New Science Power 8

Crop Production 1

ANSWERS

Check Point 1

1. Name the main cereal crops grown in India?

Ans. Main cereal crops grown in India are rice, wheat, maize, barley and ragi.

2. Name the crop seasons in India. Why do we have different crop seasons?

Ans. Rabi and Kharif are two crop seasons in India.

We have different crop seasons because all crops do not grow in same environmental condition. They grow in different conditions of temperature and moisture, and require water differently.

3. Give one specific reason why kharif crops cannot be grown in rabi season?

Ans. Kharif crops cannot be grown in rabi season because they need lots of water.

4. Name three crop plants grown in kharif season.

Ans. Rice, maize and bajra.

5. What are the important aspects of getting a bumper crop?

Ans. Important aspects of getting a bumper crop are preparation of soil, selection and sowing of seeds, application of manures and fertilisers, irrigation, protection of crops from pests and diseases.

6. Give two advantages of ploughing the field?

Ans. (a) Ploughing loosens the soil for easy and deeper penetration of roots.

(b) It allows circulation of air in the soil.

7. Why is levelling essential?

Ans. Levelling is essential because it prevents loss of moisture from soil as well as waterlogging. It helps in uniform irrigation.

Check Point 2

1. **What are the methods of sowing seeds?**

Ans. Manual method (broadcasting) and mechanical method (with seed drill) are two methods of sowing seeds.

2. **Name the medium in which plants grow.**

Ans. Soil

3. **Which crops are grown by transplantation?**

Ans. Crops of rice, chillies, tomatoes, etc., are grown by transplantation.

4. **Sowing with seed drill is better. Give reasons.**

Ans. The seed drill makes furrows in the soil and seeds fall into the furrows at regular intervals and at appropriate depth.

5. **What is transplantation?**

Ans. The transfer of seedlings from nursery to the main field is called transplantation.

Check Point 3

1. **Name two fertilisers containing nitrogen and other containing phosphorus?**

Ans. Urea and ammonium sulphate contain nitrogen while superphosphate contains phosphorus.

2. **How is compost prepared?**

Ans. Compost is prepared by the decomposition of vegetable refuse, farm litter, kitchen waste, sugarcane trash, weeds, sewage sludge and animal waste by the action of soil bacteria.

3. **What is the use of biofertilisers?**

Ans. Biofertilisers are microorganisms like *Azotobacter* and Mycorrhiza which are used to improve soil fertility.

4. **What is fallowing?**

Ans. Fallowing is leaving the field to rest for a season after harvesting one crop. It improves soil fertility.

5. **Explain the significance of crop rotation and mixed cropping.**

Ans. In crop rotation, different types of crops are grown in succession to improve soil fertility. For example, a crop of pulses, peas, beans or gram is grown between two cereal crops.

In mixed cropping, two or more types of crops are grown together in the same field at the same time. This improves soil fertility. For example, raising cotton crop with groundnut crop is mixed cropping.

Check Point 4

1. **Why should seeds be sown in moist soil?**

Ans. Seeds should be sown in moist soil because seeds need moisture (water) to germinate.

2. **Why is drip irrigation better than other methods?**

Ans. Drip irrigation is better than other methods because in this system water is not wasted and all the plants get regular water supply.

3. **Why is excessive irrigation harmful to the crop?**

Ans. Excessive water reduces air in the spaces between soil particles. This cuts off oxygen supply and the roots get damaged. Excessive irrigation also increases salts in the soil, reducing its fertility.

Check Point 5

1. **What are weeds? How do they affect the crop?**

Ans. The unwanted plants that grow naturally along with crop plants are called weeds. They compete with the crop plants for nutrients, water, sunlight and space, and hence, affect their growth.

2. **Give one difference and one similarity between weedicides and insecticides.**

Ans. **Difference:** Weedicides are used to kill weeds, whereas insecticides are used to kill insect pests.

Similarity: Both the weedicides and insecticides are chemical substances.

3. **Differentiate between insecticide and pesticide.**

Ans. The chemicals used to kill pests are called pesticides, e.g., malathion, parathion, endrine, copper oxychloride and zinc phosphide. The pesticides used to kill insect pests are called insecticides.

4. **Name the methods used for pest eradication.**

Ans. Biological control and crop rotation.

5. **What are the harmful effects of using insecticides or pesticides?**

Ans. Using insecticides or pesticides contaminates soil and water, kills useful insects also.

Check Point 6

1. **What is harvesting?**

Ans. The cutting and gathering of crop after it has matured is called harvesting.

2. **Give example of two crops for which harvesting is done manually.**

Ans. Manual harvesting is done for rice and wheat.

3. **Name the machine which is used for harvesting as well as for threshing.**

Ans. Combine is used both for harvesting and threshing.

4. **Name the process of separating grains from harvested crop.**

Ans. Threshing

5. **What do you mean by Green Revolution?**

Ans. Improvement in the production of foodgrains and other agricultural produce during the period 1960–80 is described as Green Revolution.

6. **Name the scientist whose efforts resulted in the success of Green Revolution.**

Ans. Prof. M S Swaminathan.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. This is not a kind of kharif crop.
(a) maize (b) bajra (c) soyabean (d) wheat ✓

2. Nitrogen deficiency of soil can be removed by
(a) manuring (b) broadcasting
(c) transplantation (d) applying urea ✓

3. BHC and malathion are
(a) pesticides ✓ (b) insecticides (c) fungicides (d) weedicides

4. Which chemical method is used to prevent rust of wheat in the crop?
(a) pesticide (b) rodenticide (c) fungicide ✓ (d) herbicide

5. The process of separating grains and husk from the harvested crop is called
(a) threshing ✓ (b) winnowing (c) harvesting (d) irrigation

6. He is pioneer of Green Revolution in India.
(a) Swaminathan ✓ (b) Maheshwari (c) Birbal Sahni (d) G. B. Pant

7. The common weedicides are
(a) 2, 4–D (b) MCPA
(c) Butachlor (d) all of these ✓

8. This insect is used to eliminate prickly pear (*Opuntia*) from the crop fields.
(a) cochineal ✓ (b) weevils (c) beetle (d) aphid

B. Fill in the blanks.

1. Cultivation of plants for food is called *agriculture*.

2. The ploughing *loosens* the soil and improves *air* circulation.

3. Big pieces of soil in the ploughed field are called *crumbs*.

4. The high-yielding varieties of crop are developed by *cross-breeding* method.

5. The manure formed by the decomposition of plant and animal wastes is called *compost*.

C. Write True or False against each statement.

1. Crop rotation is a method of replenishing nitrogen of the soil. *True*

2. Sandy soil needs less water for growing plants. *False*

3. A machine called combine is used for winnowing. *False*

4. Excessive use of fertilisers enhances nitrogen content of soil. *False*

5. Kharif crops need more water than rabi crops. *True*

D. Answer in one word.

1. Chemical compounds used to increase soil fertility. *Fertilisers*

2. Leaving the field to rest for one season after harvesting one crop. *Fallowing*

3. Raising crop by providing organic manure and applying biological control. *Organic farming*

4. Overflooding of fields causing accumulation of water for long. *Waterlogging*

5. Animals that attack and damage crops. *Pests*

E. Define these terms.

1. Green Revolution

Ans. Improvement in the production of foodgrains and other agricultural produce during the period 1960–80 is described as Green Revolution.

2. Hybridisation

Ans. Selective cross-breeding of two or more varieties of plants having different desired characters to produce a new variety is called hybridisation.

3. Harvesting

Ans. The cutting and gathering of crop after it has matured is called harvesting.

4. Drip irrigation

Ans. Drip irrigation is a system of irrigation in which water is provided to the plants drop by drop just at their base, near the roots.

F. Differentiate between the following.

1. Fertiliser and manure

Ans. Fertiliser is an inorganic salt or an organic compound which is manufactured in factories and provides specific nutrients to the soil, whereas manure is a decomposed organic matter which is prepared naturally in the fields by the action of microbes on the animal and plant waste. It provides humus to the soil.

2. Threshing and winnowing

Ans. The process of separating grains and husk from the harvested crop is called threshing, whereas the process of separating the hay and chaff from the grains with the help of wind is called winnowing.

G. Answer these questions.

1. Give three important advantages of ploughing the field.

Ans. Ploughing has following advantages:

(a) It loosens the soil and improves air circulation in it.

(b) It increases water-retention capacity of the the soil.

(c) It mixes manures and fertilisers with the soil.

2. Name three basic steps in the preparation of soil.

Ans. Ploughing, levelling and manuring are three basic steps in the preparation of soil.

3. Summarise the benefits of using seed drill for sowing seeds.

Ans. Sowing seeds with a seed drill has following benefits:

(a) Seeds are sown uniformly at proper distance and at proper depth in the furrows only.

(b) Seeds get covered with soil and are saved from being picked up and eaten by birds.

(c) It saves time and labour, and prevents wastage of seeds.

4. Write the advantages of applying manure. When should it be used?

Ans. Following are the advantages of applying manure:

- Manure provides humus to the soil which improves physical and chemical properties of soil.
- It restores the soil texture.
- It improves water holding capacity of soil.
- It makes soil porous and airy.
- It replenishes soil with all the nutrients.

Manure should be used first before sowing the seeds and then at frequent intervals after the plants have grown.

5. Discuss the importance of mixed cropping.

Ans. The mixed cropping improves soil fertility as different crops need different nutrients to grow.

6. What do you mean by crop rotation? Why should it be recommended to the farmers?

Ans. Growing different types of crops in rotation is called crop rotation. Growing crops in rotation should be recommended to the farmers because it improves soil fertility.

7. Name the old methods of irrigation used in India.

Ans. The old methods of irrigation used in India are pulley system or moat, chain pump, dhiekli, rahat, etc.

8. Why is drip irrigation the best method of watering plants?

Ans. Drip irrigation is the best method of watering plants because in this method water is not wasted and all the plants get regular water supply near their roots.

9. Discuss the necessity of weeding. How is it done?

Ans. Weeding is a necessary step in growing crop plants because:

- Weeds may produce toxic substances that interfere with the growth of crop plants.
- Weeds may be poisonous to humans and domestic animals.
- Weeds attract pests and spread them to the crop plants.

Weeding is carried out by following methods:

(a) **Mechanical method:** In this method, weeding before sowing seeds, is carried out by harrow or rake and from a standing crop by trowel or hoe.

(b) **Chemical method:** In this method, different chemicals called weedicides are used for weeding. The common weedicides are 2, 4–D, MCPA and Butachlor.

(c) **Biological method:** In this method, the living organisms which feed on weed are released in the field. They feed on and destroy the weed. For example, cochineal insect is used to eliminate prickly pear from the crop field.

10. How was Green Revolution achieved? Name the scientist who started Green Revolution.

Ans. Green Revoluation was achieved by using new techniques of agriculture and by developing high-yielding, disease-resistant and pest-resistant varieties of wheat.

The new varieties of wheat were developed by carrying out cross-breeding methods between Indian varieties and high-yielding dwarf varieties from Mexico and Australia. Prof. M S Swaminathan started Green Revolution.

11. Write a note on different types of fertilisers and manures.

Ans. **Fertilisers:** There are three main types of fertilisers. They are nitrogenous, phosphatic and potassium fertilisers. Nitrogenous fertilisers contain nitrogen as main constituent. They are urea, ammonium sulphate, ammonium nitrate and sodium nitrate. Similarly, phosphatic and potassium fertilisers contain phosphate and potassium as main constituent respectively. Examples of phosphatic fertilisers are ammonium phosphate, ammonium hydrogen phosphate, etc. and that of potassium fertilisers are potassium chloride, potassium nitrate, etc. Some fertilisers contain two or more main mineral nutrients. For example, superphosphate of lime contains phosphate and calcium, while NPK contains nitrogen, phosphorus and potassium.

