The natural living place of an organism is called its habitat, whereas variety of plants and animals in an area is called biodiversity.

**2. Deforestation and desertification**

**Ans.** Deforestation is the large-scale cutting of trees to clear a land area for agriculture, housing or industrial use. On the other hand, desertification is the process of conversion of a green area into a dry and sandy area due to low or no rainfall for a long period of time or deforestation, overgrazing and soil erosion.

**G. Answer these questions.**

**1. Mention two important benefits of forests.**

**Ans.** Important benefits of forests:

- (a) Forests purify air, i.e., provide clean and fresh air for breathing to all living beings.
- (b) Forests regulate climate by reducing temperature and bringing rainfall.

**2. With two suitable examples, explain the interdependence of plants and animals.**

**Ans.** Plants and animals are interdependent on each other as follow:

- (a) Animals obtain food, oxygen and shelter from the plants.
- (b) Plants depend on animals for carbon dioxide, inorganic nutrients, pollination and seed dispersal.

**3. Mention the causes of deforestation.**

**Ans.** Following are the causes of deforestation:

- (a) Increased demand of fuelwood, paper and timber.
- (b) Increased demand of land for industries, houses, roads, railway tracks and for agriculture.
- (c) Increased mining activity and overgrazing.
- (d) Lowering of water table causes plants and trees to wilt and die.
- (e) Fire is also responsible for the destruction of forests on a large scale.

**4. Name five important products obtained from forests.**

**Ans.** Food, wood, rubber, gum, resin, honey, lac, bamboo, fuel wood, fodder, etc., are some important products obtained from forests.

**5. How can forests be conserved?**

**Ans.** Forests can be conserved by taking following measures:

- (a) Large-scale cutting of trees must be stopped.
- (b) When trees are cut, more trees should be planted in their place.
- (c) Overgrazing by cattle and other animals should be stopped.
- (d) To develop new forests, more saplings should be planted every year during the rainy season.
- (e) Forests must be protected from insects, pests and infections by treating them with insecticides and pesticides.
- (f) Forest fires must be checked. People should avoid smoking or cooking in the forest area.
- (g) Various activities leading to soil erosion must be avoided.
- (h) Pollution of air, land and water should be controlled so that trees and vegetation could survive.

**6. What can you do to protect the forests?**

**Ans.** Forests can be protected by creating awareness about their importance among people. This awareness can be created by organising debates, road shows, competitions in poster making on forests in schools and at community level.

**H. Give reasons for the following.**

**1. Forest cover is necessary.**

**Ans.** Forest cover is necessary because forests control soil erosion by binding soil. They hold rainwater and allow it to infiltrate, thus, prevent floods. Forests make the soil fertile by recycling the nutrients. Also, forests purify air and provide several useful products to us.

**2. We should conserve forests.**

**Ans.** We should conserve forests because they are an important natural resource. They are essential for preservation of environment and survival of all animals. They regulate the climate by reducing the temperature of surroundings. They help in bringing rainfall, control soil erosion, provide shelter to animals. They also provide us with food, wood, fuelwood, etc.

**3. Plants purify air.**

**Ans.** Plants remove carbon dioxide from the air and use it in the process of photosynthesis. They release oxygen during the same process. They hold soil particles together and thus, decrease the amount of dust in the air. In this way, they purify air.

**4. Forest soil is fertile.**

**Ans.** In the forest, the fallen leaves, dead plants and animals and their wastes are decomposed by microbes into inorganic compounds. These inorganic compounds get mixed with soil and make humus. This makes the forest soil fertile.

### **I. Skill-based questions.**

#### **1. How does air pollution affect plants?**

**Ans.** Air pollution caused by suspended particulate matter (SPM) affects the functioning of leaves by clogging their stomata.

#### **2. Why are forests called the lungs of nature?**

**Ans.** Forests are called nature's lungs because (a) their green vegetation releases oxygen during photosynthesis, (b) they utilise atmospheric carbon dioxide, (c) they maintain a balance of oxygen and carbon dioxide in the atmosphere.

#### **3. How is clearing of forests responsible for global warming?**

**Ans.** Clearing of forests (deforestation) reduces the number of plants and trees which use carbon dioxide from air to prepare their food. Due to less number of trees, carbon dioxide level in air increases. The increased amount of CO<sub>2</sub> traps more heat from the sun and finally increases overall temperature of atmosphere, leading to global warming.