Manures: Manures are grouped on the basis of material they are made from. However, the process of formation is same for all kinds of manures, i.e., they are made by action of microbes on dead and decaying organic matter. There are mainly three kinds of manure. They are farmyard manure (FYM), green manure and compost manure. Farmyard manure is made from household waste such as fruits and vegetable peels, rags, sewage, etc. and garden waste such as weeds, animal waste, dry fallen leaves, etc., under controlled conditions.

H. Give reasons for the following.

1. To plough the land is necessary before sowing seeds.

Ans. Ploughing is necessary as:

(a) It loosens the soil and improves air circulation in it.
(b) It increases water-retention capacity of the soil.
(c) It mixes manures and fertilisers with soil.

2. Farmers use manures and fertilisers.

Ans. Farmers grow different crops in the same field for many years. This makes the soil poor in nutrients and infertile. So, to make soil fertile and rich in nutrients for growing healthy crop plants, farmers use manures and fetilisers.

3. Compost manure is better than chemical fertilisers.

Ans. Regular use of fertilisers damages the fertility of soil. Fertiliers slow down the activities of useful soil bacteria, may increase the acidity or alkalinity of soil and can cause water and soil pollution. On the other hand, compost manure restores the soil texture, improves water holding capacity of soil and makes soil airy. Therefore, compost manure is better than chemical fertilisers.

4. Weedicides are used in agriculture.

Ans. Weeds compete with the crop plants for nutrients, water, sunlight and space. They may produce toxic substances and hamper the growth of crop plants. They may be poisonous to humans and domestic animals. They attract pests and spread them to the crop plants. Thus, weeds are very harmful for crops. Therefore, weedicides are used in agriculture.

I. Skill-based questions.

1. How is algal bloom caused?

Ans. Algal bloom is excessive growth of algae in a waterbody. It is caused due to enrichment of nutrients in the water. The excess of fertilisers used by farmers are washed away by rainwater and carried to nearby waterbody. These fertilisers promote the growth of algae causing algal bloom.

2. It is recommended to use manure instead of chemical fertilisers. Why?

Ans. Manures are more beneficial than fertilisers. They provide humus rich in nutrients to soil and keep the fertility of soil last longer. On the other hand, fertilisers do not provide humus to soil and their use for many years makes the soil infertile.

J. Activity/Project–Do as directed.

Perform an activity to study the effects of deep and shallow sowing of seeds.

Ans. Do it yourself.

Think Zone

Use of chemical pesticides was highly recommended in 1980s, but now scientists are in favour of using biopesticides. Why?

Ans. In 1980s, it was the phase of Green Revolution in India and several modern methods were employed to increase food production. Now, the excessive use of pesticides has become harmful as they contaminate food, water as well as environment. Therefore, use of biopesticides is favoured now.

Microorganisms

2

ANSWERS

Check Point 1

1. Define microorganisms and microbiology.

Ans. The tiny organisms present in soil, air and water that we can see with the help of a microscope only are called microorganisms.
The study of mircroorganisms is called microbiology.

2. Who observed very small organisms in water?

Ans. Leeuwenhoek

3. Who is called the father of bacteriology?

Ans. Louis Pasteur

4. Name the scientist who proposed germ theory of disease.

Ans. Louis Pasteur

5. What is the use of bacteria that reside in our intestine?

Ans. The bacteria residing our intestine synthesise B-complex vitamins that help in the digestion of food.

6. How are bacteria able to survive in extreme hot or cold?

Ans. During extreme hot or cold conditions, bacteria enclose themselves in hard and resistant cysts. This helps them survive in extreme hot or cold.

Check Point 2

1. Where are bacteria found?

Ans. Bacteria are found in air, water, soil, in food products and in the bodies of other organisms.

2. What are endospores?

Ans. Under unfavourable conditions, each bacterium develops a thick, protective wall around it. It is now called an endospore.

3. What is the mode of nutrition in fungi?

Ans. Fungi have sprotrophic and parasitic mode of nutrition.

4. Name the types of algae, based on their pigments.

Ans. The types of algae based on their pigments are green algae, red algae and brown algae.

5. What is the mode of nutrition in algae?

Ans. Algae have autotrophic mode of nutrition.

Check Point 3

Fill in the blanks.

1. Viruses can be seen by *electron microscope*.
2. Yeast is used in the manufacture of *alcohol* from grapes.
3. Free nitrogen of the atmosphere is fixed into *nitrogen compounds* by nitrogen-fixing bacteria.
4. *Rhizobium* lives in the root nodules of legumes.
5. Dough for making bread, cake and pastry is made soft and fluffy by adding *yeast*.
6. Antibiotic penicillin was obtained from the fungus *Penicillium notatum*.

Check Point 4

1. **Define the term pathogen.**

Ans. Disease-causing microorganisms are called pathogens.

2. **Name two plant diseases caused by fungi.**

Ans. Potato blight and mildew are two plant diseases caused by fungi.

3. **Which bacterium causes curdling of milk?**

Ans. *Lactobacillus* causes curdling of milk.

4. **Name two viral diseases that spread by air.**

Ans. Common cold and chickenpox.

5. **What is the cause of jaundice?**

Ans. Jaundice is caused by drinking water contaminated with *Hepatitis* virus.

6. **What is botulism?**

Ans. Botulism is a kind of food poisoning caused by eating tinned or canned food which is spoilt by bacterium *Clostridium botulinum.*

Check Point 5

1. **Define pasteurisation.**

Ans. Pasteurisation is the process of heat and cold treatment to which milk is subjected to make it bacteria-free.

2. **Name two food items which are preserved by using salt.**

Ans. Fruits and meat.

3. **Suggest a method for preserving a green leafy vegetable like spinach or fenugreek (*methi*).**

Ans. Spinach and fenugreek are preserved by drying and dehydration.

4. **Which microorganisms spoil the food?**

Ans. Bacteria and Fungi.

5. **Name the method used for the preservation of milk.**

Ans. Pasteurisation.

Check Point 6

1. What is nitrogen fixation?

Ans. Nitrogen fixation is the process of fixing of atmospheric nitrogen into nitrogen compounds such as nitrates and making these available to plants.

2. Name two cyanobacteria that carry out nitrogen fixation.

Ans. *Anabaena* and *Nostoc*.

3. What is nitrogen cycle?

Ans. The cyclic movement of nitrogen element between living and nonliving components of the biosphere is called nitrogen cycle.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. Malaria is caused by a
(a) bacterium (b) virus (c) protozoan ✓ (d) fungus

2. Pasteurisation of milk destroys
(a) fats (b) vitamins (c) proteins (d) bacteria ✓

3. Viruses are
(a) eukaryotes (b) prokaryotes (c) microbes ✓ (d) protozoans

4. Microorganisms were discovered by
(a) Leeuwenhoek ✓ (b) Louis Pasteur
(c) Edward Jenner (d) Robert Hooke

5. Cyanobacteria present in the soil fix this gas into nitrogen compounds.
(a) hydrogen (b) nitrogen ✓ (c) oxygen (d) chlorine

6. Some microorganisms are used in the manufacture of
(a) alcohol (b) wine (c) acetic acid (d) all of these ✓

7. The disease that spreads through air, water, food or physical contact is
(a) waterborne (b) bacterial (c) communicable ✓ (d) viral

8. To make milk bacteria-free, it is heated to
(a) 50°C (b) 70°C ✓ (c) 90°C (d) 100°C

B. Fill in the blanks.

1. Viruses are *acellular* organisms.

2. *Saprophytes* obtain food from dead and decaying organic matter.

3. Mushrooms are *multicellular* fungi.

4. The diseases that are caused by microorganisms are called *communicable or infectitious* diseases.

5. *Denitrifying* bacteria decompose nitrogen compounds to liberate nitrogen in the air.

6. Amoebic dysentery is caused by a *Entamoeba* .

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

1. Microbes are disease-causing organisms. *False*
2. Some bacteria can make their food like plants. *True*
3. Red and brown algae do not possess chlorophyll. *False*
4. Blight of potato is a bacterial disease. *False*
5. Fungi cannot survive in the absence of oxygen. *False*

D. Answer in one word.

1. Study of microorganisms.

Ans. Microbiology

2. Bacterium that helps in the formation of curd.

Ans. *Lactobacillus*

3. The process of conversion of sugar into alcohol by yeast.

Ans. Fermentation

4. Cyanobacteria that fix free atmospheric nitrogen into nitrates.

Ans. *Anabaena* and *Nostoc*

5. Poisonous substances which are produced by microorganisms.

Ans. Toxins

E. Define these terms.

1. Pasteurisation

Ans. Pasteurisation is the process of giving heat and cold treatments to milk to make it bacteria-free.

2. Fermentation

Ans. Breakdown of sugars into alcohol and carbon dioxide by anaerobic bacteria or yeast in the absence of oxygen is called fermentation.

3. Pathogen

Ans. The microorganism which causes diseases is called pathogen.

F. Differentiate between the following.

1. Viruses and bacteria

Ans. Viruses are acellular microorganisms. They can multiply only inside host cells and remain inactive outside the host cells. They harm plants and animals. On the other hand, bacteria are the simplest microorganisms. They are found in many shapes. They occur everywhere. They are both useful and harmful.

2. Algae and fungi

Ans. Algae are simple unicellular or multicellular green plants which do not have roots, stem and leaves. They are autotrophs and make their food by the process of photosynthesis. On the other hand, fungi are plant-like, nongreen unicellular or multicellular microorganisms. Most fungi are saprotrophs and take their food from dead and decaying organic matter over which they grow.

3. Yeast and *Mucor*

Ans. Yeast is a useful fungus which is used in the production of alcohol, bread, pasteries, cakes, and making the dough rise for idlis, dhoklas, etc. On the other hand, *Mucor* is a harmful fungus which grows as cottony mass on food items, fruits and vegetables and spoils them.

G. Answer these questions.

1. Describe classification of bacteria based on their shape?

Ans. On the basis of shape, bacteria are classified as cocci (spherical), bacilli (rod-shaped), spirilla (spiral) and vibrio (comma-shaped) bacteria.

2. Describe nitrogen cycle in brief.

Ans. The main steps of nitrogen cycle are as follows:

(a) **Nitrogen fixation:** Atmospheric nitrogen is converted into nitrogen compounds by electric discharge and by soil bacteria. These compounds are made available to plants.

(b) **Nitrogen assimilation:** Nitrogen compounds absorbed by plants are used in the synthesis of amino acids, proteins, etc. Animals eat plant food and synthesise animal proteins.

(c) **Ammonification:** Soil bacteria and fungi break down proteins and other nitrogen compounds from the waste, dead and decaying plants and animals into ammonium salts and ammonia.

(d) **Nitrification:** The soil bacteria *Nitrosomonas* and *Nitrobacter* convert ammonia and ammonium salts into nitrates which are absorbed by plants.

(e) **Denitrification:** The nitrates in the soil are converted into free molecular nitrogen by *Pseudomonas,* a denitrifying bacterium. This molecular nitrogen is released into the atmosphere.

In this way, nitrogen cycle is completed in nature.

3. What are antibiotics? What precautions should be taken while taking antibiotics?

Ans. Antibiotics are the substances which are used to prevent the growth of bacteria or to kill them. Penicillin, streptomycin and erythromycin are some examples of antibiotics.

Precautions:

(a) We should not take antibiotics ourselves.
(b) Antibiotics should not be taken empty stomach.
(c) We should take antibiotics only after consulting a doctor.

4. What is the mode of nutrition in fungi? Write three benefits of fungi.

Ans. Fungi have saprotrophic mode of nutrition. However, some fungi also have parasitic mode of nutrition.

Three benefits of fungi are as follows:

(a) Fungi like yeast is used in making bread, cakes and alcohol from fruit juices.
(b) Mushrooms are rich source of protein and are used as food.
(c) Some fungi like *Penicillium notatum* are used for making antibiotics.

5. Some microorganisms act as decomposers. How is this activity useful to us?

Ans. Microorganisms decompose organic waste and help clean our environment.

6. **Which activities of microorganisms are utilised in making wine and vinegar, and soil fertile?**

Ans. Beneficial activities of microorganisms are utilised in making useful products like:

Wine: It is produced by the yeast, which breaks down sugar of fruit juices and convert it into alcohol. The process is called fermentation.

Vinegar: The alcohol obtained by fermentation of fruit juices is converted into vinegar by the action of acetic acid bacteria.

Soil fertility: Soil bacteria like *Nostoc*, *Anabaena* and *Rhizobium* fix free nitrogen of air and convert it into nitrogen compounds and make the soil fertile. Algae are also used as manure to increase soil fertility. Bacteria and fungi break dead and decaying organic matter of soil into simpler substances and increase the fertility of soil.

H. Give reasons for the following.

1. **Food should always be kept covered.**

Ans. Uncovered food is exposed to dust, dirt and germs. Harmful microbes present in air on coming in contact with uncovered food may spoil it. Therefore, food should always be kept covered.

2. **Milk gets curdled when curd is added to it.**

Ans. Curd contains a kind of bacteria which act upon the milk sugar and form an acid. This acid curdles the milk.

3. **Vaccines are given to healthy persons.**

Ans. Vaccines are given to healthy persons to induce the formation of antibodies in their bodies for fighting against bacterial infection.

4. **Mangoes get spoiled, not the jam made from them.**

Ans. Jams are made from fruit pulp by adding suitable amount of sugar to them. This sugar prevents the growth of microbes coming in contact with jams and saves them from getting spoiled.

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

1. **Bacteria, (viruses), fungi**

Ans. Viruses; They are the connecting link between living and nonliving things while rest are the living organisms.

2. ***Amoeba*, (*Laminaria*), *Euglena***

Ans. *Laminaria*; It is an alga while rest are protozoans.

3. **Measles, polio, (tuberculosis)**

Ans. Tuberculosis; It is a bacterial disease while rest are viral diseases.

J. Skill-based questions.

1. **Why does drain water smell foul?**

Ans. Drain water contains sewage which has organic components including amino compounds. The putrefaction of protein in the absence of oxygen produces foul smell.

2. **The ponds and lakes which have luxuriant growth of vegetation, have polluted water that causes death of aquatic animals living in it. Why is it so even when plants produce oxygen to support animal life? Explain.**

Ans. Luxuriant growth of aquatic plants in polluted water does not provide extra oxygen to aquatic animals. Rather the decomposition of dead aquatic plants requires more oxygen for their breakdown. This lowers down the dissolved oxygen level in water that may cause the death of aquatic animals.

K. Activity/Project–Do as directed.

Prepare a project report on 'Microorganisms–Friends and Foes'.

Ans. Do it yourself.

Think Zone

Study a housefly and see the hairy structures on its legs and abdomen. What is the use of this hairy growth on the body?

Ans. Pathogens stick to the hairy growth on the legs and body of housefly when it sits on animal excreta, vomit or garbage. When this housefly sits on our food or cut fruits, the pathogens are deposited there and food is contaminated.

3 Synthetic Fibres and Plastics

ANSWERS

Check Point 1

1. What are the small units that join to make a polymer called?

Ans. Monomers

2. Which fibre is also known as artificial silk?

Ans. Rayon

3. Name the synthetic fibre that is used as a cheaper alternative to wool.

Ans. Acrylic

4. From where are natural fibres obtained?

Ans. Plants and animals

5. What is a synthetic fibre?

Ans. A fibre made by chemical processes in factories is called a synthetic fibre.

Check Point 2

1. What are plastics?

Ans. Plastics are synthetic polymers made from chemical substances in factories.

2. What do you understand by thermoplastics?

Ans. Plastics which can soften and get deformed on heating are called thermoplastics.

3. List some differences between thermoplastics and thermosetting plastics.

Ans.

Thermoplastics	Thermosetting plastics
(a) They can be reshaped (remoulded) as many times as desired.	(a) Once set, they cannot be reshaped even on heating.
(b) They soften and get deformed on heating.	(b) They do not soften or melt on heating.

4. Why are plastics used to make a number of objects?

Ans. Plastics are used to make a number of objects because they are durable, resistant to weather conditions and many chemicals, can be shaped and coloured easily, are inexpensive and quite strong.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. A synthetic fibre obtained from cellulose is
(a) nylon (b) rayon ✓ (c) polyester (d) acrylic

2. This is used for making coverings around electrical wires.
(a) bakelite (b) polystyrene (c) PVC ✓ (d) polyethene

3. This synthetic fibre is used for making woollen clothes.
(a) rayon (b) acrylic ✓ (c) nylon (d) polyester

4. This is a thermosetting plastic.
(a) polyethene (b) PVC (c) polystyrene (d) bakelite ✓

5. Nylon is used to make
(a) swimwear (b) raincoats (c) tyres (d) all of these ✓

6. Terycot is made up of terylene and
(a) cotton ✓ (b) silk (c) wool (d) polyester

7. Plastics are
(a) biodegradable (b) nonbiodegradable ✓
(c) nonrecyclable (d) sensitive to weather

B. Fill in the blanks.

1. The small units that join to make a polymer are called *monomers*.
2. One of the most common forms of polyester is *PET* that is used to make *water bottles*.
3. *Acrylic* is a synthetic fibre having wool-like feel.
4. *PVC* is a thermoplastic whereas *bakelite* is a thermosetting plastic.
5. Plastics are *nonbiodegradable*, i.e., they cannot be decayed or rotton by bacteria or fungi.

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

1. A monomer is a large unit made of thousands of smaller units called polymers. *False*

2. Polymers do not corrode or rust. *True*

3. Plastics release many poisonous gases on burning. *True*

4. We should not reuse plastics as they can be made in plenty. *False*

D. Answer in one word.

1. This is also called synthetic fibre. *Man-made fibre*

2. This is the first fully synthetic fibre. *Nylon*

3. Bakelite is this kind of plastic. *Thermosetting plastic*

E. Define these terms.

1. Thermoplastics

Ans. Plastics which can be reshaped (remoulded) as many times as desired are called thermoplastics. They are polymers which soften and get deformed on heating.

2. Thermosetting plastics

Ans. Plastics which once set cannot be reshaped even on heating are called thermosetting plastics. They do not soften or melt on heating.

F. Differentiate between the following.

1. Rayon and acrylic

Ans. Rayon is obtained from naturally occurring polymer called cellulose. It is a cheaper alternative to silk fibre. On the other hand, acrylic is obtained from synthetic chemicals. It is a cheaper alternative to wool fibre.

2. Natural fibres and synthetic fibres

Ans. Natural fibres are obtained from plants and animals, whereas synthetic fibres are made by chemical processes in factories.

G. Answer these questions.

1. Define polymer. What is the need for making polymers?

Ans. Polymer is a substance made of smaller units called monomers.

Need for making polymers: Polymers have properties which make them very useful. Some of them are as follows:

(a) Polymers do not corrode or rust.

(b) They can be produced in various colours.

(c) They can be given different shapes.

(d) They are strong and inexpensive.

2. What is rayon? Give any three properties and two uses of rayon.

Ans. Rayon is a synthetic fibre obtained from a naturally occurring polymer called cellulose.

Properties of rayon: Rayon has silk-like appearance. It does not shrink. It is a good absorbent and hence, cool to wear.

Uses of rayon: Rayon is used in making cloths, bedsheets, carpets and bandages.

3. Why is nylon used for making rock-climbing ropes?

Ans. Nylon has high tensile strength. This property of nylon makes it bear heavy load without breaking. Therefore, nylon is used for making rock-climbing ropes.

4. What are the two types of plastics? List any three properties of plastics.

Ans. The two types of plastics are thermoplastic and thermosetting plastic.

Three properties of plastics are:

(a) Plastics are durable and last for long.

(b) They can take wear and tear of daily life.

(c) They do not break easily.

5. Give two examples each of (a) thermoplastics (b) thermosetting plastics.

Ans. (a) Thermoplastics: Polyethene, PVC and polystyrene.

(b) Thermosetting plastics: Melamine and bakelite.

6. Give two uses each of (a) bakelite (b) PVC.

Ans. (a) Bakelite is used in making electrical plugs and combs.

(b) PVC is used in making covering of electrical wires and in making raincoats.

7. What are the properties of acrylic? Give two uses of acrylic.

Ans. Properties of acrylic:

(a) It is warm, soft and lightweight.

(b) It is easy to wash and dries quickly.

(c) It is easy to dye in various colours and has excellent colour fastness.

(d) It does not shrink or stretch or wrinkle. It is resistant to chemicals and moths.

Uses of acrylic:

(a) It is used for making sweaters, shawls, socks, sportswear, etc.

(b) It is also used for making blankets, awnings and rugs.

8. List any three disadvantages of plastics and three ways to reduce plastic pollution.

Ans. Disadvantages of using plastics:

(a) Plastics are nonbiodegradable substances.

(b) They remain unchanged in garbage and therefore, keep accumulating.

(c) On burning, they release harmful and poisonous gases into the air causing air pollution.

Ways to reduce plastic pollution: We can reduce plastic pollution by

(a) using shopping bags made of jute, cotton or paper instead of plastic.

(b) reusing plastic articles such as boxes, bottles, bags, etc.

(c) buying the products which have less plastic packaging.

H. Give reasons for the following.

1. Bakelite is used for making electrical plugs and switches.

Ans. Bakelite is a thermosetting plastic. It does not soften or melt on heating. Therefore, it is used for making electrical plugs and switches.

2. Nylon is used for making swim suits.

Ans. Nylon absorbs less water and dries quickly. Therefore, it is used for making swim suits.

3. We should not throw away plastics carelessly on roads.

Ans. Plastic is a nonbiodegradable substance. It is not decomposed by microorganisms. Therefore, it remains unchanged in garbage and keeps accumulating and causes soil pollution. Also, on burning, it releases poisonous gases, hence, causes air pollution.

4. We should not wear nylon clothes while working in the kitchen.

Ans. Nylon clothes catch fire easily. They melt and stick to the body of the person wearing them. Therefore, it is not advisable to wear them in the kitchen.

I. Skill-based questions.

1. Why do electric plugs not melt even if the wires inside them get overheated?

Ans. Electric plugs do not melt even if the wires inside them get overheated because the electric plugs are made of bakelite which is a thermosetting plastic. It does not soften or melt on heating.

2. Anu and Manu go for shopping in the market and have chips.

(a) There is no dustbin in the market area. What should they do with the empty packets of chips?

(b) Do you think the jute bags they are carrying for shopping are environment-friendly? Why/Why not?

Ans. (a) Anu and Manu should carry the empty packets of chips back home and throw them in the dustbin instead of throwing on the road.