#### **4. What will happen if decomposers are destroyed from forests?**

**Ans.** The absence of decomposers from forests will lead to the accumulation of fallen leaves, dead plants and animals and their waste products. The topsoil of forest floor will be without nutrients and will not be suitable for growth and support of vegetation.

### **I. Activity/Project–Do as directed.**

**'Forests maintain balance of oxygen and carbon dioxide in the atmosphere'. Prepare a project report on it.**

**Ans.** Do it yourself.

### **Think Zone**

#### **1. In olden days, people lived in forests. Why?**

**Ans.** Forests provided people living there with everything they needed like food, shelter, water and medicinal plants.

#### **2. Trees are planted along the road. Why?**

**Ans.** Trees are planted along roadsides to provide shade for the passengers. They also help to reduce air and noise pollution.

## ANSWERS

Check Point 1

## Fill in the blanks.

1. Clean water that is fit for drinking is called potable water.
2. Sewage is treated in sewage treatment plants or waste water treatment plants.
3. Biogas is released during the treatment of sludge.
4. Chlorine or ozone are used to disinfect water.

Check Point 2

## Fill in the blanks.

1. Contaminated water is not suitable for drinking.
2. Substances that pollute water are called pollutants.
3. Manure also helps in retaining soil fertility.
4. Typhoid is a waterborne disease.

PRACTICE TIME

## A. MCQs—Choose the correct answers.

1. This water is fit for drinking.
 

(a) potable water <input checked="" type="checkbox"/>	(b) waste water
(c) rainwater	(d) groundwater
2. Sewage includes
 

(a) garbage	(b) human wastes
(c) water	(d) all of these <input checked="" type="checkbox"/>
3. This is not a constituent of biogas.
 

(a) methane	(b) carbon dioxide	(c) hydrogen	(d) nitrogen <input checked="" type="checkbox"/>
-------------	--------------------	--------------	--
4. Sludge is this kind of waste in water.
 

(a) solid <input checked="" type="checkbox"/>	(b) liquid	(c) gas	(d) none of these
---	------------	---------	-------------------
5. The suspended microbes settle down at the bottom as
 

(a) sludge	(b) sewage
(c) activated sludge <input checked="" type="checkbox"/>	(d) none of these

6. This gas is used as disinfectants.  
 (a) chlorine (b) hydrogen  
 (c) ozone (d) both (a) and (c)
7. This is not a waterborne disease.  
 (a) AIDS  (b) dysentery (c) cholera (d) typhoid

**B. Fill in the blanks.**

- Dirty water containing human waste and garbage is called sewage.
- The organic impurities present in sewage include human waste and animal waste.
- Biogas is a mixture of methane, hydrogen, carbon dioxide and hydrogen sulphide.
- Used oils and fats should not be thrown in the drain.

**C. Write True or False against each statement.**

- Potable water is unfit for drinking. False
- The first step in the treatment of waste water is to pass the waste water through grit tanks. False
- Biogas is obtained by the action of aerobic bacteria on organic wastes. False
- Aeration tanks contain aerobic bacteria. True

**D. Answer in one word.**

- Clean water which is fit for drinking. Potable
- Tanks that collect sludge. Digesters
- Dissolved impurities present in water. Contaminants
- A fuel obtained by decomposing sludge. Biogas

**E. Define these terms.**

**1. Sewage**

**Ans.** The waste water which carries industrial, domestic and human waste is called sewage.

**2. Contaminants**

**Ans.** The substances which change the quality of air, water and soil and make them unfit for use are called contaminants.

**3. Waste water treatment plant**

**Ans.** An establishment where waste water is treated to remove physical, chemical and biological contaminants from it and made reusable is called waste water treatment plant.

**F. Answer these questions.**

**1. What are the various uses of water?**

**Ans.** We use water for drinking, cooking, cleaning, bathing, washing clothes, watering plants and in many industrial processes.

**2. Define sewage. List some contaminants present in sewage.**

**Ans.** The waste water which carries industrial, domestic and human waste is called sewage.

Sewage contains following contaminants:

- (a) **Organic impurities:** They are human waste, animal waste, food waste, soaps, detergents, pesticides, etc.