(b) Yes, the jute bags are environment-friendly because even after throwing in garbage, jute is broken down by microbes and gets mixed in soil. Therefore, they do not have bad effects on the environment.

J. Activity/Project–Do as directed.

Perform an activity to show the comparison between water absorbing capacity of natural and synthetic fibres.

Ans. Do it yourself.

Think Zone

Do you think a warning label stating reusing the plastic bags on plastic bags would help in creating awareness about plastic pollution?

Ans. Yes, it will help in creating awareness about plastic pollution.

Metals and Nonmetals

4

ANSWERS

Check Point 1

1. A material is nonsonorous, nonlustrous and a poor conductor of heat and electricity. Is it likely to be a metal or a nonmetal?

Ans. Nonmetal

2. Name the following:

(a) A liquid metal

(b) A gaseous nonmetal

(c) A solid metal

Ans. (a) Mercury (b) Oxygen (c) Aluminium

3. Give one-word for the following:

(a) Ability to be drawn into thin wires

(b) Ability to be hammered into thin sheets

Ans. (a) Ductility (b) Malleability

Check Point 2

1. What is rust?

Ans. Rust is an oxide of iron.

2. Which gas burns with popping sound?

Ans. Hydrogen

3. What are displacement reactions?

Ans. A reaction in which a more reactive metal displaces a less reactive metal from its salt solution is called a displacement reaction.

4. Why is carbon essential for life?

Ans. Carbon is essential for life because all life forms on the earth are made up of carbon compounds.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. This is a nonmetal among the following.

(a) sodium (b) copper (c) iron (d) oxygen ☑

2. Which of these is the most ductile metal?
(a) sodium (b) copper (c) aluminium (d) gold ✓

3. This nonmetal has antiseptic properties.
(a) oxygen (b) nitrogen
(c) iodine ✓ (d) hydrogen

4. This gas is used for breathing and also for burning.
(a) nitrogen (b) oxygen ✓ (c) hydrogen (d) chlorine

5. Metals react with water and liberate this gas.
(a) oxygen (b) hydrogen ✓
(c) sulphur (d) nitrogen

6. Metals react with bases to form this gas.
(a) nitrogen (b) oxygen
(c) chlorine (d) hydrogen ✓

7. This gas is used for water purification.
(a) chlorine ✓ (b) nitrogen (c) hydrogen (d) sulphur

8. This nonmetal is good conductor of electricity.
(a) oxygen (b) diamond (c) graphite ✓ (d) sulphur

B. Fill in the blanks.

1. *Aluminium* and *zinc* are metals, whereas *sulphur* and *oxygen* are nonmetals.

2. Metals on coming in contact with *oxygen* or *moisture* present in air become dull.

3. Nonmetals cannot be hammered into thin sheets. They are *nonmalleable*.

4. *Diamond* is a nonmetal but is very hard.

5. Hydrogen gas burns with a *pop* sound.

6. *Hydrogen* gas is liberated when metals react with dilute acids.

7. The metals which cannot displace iron from iron sulphate solution are *less* reactive than iron.

8. Most of the nonmetallic oxides are *acidic* while metallic oxides are *basic* in nature.

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

1. Sodium metal can be cut with a knife. *True*

2. Bromine is the only liquid nonmetal. *True*

3. Oxygen has antiseptic properties. *False*

4. Sulphur is a lustrous nonmetal. *False*

5. Metallic oxides are generally acidic in nature. *False*

6. Graphite is a nonmetal. *True*

7. Oxygen gas is used to preserve food. *False*

D. Answer in one word.

1. This metal is the best conductor of electricity.

Ans. Silver

2. This metal is the most ductile.

Ans. Gold

3. This is the hardest substance.

Ans. Diamond

E. Define these terms.

1. Malleability

Ans. The property of a metal by which it can be hammered or beaten into very thin sheets without breaking is called malleability.

2. Sonority

Ans. The property of a metal by which it makes a ringing sound when struck is called sonority.

3. Ductility

Ans. The property of a metal by which it can be drawn into thin wires is called ductility.

F. Differentiate between the following.

1. Physical properties of metals and nonmetals

Ans.

Properties	Metals	Nonmetals
Ductility	Ductile (can be drawn into fine wires)	Nonductile (cannot be drawn into fine wires)
Malleability	Malleable (can be hammered into thin sheets)	Nonmalleable (cannot be hammered into thin sheets)
Thermal conductivity	Good conductors of heat	Generally poor conductors of heat
Electrical conductivity	Good conductors of electricity	Bad conductors of electricity (Exception: Graphite is a good conductor of electricity.)

2. Chemical properties of metals and nonmetals

Ans. Chemical properties of metals and nonmentals:

Property	Metals	Nonmetals
Reaction with oxygen	React to form metallic oxides.	React to form nonmetallic oxides.
Nature of oxides	Basic	Mostly acidic
Reaction with water	Form metal oxide (or hydroxide) and hydrogen gas.	Do not react with water.
Reaction with dilute acids	Form metal salt and hydrogen.	Do not react with dilute acids.

G. Answer these questions.

1. Metals are sonorous while nonmetals are nonsonorous. Explain.

Ans. Sonority is a basic property of all metals. Therefore, metals make a ringing sound when struck, so, they are called sonorous. On the other hand, nonmetals do not make a ringing sound when struck. Therefore, they are nonsonorous.

2. **Which of these are nonmetals?**

Graphite, aluminium, sulphur, diamond, iron, copper, iodine, bromine, gold

Ans. Graphite, sulphur, diamond, iodine and bromine are nonmetals.

3. **Which of these are good conductors of electricity?**

Aluminium, sulphur, gold, silver, diamond, graphite

Ans. Aluminium, gold, silver and graphite are good conductors of electricity.

4. **Give the physical states at room temperature of the following metals and nonmetals: Mercury, potassium, calcium, oxygen, bromine**

Ans. Mercury – Liquid, Potassium – Solid, Calcium – Solid, Oxygen – Gaseous, Bromine – Liquid

5. **Describe an activity to show that metals react with oxygen to form basic oxides.**

Ans. Activity to show that metals react with oxygen to form metallic oxides:

Take a clean magnesium ribbon. Hold it with a pair of tongs and burn it over a flame. Magnesium ribbon burns with a dazzling white flame to form a white ash. The white ash formed is magnesium oxide. Now, mix some water with this ash and test it with blue and red litmus papers. The red litmus paper turns blue showing basic nature of oxide.

6. **Name the metals present in the following bases: magnesium hydroxide, calcium hydroxide.**

Ans. Magnesium in Magnesium hydroxide

Calcium in Calcium hydroxide

7. **What is a displacement reaction? Explain with the help of an example.**

Ans. A reaction in which a more reactive metal displaces a less reactive metal from its salt solution is called a displacement reaction. For example, iron is more reactive than copper. So, it displaces copper from copper sulphate solution.

8. **Give two uses each of metals and nonmetals.**

Ans. **Uses of metals:**

(a) Metals are used in construction of houses, buildings, bridges, etc.

(b) Metals such as gold, silver and platinum are used in making jewellery.

Uses of nonmetals:

(a) Chlorine is used for water purification.

(b) Iodine has antiseptic property, so, it is applied on wounds.

H. Give reasons for the following.

1. **Sodium metal is kept immersed in kerosene.**

Ans. Sodium is a very reactive nonmetal. It reacts violently with moisture present in air. Therefore, it is kept immersed in kerosene.

2. **Vessels made of metals lose their shine after few days.**

Ans. Metals on coming in contact with oxygen of air, acquire a layer of metallic oxide on them. Therefore, vessels made of metals lose their shine with time.

3. **Aluminium and copper metals are used to make electric wires.**

Ans. Aluminium and copper metals are good conductors of electricity. Therefore, they are used to make electric wires.

4. **Zinc metal can displace copper from copper sulphate solution.**

Ans. A more reactive metal displaces a less reactive metal form its salt solution. Zinc metal is more reactive than copper. Therefore, it displaces copper from copper sulphate solution.

5. **Jewellery is generally made from silver, gold and platinum.**

Ans. Silver, gold and platinum are very ductile metals. They can be drawn into fine wires. Therefore, they are used in making jewellery.

6. **Aluminium and copper are used to make utensils.**

Ans. Aluminium and copper do not melt on heating as they have high melting points. Therefore, they are used to make utensils.

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

1. **Bromine, oxygen, nitrogen, hydrogen**

Ans. Bromine; This nonmetal is liquid at room temperature while rest are gases.

2. **Sodium, potassium, phosphorus, calcium**

Ans. Phosphorus; It is a nonmetal while rest are metals.

3. **Copper, magnesium, aluminium, mercury**

Ans. Mercury; This metal is liquid at room temperature while rest are solid.

4. **Oxygen, nitrogen, sulphur, graphite**

Ans. Graphite; This nonmetal is good conductor of electricity while rest are bad conductors.

5. **Iodine, sulphur, oxygen, phosphorus**

Ans. Oxygen; This nonmetal is gas at room temperature while rest are solid.

J. Skill-based questions.

1. **Metal pans in the kitchen have either wooden or plastic handles. Why?**

Ans. Since, wood and plastic do not conduct heat, the metal pans in the kitchen have either wooden or plastic handles.

2. **When Jessica placed a piece of copper wire in a test tube containing water, she did not find any change occurring. Why?**

Ans. Copper does not react with water at room temperature.

3. **Have you ever used immersion rod for heating water? Is it made of a metal or a nonmetal? Why?**

Ans. An immersion rod is made of a metal as metals are good conductors of electricity. When electric current is passed through an immersion rod, it becomes hot due to heating effect of current. As a result, the water in which the rod is dipped also becomes hot.

4. **Metallic bells exist but not the wooden bells. Why is it so?**

Ans. Metals are sonorous, i.e., make ringing sound while wood is non-sonorous. Therefore, metallic bells exist but not the wooden belts.

5. **Manu placed a piece of copper in zinc sulphate solution. He did not observe any change occurring. Can you explain why?**

Ans. Copper is less reactive than zinc. So, copper cannot displace zinc from zinc sulphate solution. Therefore, no reaction occurs and no change is observed.

K. Activity/Project–Do as directed.

Perform an activity to show that metals react with dilute acids to form metal salt and hydrogen.

Ans. Do it yourself.

Think Zone

1. **Think of a metal which is nonductile and nonmalleable at room temperature.**

Ans. Mercury

2. **Metals are sonorous. For some uses, highly sonorous metals are needed. Think of at least two such examples.**

Ans. For making musical instruments like cymbals and for making bells.

Coal and Petroleum

5

ANSWERS

Check Point 1

1. What are natural resources?

Ans. Resources which are required for our survival and are available in nature are called natural resources.

2. Name any three natural resources.

Ans. Air, water and sunlight

3. Name an important fossil fuel.

Ans. Coal

4. Give one important use of coal gas.

Ans. Coal gas is used as an important industrial fuel.

Check Point 2

1. Give any one use of each of the following:
(a) petroleum gas (b) fuel oil (c) diesel oil

Ans. (a) Petroleum gas is used as a fuel in homes and industries.
(b) Fuel oil is used in thermal power plants to generate electricity.
(c) Diesel oil is used as a fuel for buses, cars, trucks, etc.

2. What is petroleum?

Ans. Petroleum is a fossil fuel which was formed by the remains of sea organisms that lived millions of years ago. It is a mixture of various liquid hydrocarbons.

3. What do you understand by petroleum refining?

Ans. The process by which various constituents of petroleum are separated is called petroleum refining.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. Natural gas consists mainly of
(a) propane (b) methane ✓ (c) butane (d) ethane

2. 'N' indicates this in the full form of CNG.
(a) nature (b) natural ✓ (c) normal (d) noble

3. This is a thick black liquid.
   (a) coal gas (b) petroleum (c) coal tar ✓ (d) kerosene
4. This is not a type of coal.
   (a) anthracite (b) paraffin ✓ (c) bituminous (d) lignite
5. This is not a constituent of petroleum.
   (a) coke ✓ (b) diesel oil (c) petrol (d) paraffin wax
6. This is used in making ointments.
   (a) petrol (b) coal (c) paraffin wax ✓ (d) fuel oil
7. This form of coal has highest percentage of carbon.
   (a) bituminous (b) anthracite ✓ (c) lignite (d) coke

B. Fill in the blanks.

1. Coal is an *exhaustible*, whereas air is an *inexhaustible* natural resource.
2. The slow conversion of dead trees and other plants into coal is called *carbonisation*.
3. The various constituents of petroleum are separated by a process called *petroleum refining*.

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

1. Coke has rough texture. *True*
2. Scientists are trying to make use of hydrogen gas as a fuel. *True*
3. Burning of fossil fuels may lead to acid rain and global warming. *True*

D. Answer in one word.

1. The gas formed when coal is heated in the absence of air. *coal gas*
2. The solid residue left behind when coal is heated in the absence of air. *Coke*
3. An oily liquid formed when coal is heated in the absence of air. *Coal tar*

E. Define these terms.

1. Carbonisation

Ans. The slow conversion of dead trees and plants into coal is called carbonisation.

2. Natural resources

Ans. Resources which are available in nature are called natural resources.

F. Differentiate between the following.

Exhaustible and inexhaustible natural resources

Ans. The natural resources which are present in limited amount in nature and cannot be continually replenished are called exhaustible natural resources, whereas the natural resources which are present in unlimited amount and can be continually replenished are called inexhaustible natural resources.

Fossil fuels like petroleum, coal and natural gas and minerals are exhaustible natural resources while air, water, soil and sunlight are inexhaustible natural resources.

G. Answer these questions.

1. How is coal useful to us? Describe briefly how it was formed.

Ans. Coal is used as a fuel in houses for cocking, in thermal power plants for generating electricity and in various industries such as cement, paper, steel, iron, etc.

Coal was formed millions of years ago by the process of carbonisation on the remains of dead plants and trees which were accumulated in the swamps. By the action of heat and pressure, they were turned into coal.

2. What is coke? How is it obtained?

Ans. Coke is a smokeless fuel. It is a greyish-black solid with rough texture. It contains 98% carbon.

Coke is obtained by the process of destructive distillation of coal. In this process, coal is heated in the absence of air due to which volatile impurities and moisture is removed. The solid left behind is coke.

3. Can burning of petroleum or its refining cause any harm to our environment? How?

Ans. On burning petroleum and its refining, carbon dioxide and other gases are released in the air. Of these gases, carbon dioxide is a main greenhouse gas which causes global warming. Global warming results into melting of polar ice, rise in sea levels and change in climate patterns.

4. What is natural gas? Why is it called a clean fuel?

Ans. Natural gas is a fossil fuel found underground. It was formed from the remains of sea animals that lived millions of years ago. It mainly contains methane along with small amount of ethane, propane and butane.

Natural gas is called a clean fuel because it does not produce ash and smoke on burning.

H. Give reasons for the following.

1. Coal gas is used as an industrial fuel.

Ans. Coal gas is used as an industrial fuel because it produces a large amount of heat on burning.

2. Burning of coal is a serious problem.

Ans. Burning of coal is a major cause of air pollution. When coal burns, it produces carbon dioxide, nitrogen dioxide, sulphur dioxide and a lot of smoke. Carbon dioxide is the main greenhouse gas and causes global warming. Sulphur dioxide and nitrogen dioxide contribute to acid rain. Nitrogen dioxide also causes smog.

3. Fossil fuels are considered as exhaustible natural resources.

Ans. Fossil fuels are exhaustible natural resources because they are present only in limited amount in nature. They take millions of years to form, hence, cannot be continually replenished.

I. Skill-based questions.

1. Do you think using a bicycle is an effective way for reducing the consumption of petrol or CNG? Conduct a survey in your class to find out how many children come to the school

(a) by bus? (b) by school van? (c) by private car? (d) by bicycle?

Ans. Yes, using a bicycle is an effective way of reducing the consumption of petrol or CNG because riding a bicycle does not require any kind of fuels like petrol or CNG.

- Do the rest part yourself.

2. **For this try to think and list some questions that you would like to include in the questionnaire for the survey.**

Ans. Do it yourself.

3. **Think about a plan/strategy to convince and encourage children who live nearby to cycle to school.**

Ans. Do it yourself.

J. Activity/Project–Do as directed.

Coke is a better fuel than coal. Prepare a project report on it.

Ans. Do it yourself.

Think Zone

1. **Which of these is a better way to save fuel – using a public transport or an individual petrol/CNG driven vehicle?**

Ans. Using a public transport is a better way to save fuel because a public transport carries large number of people at a time. This saves per head expense of fuel as compared to if they were going individually to same place.

2. **Planting more and more trees can help reduce pollution caused due to fossil fuels. How?**

Ans. On burning, fossil fuels release carbon dioxide and other gases in the air. Carbon dioxide is the main greenhouse gas causing global warming. On planting more trees, the carbon dioxide will be taken up by plants for photosynthesis. In return, they will release oxygen into the air. In this way, the amount of carbon dioxide will be controlled and air pollution will be reduced.

Combustion and Flame

6

ANSWERS

Check Point 1

1. Circle the noncombustible substances from the following:
Stone, petrol, kerosene, wood, glass, marbles

Ans. Stone, glass and marbles

2. List the conditions necessary for combustion to occur.

Ans. The three conditions necessary for combustion to occur are: (a) presence of air or oxygen, (b) presence of a combustible substance, and (c) suitable ignition temperature.

3. What is a combustible substance?

Ans. A substance that can burn or catch fire is called a combustible substance.

4. Do all combustible substances have the same ignition temperature?

Ans. No

Check Point 2

1. Why can we not use water to extinguish fire caused due to oil or petrol?

Ans. We cannot use water to extinguish fire caused due to oil or petrol because water is heavier than oil. So, it sinks below the oil or petrol, and they keep burning on the top.

2. How does a blanket help in controlling fire if a person's clothes catch fire?

Ans. If the clothes of a person catch fire, a blanket must be wrapped immediately over his body. This cuts the supply of oxygen and helps in extinguishing the fire.

3. What is spontaneous combustion?

Ans. When a substance suddenly bursts into flames without any external source of ignition, such a combustion is called spontaneous combustion.

Check Point 3

Fill in the blanks.

1. Yellow flame has _*low*_ temperature.
2. The fuel should have high _*calorific*_ value.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. The unit for calorific value is
(a) kJ (b) kJ/cm (c) kJ/mm (d) kJ/kg ✓

2. Due to complete combustion, a fuel gives out
(a) blue flame ✓ (b) yellow flame (c) green flame (d) black flame

3. The highest temperature zone of a candle flame is
(a) inner zone (b) middle zone (c) outer zone ✓ (d) tip of flame

4. This zone is dark-black in colour.
(a) middle zone (b) inner zone ✓ (c) outer zone (d) none of these

5. This gas is not responsible for acid rain.
(a) nitrogen dioxide (b) sulphur dioxide (c) both (a) and (b) (d) methane ✓

6. This gas is responsible for combustion.
(a) nitrogen (b) oxygen ✓ (c) carbon dioxide (d) hydrogen

B. Fill in the blanks.

1. During *incomplete* combustion, the fuel gives out a luminous flame.

2. In a candle flame, the wax vapour burns completely in the *outer* zone.

3. *Acid* rain can have serious effects on soil and water in the lakes and rivers.

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

1. The temperature at which a substance catches fire is called its calorific value. *False*

2. Air is necessary for combustion. *True*

3. Water can be used to extinguish fire caused due to electrical equipments. *False*

D. Answer in one word.

1. The minimum temperature at which a substance catches fire. *Ignition temperature*

2. This gas is used to extinguish fire. *Carbon dioxide*

3. The other name for the outer zone of a candle flame. *Nonluminous zone*

E. Define these terms.

1. Combustion

Ans. The process of burning of a substance is called combustion.

2. Ignition temperature

Ans. Ignition temperature is that minimum temperature at which a combustible substance catches fire.

3. Calorific value

Ans. The amount of heat produced by a fuel on burning is called its calorific value.

F. Answer these questions.

1. What are the conditions necessary for combustion to take place?

Ans. The conditions necessary for combustion to take place are as follows:
(a) Presence of a combustible substance.

(b) Ignition temperature.

(c) Supporter of combustion – air (oxygen).

2. How do water and carbon dioxide gas help in extinguishing fire?

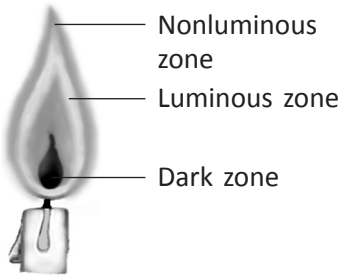
Ans. Water and carbon dioxide gas cut off oxygen supply and reduce the temperature of the combustible substance below its ignition temperature.

3. Explain the different zones of a candle flame with the help of a diagram.

Ans. Different zones of a candle flame are as follows:

(a) **The inner zone (Dark zone):** This zone is dark-black in colour and consists of unburnt wax vapour. This zone is the least hot zone. It has a temperature of about 800-1000°C.

(b) **The middle zone (Luminous zone):** This is the zone where wax vapour starts burning. Here, the flame is yellowish as oxygen is not available in plenty in this region. The wax vapour does not burn completely. The temperature here is about 1200°C.



Zones of a candle flame

(c) **The outer zone (Nonluminous zone):** This is the zone where wax vapour burns completely as oxygen is available in plenty in this region. The flame is blue in colour and appears nonluminous. The temperature here is very high, i.e., about 1400°C.

G. Give reasons for the following.

1. A candle burns with a flame.

Ans. A substance that vaporises during burning gives off a flame. A candle burns with a flame because it is made of wax. When the wick of a candle is lighted, it melts the wax. The wax vapours rise higher and eventually catch fire and form a flame.

2. Water is not suitable for the fire caused by electricity.

Ans. Water is not suitable for the fire caused by electricity because water is a good conductor of electricity and we can get an electric shock.

3. A paper cup containing water does not catch fire on heating.

Ans. The water in the paper cup keeps the temperature of the material, i.e., paper below its ignition temperature and prevents it from catching fire on heating.

H. Skill-based questions.

1. Some materials burn with a flame, whereas others burn without a flame.

Ans. Materials which vapourise during burning give off flame. For example, a candle burns with a flame. This is because a candle is made of wax. When the wick of a candle is lighted, it melts the wax. The vapours rise higher and eventually catch fire and form flame. Materials which do not vaporise, burn without a flame, e.g., LPG.

2. **White phosphorous is stored under water.**

Ans. White phosphorus gets ignited spontaneously at room temperature during summer when the temperature rises to about 35°C. Therefore, it is stored under water.

3. **Carbon dioxide gas is used to extinguish fire.**

Ans. Carbon dioxide gas is a nonflammable gas and is heavier than oxygen. It, therefore, covers the fire like a blanket. This results in cutting off the contact between the combustible substance and oxygen, and the fire gets controlled. Carbon dioxide also works by cooling the combustible substance below its ignition temperature.

I. Activity/Project–Do as directed.

Perform an activity to show that air is necessary for combustion.