- (b) **Inorganic impurities:** They are nitrates, sulphates, phosphates, metals, etc.
- (c) **Nutrients:** They are nitrogen, phosphorus, etc.
- (d) **Microorganisms:** They are mainly disease-causing microbes which may cause typhoid, cholera, dysentery, etc.

**3. Why is it necessary to treat the sewage before it is discharged into the rivers?**

**Ans.** Sewage contains a large number of germs and impurities. If it is discharged untreated into the rivers, it will pollute river water and many aquatic animals such as fishes, tortoises, etc. will die.

**4. What happens when the sewage is passed through bar screens?**

**Ans.** When sewage is passed through bar screens, the large objects like rags, wood pieces, sticks, stones, polythene bags, etc., present in it are left behind and are removed.

**5. How is biogas formed?**

**Ans.** Biogas is formed during the decomposition of sludge in digesters by the action of anaerobic bacteria.

**6. Why is clarified water passed through aeration tanks?**

**Ans.** Clarified water is passed through aeration tanks for the decomposition of organic waste present in it by the aerobic bacteria. This makes waste water safe to be discharged into the waterbodies.

**7. List two ways to control water pollution in our homes.**

**Ans.** Water pollution in homes can be controlled as follows:

- (a) Used oils and fats should not be thrown in the drain.
- (b) Hazardous household products such as paints, cleaning liquids, insecticides, etc. should not be thrown in the drain.

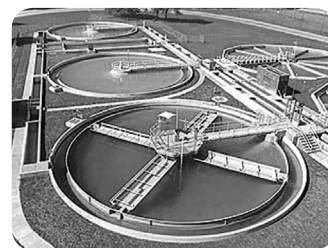
**8. How can we reduce water pollution at public places?**

**Ans.** At public places, we can reduce water pollution by following ways:

- (a) By not throwing plastic bags or any other material in rivers, lakes or any other waterbodies.
- (a) By disposing off waste properly after fairs, weddings, processions, etc.

**9. Look at the picture given alongside and answer the questions.**

- (a) **What does this picture show?**
- (b) **Why is it necessary to pass the waste water through grit tanks?**
- (c) **Why is aeration important?**
- (d) **Why is water sometimes disinfected before discharging into waterbodies?**



**Ans.** (a) This picture shows a waste water treatment plant.

- (b) It is necessary to pass the waste water through grit tanks so as to allow the grit, sand, stones and other heavy objects which escape from bar screen to settle at the bottom of the tank.

- (c) Aeration is important as it allows the decomposition of organic waste present in water by aerobic bacteria. After the process of aeration, the waste water is safe to be discharged into the rivers and lakes.
- (d) Water is sometimes disinfected before discharging into waterbodies to make it free from harmful microbes.

**G. Give reasons for the following.**

**1. Used oils and fats should not be thrown in the drain.**

**Ans.** Used oils and fats should not be thrown in the drain because they may choke the pipes and damage the drainage system.

**2. Using compost is better than using fertilisers in the gardens.**

**Ans.** Using compost is better than using fertilisers in the gardens because it retains the fertility of soil, whereas use of fertilisers causes water pollution and can make the soil barren after a long period.

**H. Skill-based questions.**

**Annu has the habit of over watering the plants in her lawn. Do you think it can lead to contamination of groundwater? How?**

**Ans.** Yes. If she over waters the plants, the fertilisers get washed with the water and reach groundwater, thus causing contamination of groundwater.

**I. Activity/Project–Do as directed.**

**Prepare a project report on waste water treatment plant that is used in removing contaminants.**

**Ans.** Do it yourself.

**Think Zone**

**1. If you were to pass a few rules about the conservation of water in your school, what would they be?**

**Ans.** Rules to conserve water in school: (a) taps must be closed after their use, and (b) the waste water should be used to water the plants.

**2. Many people use river water for bathing and washing clothes. Do you think these activities pollute the river water? What harmful effects can be caused due to this?**

**Ans.** Yes, washing clothes and bathing in rivers pollute the river water. This can cause diseases and even death of aquatic animals and plants. If such a polluted water is used for drinking purpose, it can cause several waterborne diseases.