Ans. Do it yourself.

Think Zone

1. **Water should not be used to extinguish fire caused due to electrical equipments. Why?**

Ans. Water is a good conductor of electricity and we can get an electric shock. So, it should not be used to extinguish fire caused due to electrical equipments.

2. **We should try to conserve energy. Why?**

Ans. We should try to conserve energy as the amount of fossil fuels is limited. They take millions of years to get formed.

Conservation of Plants and Animals 7

ANSWERS

Check Point 1

1. Define the terms deforestation and afforestation.

Ans. Cutting of trees in large numbers for growing crops, building houses, roads, factories and for obtaining timber is called deforestation.

Replanting trees in forests to replace the cut-down trees with the same type of trees is called afforestation.

2. What is conservation?

Ans. The judicious and wise use of available natural resources is called conservation.

3. What causes desertification?

Ans. Soil erosion and deforestation cause desertification.

4. What is the effect of deforestation on rainfall and climate?

Ans. Deforestation increases temperature, reduces rainfall and increases wind velocity. These changes lead to climatic changes.

Check Point 2

1. Define wildlife.

Ans. Wildlife refers to organisms (plants and animals) living in their natural habitats.

2. Give one difference between endangered and vulnerable species.

Ans. The species that is not likely to survive and will soon become extinct if the causative factors continue, is called endangered species.

Vulnerable species is the species which is likely to move to endangered category in near future, if causative factors continue to operate.

3. What is Red Data Book?

Ans. Red Data Book contains a record of all those species of plants and animals which are under the threat of extinction or are rare and vulnerable to extinct.

4. Name the first national park of India. When was it established?

Ans. Jim Corbett National Park in Uttarakhand was the first national park of India. It was established in 1936.

5. Name the three different regions of a biosphere reserve.

Ans. Three different regions of a biosphere reserve are core zone, buffer zone and manipulation zone.

6. Name the international body responsible for wildlife conservation.

Ans. World Conservation Union.

7. What is the objective of Project Tiger?

Ans. The objective of Project Tiger is to save tigers from poaching.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. Wildlife is destroyed the most by
(a) hunting and poaching (b) pollution
(c) destruction of natural habitats ✓ (d) natural disaster

2. The organisation that maintains Red Data Book is
(a) WCU ✓ (b) WWF (c) UNESCO (d) none of these

3. Which of these is a rare species?
(a) golden cat ✓ (b) chinkara deer (c) black buck (d) golden langur

4. The first national park of India is
(a) Gir (b) Kaziranga (c) Jim Corbett ✓ (d) Kanha

5. Project Tiger was launched in this year.
(a) 1943 (b) 1973 ✓ (c) 1975 (d) 1972

6. How many biosphere reserves are there in India?
(a) 10 (b) 12 (c) 13 (d) 18 ✓

7. The part of the earth in which living organisms exist is called
(a) zoo (b) ecosystem (c) biosphere ✓ (d) national park

8. The term 'biodiversity' was coined by E.O. Wilson in
(a) 1982 (b) 1983 (c) 1984 (d) 1985 ✓

B. Fill in the blanks.

1. Deforestation leads to _*less*_ rainfall.

2. Felling of trees is responsible for _*deforestation*_.

3. A species found in a particular area is known as _*endemic*_.

4. Birds fly from their _*habitat*_ when it becomes very cold.

5. Forests are our _*natural treasures*_.

C. Match the columns.

Column A	Column B
1. Carbon dioxide	(a) biosphere reserve
2. Endangered species	(b) floods and soil erosion
3. National parks/ wildlife sanctuaries	(c) global warming
4. Urbanisation	(d) Asiatic lion
5. Deforestation	(e) loss of biodiversity

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

1. Animals and plants are best protected in zoos and botanical gardens respectively. *True*
2. Red Data Book contains list of plants and animals that have become extinct. *False*
3. Wildlife conservation is closely related to forest conservation. *True*
4. Habitat destruction causes depletion of wildlife. *True*
5. In national parks, village people are permitted to carry out their activities. *False*
6. Lion is endemic to Gir forests in Gujarat. *True*

E. Answer in one word.

1. Judicious utilisation of natural resources. *Conservation*
2. The reservoirs of biodiversity. *Hot spots*
3. The zone of biosphere reserve where no human activities are permitted. *Core zone*
4. The species which is on the verge of extinction. *Endangered species*
5. The book that contains information about threatened, endangered and vulnerable species. *Red Data Book*
6. Restocking of destroyed forests by replanting new trees of the same type. *Afforestation*
7. Excessive use of natural resources, forests and wildlife. *Overexploitation*

F. Define these terms.

1. Flora

Ans. The plants found in a particular geographical area form the flora of that area.

2. Wildlife sanctuary

Ans. A wildlife sanctuary is a protected area reserved for the conservation of wild animals, birds and plants. Hunting is strictly prohibited there. However, private ownership rights for collecting minor forest products, harvesting of timber and cultivation are granted so long as they do not interfere with the life of wild animals.

3. Biosphere reserve

Ans. A biosphere reserve is a specified area in which multiple use of land is permitted for preserving biodiversity. It is divided into three zones for different activities. These zones are core zone, buffer zone and manipulation zone.

4. Fauna

Ans. The animals found in a particular geographical area form the fauna of that area.

G. Differentiate between the following.

1. Endangered and extinct species

Ans. Endangered species is the species which is not likely to survive and will soon become extinct if the same causative factors continue, while the species which is lost forever with no member alive is called extinct species.

2. Endemic and exotic species

Ans. The species which is found exclusively in a particular area and do not occur naturally anywhere else is called endemic species. For example, Asiatic lion is endemic to Gir

forests in Gujarat. On the other hand, the species which is introduced in a new area from some other geographical area is called exotic species.

H. Answer these questions.

1. What is Red Data Book?

Ans. Red Data Book is a book of records of all those species of plants and animals which are under the threat of extinction or are rare and vulnerable to extinction.

2. Define afforestation and deforestation. Give consequences of deforestation.

Ans. Replanting trees in forests to replace the cut-down trees with the same type of trees is called afforestation.

Cutting of trees in large numbers for cultivation, urbanisation, factories, timber or mining is called deforestation.

Consequences of deforstation: Deforstation leads to global warming, change in climate patterns, desertification, drought, soil erosion, floods, loss of wildlife and depletion of natural resources.

3. Mention the effects of deforestation on environment and wildlife.

Ans. Deforestation has following harmful effects:

(a) Destruction of forests increases the level of carbon dioxide in the atmosphere causing global warming.

(b) It increases temperature and wind velocity and reduces rainfall. This causes change in climate.

(c) It lowers water-holding capacity of soil and makes topsoil dry, thus, resulting in soil erosion and desertification.

(d) It causes droughts due to disturbed water cycle and lowering of water table.

(e) It causes floods due to soil erosion and low water-holding capacity.

(f) It results in loss of wildlife due to habitat loss of wild animals and plants.

(g) It results in the depletion of forest resources such as food, fodder, firewood, etc. and affects the life of people living in and around forests.

4. Why is tiger an endangered species?

Ans. Tigers are poached for illegal trading of their nails, teeth, skin, etc. This made tigers an endangered species.

5. What are the major threats to wildlife?

Ans. Following are the major threats to wildlife:

(a) Habitat loss due to deforestation.

(b) Uncontrolled killing and poaching of wild animals for food, skin, fur, horn, tusk, etc.

(c) Air, water and soil pollution.

6. Why are biosphere reserves the best way of wildlife conservation?

Ans. Biosphere reserves are protected areas and undisturbed habitats for wildlife. They are well organised areas for multiple use of land to save biodiversity. They help in maintaining the biodiversity and culture of that area.

7. 'Human population is a threat to biodiversity.' Justify the statement.

Ans. Human beings are clearing forests for growing crops, building houses, factories, roads, etc. This has resulted in loss of habitats and extinction of many wild species of plants and animals. Also, various human activities are source of air, water and soil pollution which affects wildlife terribly. So, it is justified to say that human population is a threat to biodiversity.

8. List major steps taken by the government to conserve biodiversity in India.

Ans. Following steps have been taken by the government to conserve biodiversity in India:

(a) Setting up of protected areas to control hunting and poaching of threatened species of animals.

(b) Enacting strict laws against hunting of animals.

(c) Initiating captive breeding programmes for saving some endangered species from extinction.

9. Write a note on

(a) Project Tiger (b) Gir Lion Project

Ans. (a) Project Tiger is one of the breeding programmes run by Government of India for the conservation of wildlife. It was launched in 1973 to save tiger from poaching. Initially, 9 tiger reserves were established in 1973-74. Now, the total number of tiger reserves in India is 50. Total area covered under these projects is 71027.10 km^2.

(b) Gir Lion Project is one of the captive breeding programmes run by Government of India to save endangered species from extinction. It was started by the Government of Gujarat in 1972 to protect Asiatic Lion from poaching and hunting.

10. What does IUCN stand for? Which name it has been replaced by?

Ans. IUCN stands for International Union for Conservation of Nature. It has now been replaced by World Conservation Union (WCU).

11. What do you know about Chipko Movement?

Ans. Chipko Movement in Garhwal region of Uttarakhand was started by Sundar Lal Bahuguna. It helped in saving trees in the area. The women of village Reni embraced the trees and prevented contractors from cutting them.

I. Give reasons for the following.

1. Why does biodiversity need to be conserved?

Ans. Biodiversity needs to be conserved because it maintains a balance in nature, provides variety of commodities and is needed for breeding programmes in agriculture, horticulture, sericulture, etc.

2. Why are some areas of the earth called megabiodiversity centres?

Ans. Some areas of the earth are called megabiodiversity centres because they have a large variety of plants and animal species. Megabiodiversity centres are located in India, Brazil, Columbia, Mexico, Indonesia, Philippines, China and Australia.

3. **Why is India called a megabiodiversity centre?**

Ans. India is called a megabiodiversity centre because it has a vast variety of flora and fauna and contributes over 8% to the global biodiversity.

4. **Why does deforestation lead to depletion of wildlife?**

Ans. Deforestation leads to depletion of wildlife because it results in loss of habitats of wild animals and plants, causes floods, drought and pollution of air, water and soil.

5. **Why do birds migrate?**

Ans. Birds migrate to escape the inhospitable winter conditions, to find plenty of food, and to lay eggs at a warm place.

6. **Why should paper be recycled?**

Ans. Paper is manufactured from trees. Paper industry is also one of the causes for deforestation. Therefore, to reduce cutting of trees, we should minimise the production of paper by using recycled paper.

7. **How does deforestation lead to desertification?**

Ans. The cutting of trees causes change in the physical property of soil. The water-holding capacity of soil changes and level of subsoil water is lowered making the topsoil layer dry. The dried topsoil is removed by strong winds causing soil erosion. Gradually, the fertile land gets converted into a desert.

J. Skill-based questions.

1. **Why is rainfall reduced in Cherrapunji which once had the highest rainfall?**

Ans. Rainfall in Cherrapunji has reduced greatly because of loss of forest cover which was cleared to create space for growing population and for cement industry.

2. **How does overgrazing lead to desertification?**

Ans. Overgrazing by cattle and sheep removes grass cover, loosens topsoil and exposes the soil to the atmospheric air. The soil dries up, its humus cover is lost and slowly the grassland changes into a dry desert.

K. Activity/Project–Do as directed.

Prepare a project report on the wildlife which has reached on the verge of extinction.

Ans. Do it yourself.

Think Zone

1. **Recycling of paper conserves our natural resources. How?**

Ans. Paper is manufactured from trees. However, paper can be recycled 5 to 7 times. It means by recycling paper, we can save our trees and conserve our forests.

2. **Deforestation leads to Global Warming. Why?**

Ans. Deforestation increases level of carbon dioxide in the atmosphere which causes increase in atmospheric temperature due to greenhouse effect and leads to global warming.

The Cell

8

ANSWERS

Check Point 1

Fill in the blanks.

1. The cell was discovered by _Robert Hooke_.
2. Cell theory was formulated by _Schleiden_ and _Schwann_.
3. Organisms formed of one cell only are called _unicellular_.
4. *Amoeba* is an example of _unicellular_ animal.
5. A group of cells similar in structure and function forms a _tissue_.

Check Point 2

1. **What is approximate size of nerve cells in our body?**

Ans. A nerve cell may be more than 1 metre long.

2. **Name the largest cell found singly.**

Ans. Egg of ostrich

3. **Name two cell organelles that are found only in plant cells.**

Ans. Chloroplast and cell wall

4. **Which cell organelle is called power house of the cell?**

Ans. Mitochondria

5. **Which cell organelle carries out photosynthesis?**

Ans. Chloroplast

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. Cell was discovered by
   (a) Robert Brown (b) Robert Hooke ✓
   (c) Leeuwenhoek (d) Charles Darwin
2. The longest cells are
   (a) nerve cells (b) hemp fibres ✓ (c) muscle cells (d) xylem vessels
3. This is not found in an animal cell.
   (a) mitochondrion (b) nucleus (c) cell wall ✓ (d) nucleolus

4. These are kidney-shaped structures, present in the leaves of plants.
(a) leucoplasts (b) chloroplasts (c) guard cells ✓ (d) vacuoles

5. These are hereditary units.
(a) genes ✓ (b) Golgi complex (c) ribosomes (d) mitochondria

6. Several organs join together to form
(a) a cell (b) a tissue
(c) a human (d) an organ system ✓

7. Which of the following cells found in humans can change their shape?
(a) nerve cell (b) muscle cell (c) WBC ✓ (d) RBC

8. These are colourless plastids.
(a) chloroplasts (b) chromoplasts (c) leucoplasts ✓ (d) none of these

B. Fill in the blanks.

1. Chemical reactions within the cell take place in the *cytoplasm*.
2. Cell wall is formed of *cellulose*.
3. *Blood* cells are the smallest cells in our body.
4. The living structures present in the cell cytoplasm are called *cell organelles*.
5. Spherical body floating in the cell cytoplasm is *nucleus*.

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

1. The cells observed by Robert Hooke in a slice of cork were living cells. *False*
2. *Paramecium* has indefinite shape. *False*
3. The basic living unit of an organism is an organ. *False*
4. Both animal and plant cells contain cell membrane. *True*

D. Match the columns.

Column A		Column B
1. Protein synthesis	(a)	ribosomes
2. Vacuole	(b)	plant cell
3. Single-celled organism	(c)	lysosome
4. Cell organelle with dissolving enzymes	(d)	unicellular

E. Answer in one word.

1. The outermost nonliving covering around a plant cell. *Cell wall*
2. The control centre of the cell. *Nucleus*
3. Plastids containing coloured pigments. *Chromoplasts*
4. Group of similar cells performing same function. *Tissue*

F. Define these terms.

1. Cell 2. Plastids 3. Lysosomes

Ans. 1. Cell: Cell is the smallest unit of life. It is the basic unit of structure and function in all living beings.

2. **Plastids:** Plastids are coloured bodies found only in plant cells.
3. **Lysosomes:** Lysosomes are the cell organelles which have tissue dissolving enzymes.

G. Differentiate between the following.

1. Chloroplast and chromoplast

Ans. Chloroplasts are green-coloured plastids which carry out photosynthesis and impart green colour to plants, whereas chromoplasts are coloured plastids which give various colours to flowers and fruits.

2. Plant cell and animal cell

Ans. Plant cell contains cell wall, plastids and a vacuole but lacks centrioles and lysosomes, whereas animal cell has centrioles and lysosomes but does not contain cell wall and plastids.

H. Answer these questions.

1. Give salient features of cell theory.

Ans. The cell theory states that:

(a) Cells are structural and functional units of living organisms.

(b) Cells arise by the division of pre-existing cells.

2. What levels of organisation are found in multicellular organisms?

Ans. Tissue, organ and organ system levels are found in multicellular organisms.

3. Discuss relationship between cells, tissues, organs and organ systems.

Ans. Cells are the units of structure and function of all living organisms. The groups of cells which do same function form tissues. Several tissues together form an organ. Several organs join together to form an organ system.

4. Give functions of nucleus.

Ans. Nucleus is the control centre of the cell. It controls all the activities of the cell. It stores information of all the hereditary characters and passes them from one generation to the next generation.

5. Name different types of plastids and their functions.

Ans. Different types of plastids are as follows:

(a) **Chloroplasts:** Chloroplasts are green in colour due to the presence of chlorophyll. They carry out photosynthesis and impart green colour to the leaves.

(b) **Chromoplasts:** Chromoplasts are coloured plastids. They have pigments of different colours and give colour to flowers and fruits.

(c) **Leucoplasts:** Leucoplasts are colourless plastids. They store starch, proteins and fats.

6. Why are chloroplasts found only in plant cells? Explain.

Ans. Chloroplasts carry out photosynthesis. So, they are found in plant cells only.

7. Why are cells described as basic units of structure of living organisms?

Ans. Cells are described as basic units of structure of living organisms because every part of the bodies of living organisms is made up of cells.

I. Give reasons for the following.

1. Mitochondria are the powerhouses of the cell.

Ans. Mitochondria are known as powerhouses of the cell because they produce energy for all the activities of the cell by the oxidation of food during respiration.

2. The nuclear envelop is perforated by nuclear pores.

Ans. The nuclear pores in nuclear envelop allow the movement of certain materials in and out of the nucleus.

J. Skill-based questions.

1. Chromosomes are called hereditary vehicles. Why?

Ans. Chromosomes are called hereditary vehicles because they carry genes and transfer them from parents to the offsprings.

2. Why was the cell discovered only after the invention of microscope?

Ans. Cells are too small to be seen with the naked eye. That is why cells were discovered only after the invention of microscope.

K. Activity/Project–Do as directed.

Perform an activity to observe plant cells in onion peel by using a slide.

Ans. Do it yourself.

Think Zone

1. Lysosomes are called 'suicide bags of the cell'. Why?

Ans. Lysosomes contain tissue dissolving enzymes. In case, lysosomes get ruptured, their tissue dissolving enzymes cause autodigestion, i.e., dissolve the cell in which they are placed. Therefore, they are called 'sicide bags of the cell'.

2. Mitochondria are called the 'powerhouse of the cell'. Why?

Ans. Mitochondria release energy by the oxidation of nutrients (glucose) in the form of ATP to be utilised by the cell for various cell activities. Hence, they are called 'powerhouse of the cell'.

Sexual Reproduction and Endocrine System

9

ANSWERS

Check Point 1

Fill in the blanks.

1. The two basic types of reproduction are asexual and *sexual*.
2. Male and female have *different* reproductive parts.
3. The gametes produced by a male are called *sperm*.
4. The gametes produced by a female are called *ova*.
5. In most aquatic animals, *external* fertilisation takes place.

Check Point 2

Name the following.

1. The organ which produces sperms. *Testis*
2. The organ that produces egg. *Ovary*
3. The organ in the body of human female where embryo develops. *Uterus*
4. The organ in the female reproductive system which receives the sperms. *Vagina*
5. The changes in the form from larva to adult in butterfly. *Metamorphosis*

Check Point 3

Fill in the blanks.

1. Pubertal changes are introduced by *sex* hormones.
2. Male sex hormone is *testosterone*.
3. *Pituitary* gland controls functioning of all endocrine glands in the body.
4. The onset of *puberty* brings about secondary sexual characters.
5. The diet for an adolescent has to be *balanced*.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. The fusion of male and female gametes is known as
   (a) development (b) birth (c) fertilisation ✓ (d) growth
2. The embryo gets nutrition from mother through
   (a) placenta ✓ (b) ovum (c) oviduct (d) uterus

3. Which of the following combination of chromosomes leads to the birth of a baby girl?
   (a) XX ✓ (b) XY (c) X (d) Y
4. The organism which has both the male and female sex organs is called
   (a) multisexual (b) unisexual (c) hermaphrodite ✓ (d) none of these
5. The first menstrual flow is called
   (a) menopause (b) pregnancy (c) menarche ✓ (d) implantation
6. Muscular tubes which join the uterus and ovaries are called
   (a) ova (b) vagina (c) sperm ducts (d) oviducts ✓
7. This hormone prepares the body to fight or run fast.
   (a) insulin (b) adrenaline ✓ (c) testosterone (d) thyroxine

B. Fill in the blanks.

1. The process of _*reproduction*_ ensures continuity of life.
2. The cells involved in sexual reproduction are called _*gametes*_.
3. The male gametes are called _*sperm*_ and the female gametes are called _*ova*_.
4. Reproduction in human beings takes place through _*internal*_ fertilisation.
5. In human male, the sex chromosomes consist of one X and one _Y_ chromosome.
6. In butterfly, the egg hatches into a _*larva*_.

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

1. The first cell of a living organism is embryo. _*False*_
2. The unfertilised egg is called zygote. _*False*_
3. Puberty is marked by the appearance of secondary sexual characters. _*True*_
4. There is no change in the life cycle of butterfly. _*False*_
5. Frog and fish reproduce by internal fertilisation. _*False*_

D. Answer in one word.

1. The type of fertilisation in cat. _*Internal*_
2. The process of fusion of the gametes. _*Fertilisation*_
3. Type of fission in *Amoeba*. _*Binary*_
4. The organ where the sperms are produced. _*Testis*_
5. The stage at which moustaches and beard appear in boys. _*Puberty*_

E. Define these terms.

1. **External fertilisation**

Ans. When the fusion of male and female gametes occurs outside the body of female, it is called external fertilisation.

2. **Internal fertilisation**

Ans. When the fusion of male and female gametes occurs inside the body of female, it is called internal fertilisation.

3. Adolescence

Ans. The period of growth between childhood and adulthood when the bodies of boys and girls undergo changes, leading to physical differentiation and reproductive maturity is called adolescence.

F. Differentiate between the following.

1. Oviparous and viviparous animals

Ans. The animals which lay eggs are called oviparous animals, e.g., insects, fishes frogs, birds and reptiles. On the other hand, the animals which give birth to young ones or babies are called viviparous animals, e.g., cat, dog, horse, lion, monkey, man, etc.

2. Asexual reproduction and sexual reproduction

Ans. In asexual reproduction, a single parent produces offsprings which are identical to parents. They are called clones. Examples: *Amoeba*, yeast, etc.

In sexual reproduction, male and female parents are needed to produce a new individual. Examples: Cat, dog, frog, birds, reptiles, man, etc.

G. Answer these questions.

1. Explain the importance of reproduction in organisms.

Ans. Reproduction in organisms is an important process because it helps in the continuity of life from one generation to the next.

2. What is metamorphosis? Give one example.

Ans. Metamorphosis is the process of transforming of a larva into an adult. It occurs in many stages. It occurs in frog, butterfly, etc.

3. Describe the process of fertilisation in human beings.

Ans. In human beings, fertilisation is internal. The fusion of sperm and ovum takes place in the anterior part of the oviduct inside the body of female.

4. What is menstruation? Explain.

Ans. The cyclic shedding of lining of uterus and unfertilised egg due to the failure of fertilisation in females is called menstruation. It occurs every 28 days.

5. List the changes that take place in the body at puberty.

Ans. Following changes take place in the body at puberty:

(a) There is increase in height of body.
(b) The shape of body changes.
(c) Boys develop deep voice while girls develop sweet voice.
(d) Acne and pimples appear on the face.
(e) Sex organs become mature.
(f) In girls, breasts enlarge and menstrual cycle starts.
(g) In boys, growth of beard, moustaches and hair on the body takes place.

6. What are sex hormones? Why are they named so? State their function.

Ans. The hormones secreted by sex organs are called sex hormones. They are testosterone in males and estrogen in females.

Sex hormones are named so because they are secreted by sex organs, i.e., by testes in males and ovaries in females.

Sex hormones bring secondary sexual characters in boys and girls.

7. Write a note on secondary sexual characters.

Ans. The external features in which boys and girls differ from each other are called secondary sexual characters. They occur at the time of puberty by the activity of sex hormones. They are different in boys and girls. In boys, they are marked by the growth of beard, moustaches and body hair; elongation of hands and feet, and hoarseness in voice. On the other hand, in girls, they are development of breasts, widening of lower abdomen region, growth of pubic hair and shrillness in voice.

8. Discuss the problems associated with adolescence.

Ans. Adolescence is a period of growth in which an adolescent gets mental, intellectual and emotional maturity. It brings a change in a person's way of thinking. Mental and physical changes in adolescents cause mood changes. They may feel insecure and confused. Sometimes, they fall in the habit of substance abuse. There is change of behaviour and attitude.

9. What is implantation?

Ans. The attachment of an embryo to the wall of uterus by placenta is called implantation.

H. Give reasons for the following.

1. During the age between 13–18 years, boys start developing beard and moustaches.

Ans. During the age 13–18 years, reproductive or sex organs become active and start producing sex hormones. In boys, sex hormone testosterone brings physical changes like development of beard and moustaches.

2. Balanced diet and physical exercise are essential during adolescence.

Ans. Adolescence is a period of much activity in the body and mind. Any disease or improper nutrition slows down the growth of body. So, to keep the mind and body healthy, balanced diet and physical exercise are essential during adolescence.

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

1. Ovary, egg, zygote, sperm

Ans. Ovary; It is a reproductive organ while rest are gametes and their fusion product.

2. Testis, vagina, sperm duct, penis

Ans. Vagina; It is a part of female reproductive system while rest are the parts of male reproductive system.

3. Ovary, oviducts, uterus, sperm duct

Ans. Sperm duct; It is a part of male reproductive system while rest are the parts of female reproductive system.

J. Skill-based questions.

1. What will happen, if a person does not take iodised salt?

Ans. If a person does not take iodised salt, it may cause iodine deficiency in his body. This will disturb the normal functioning of thyroid gland. As iodine takes part in the formation of

thyroxine hormone, the deficiency of iodine will cause thyroid to produce less thyroxine. This will slow down metabolism and hence, the growth of the body.

2. Why do acne and pimples appear during adolescent period?

Ans. At puberty, both sweat and sebaceous glands become more active, especially on the face. If their openings are closed and not properly cleaned, bacteria grow there and form acne and pimples on the face.

3. Some glands do not have ducts. How are their secretions transported in the body?

Ans. The endocrine glands do not have ducts. They discharge their secretions (hormones) directly in the blood. The blood transports hormones to different parts of the body.

K. Activity/Project–Do as directed.

Prepare a project report on 'Youth and Drugs'.

Ans. Do it yourself.

Think Zone

1. If hen's eggs are left open and are not incubated by hen, how long will it take for them to hatch?

Ans. Hen's eggs, if not incubated by hen, will fail to develop and hatch because they would not get proper warmth for hatching.

2. Why do frogs and toads move to ponds or lakes during rainy season?

Ans. Frogs and toads move to ponds or lakes to lay their eggs. Their eggs are fertilised in water.

10 Force and Pressure

ANSWERS

Check Point 1

Fill in the blanks.

1. The words as a kick, hit, throw, etc. indicate the action of a *force*.
2. A *push* or a *pull* is defined as a force.
3. An *action* between at least two objects is a must to generate a force.
4. Whenever two bodies interact, a force is applied on *each* of them.
5. A force can cause one or *more* than *one* effect at a time.

Check Point 2

1. **When does an object sink in water?**

Ans. When the downward gravitational force acting on an object is greater than upward force by the liquid, the object sinks in the liquid.

2. **What is a contact force?**

Ans. When the object is in direct or indirect contact with the source of the force applied, the force is called contact force.

3. **What is friction?**

Ans. Friction is a force that comes into play whenever a body tries to move over the surface of another body.

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

Ans. Electrostatics is the study of charged objects and their behaviours.

Check Point 3

Fill in the blanks.

1. Force applied per unit area is called *pressure*.
2. Pillars of bridges have *broad* bases.
3. Liquids exert pressure in all *directions*.
4. Thick layer of air present around the earth is called *atmosphere*.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. This force occurs due to attraction or repulsion between two charged bodies.
(a) magnetic (b) frictional (c) electrostatic ✓ (d) muscular

2. This is defined as a push or a pull applied on an object.
(a) pressure (b) force ✓ (c) power (d) work

3. This force is used to stop the moving vehicles.
(a) magnetic (b) electrostatic (c) gravitational (d) frictional ✓

4. More the depth of liquid, higher is the
(a) area (b) volume (c) pressure ✓ (d) length

5. A device used to measure the atmospheric pressure is called
(a) lactometer (b) hydrometer (c) barometer ✓ (d) hygrometer

6. Force applied per unit area is known as
(a) work (b) energy (c) pressure ✓ (d) power

7. This force is used in handling a handbag.
(a) gravitational (b) frictional (c) muscular ✓ (d) magnetic

8. This is a contact force.
(a) muscular (b) electrostatic (c) frictional (d) both (a) and (c) ✓

B. Fill in the blanks.

1. A force can cause a change in _*speed*_ and _*direction*_ of an object.

2. An _*action*_ between two objects causes a force.

3. A force applied by direct touching an object is called a _*contact force*_.

4. Gravitational force is an example of _*noncontact*_ force.

5. Liquids exert _*pressure*_ in all directions.

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

1. A player kicking a football is an example of a noncontact force. _*False*_

2. Liquids and gases do not apply pressure. _*False*_

3. Pressure in a liquid decreases with its depth. _*False*_

4. Like charges repel and unlike charges attract each other. _*True*_

5. Magnetic poles attract magnetic substances like iron and nickel. _*True*_

D. Match the columns.

Column A	**Column B**
1. The earth revolving around the sun	(a) contact force
2. A force applied by touching	(b) air pressure
3. Force between two charged objects	(c) pressure
4. Bloating of the tube of a cycle tyre	(d) gravitational force
5. Force applied per unit area	(e) electrostatic force

E. Answer in one word.

1. A force of attraction acting on all bodies on the earth due to mass of the earth. *Gravitational force*
2. A push or a pull acting on a body. *Force*
3. The pressure due to the layer of atmosphere on a unit area of the earth's surface. *Atmospheric pressure*
4. A force acting on a body from a distance. *Magnetic force*

F. Define these terms.

1. Force

Ans. Force is a push or pull which can change the shape, state of rest or motion, speed or direction of a body.

2. Pressure

Ans. Force acting per unit area is called pressure.

3. Magnetic force

Ans. The force exerted by a magnet on magnetic materials is called magnetic force.

4. Atmospheric pressure

Ans. The force exerted per unit area on a surface by the weight of the air above that surface is called atmospheric pressure.

G. Differentiate between the following.

1. Contact and noncontact forces

Ans. The force which acts on an object by direct or indirect contact is called contact force, e.g., muscular force, mechanical force and friction. On the contrary, the force which does not need physical contact with the object on which it is acting is called noncontact force, e.g., gravitational force, electrostatic force and magnetic force.

2. Electrostatic and gravitational forces

Ans. The force which acts between electric charges or charged objects is called electrostatic force. On the other hand, the force of attraction exerted by the earth on all objects is called gravitational force or gravity.

H. Answer these questions.

1. Write the possibilities when two or more than two forces act simultaneously on an object.

Ans. There are following possibilities when two or more forces act simultaneously on an object:

(a) When the forces act in the same direction, the forces are added together and produce a large effect in the same direction.

(b) When the unequal forces act in the opposite directions, the object will move in the direction of the bigger force.

(c) When the equal forces act in the opposite directions, the forces cancel or balance each other.

2. Name the two categories of force and give two examples of each.

Ans. The two categories of force are contact and noncontact forces.

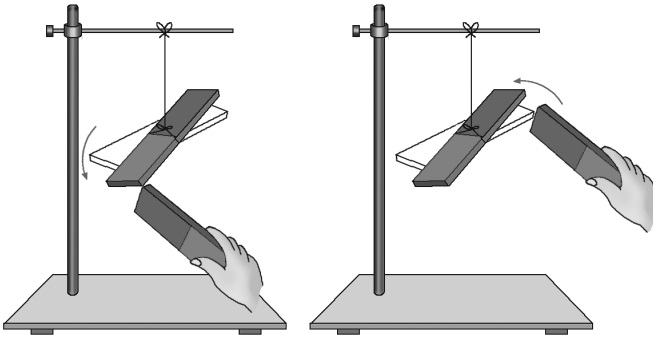
(a) **Contact force:** The force which acts on an object by direct or indirect contact is called contact force, e.g., muscular force, mechanical force and friction.

(b) **Noncontact force:** The force which does not need physical contact with the object on which it is acting is called noncontact force, e.g., gravitational force, electrostatic force and magnetic force.

3. Describe an experiment to suggest that magnetic force is a noncontact force.

Ans. Experiment to show that magnetic force is a noncontact force:

Hang a magnet with a thread to a stand and let it come to rest. Now, take another magnet and bring its one end near the north pole of the hanging magnet. Now, take the magnet near to the other end of hanging magnet. We see that the two ends of both magnets repel and attract each other from a distance without touching. This shows that magnetic force is a noncontact force.



Noncontact force

4. What is the force of friction? State the direction of its action.

Ans. Friction is a force that comes into play whenever a body tries to move over the surface of another. Friction always acts in the opposite direction of motion.

5. How does a body get charged on rubbing? Explain.

Ans. On rubbing, some particles are moved in or out of body. This makes the body charged.

6. Describe the role of gravitation in supporting life on the earth.

Ans. We cannot live without air and water. The gravitational force of the earth holds molecules of air and water on it and makes the earth a liveable place.

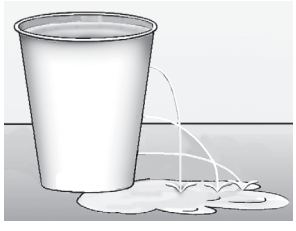
7. Why are the tips and edges of cutting and piercing tools made sharp?

Ans. The tips and edges of cutting and piercing tools are made sharp so that they can pierce and cut an object easily. It is because sharp edges and tips have less area and hence, exert more pressure.

8. Describe an experiment to show that the pressure in liquids increases with depth.

Ans. Experiment to show that the pressure in liquids increases with depth:

Take a tall throwaway soft drink glass. Fill it completely with water and keep it on the floor. Make three holes using a pin, along the height of the glass, one near the bottom, the other near the top and the third in the middle of the glass. Observe the water coming out of these holes. Note that the stream of water from the topmost hole falls nearest to the base of the glass, the stream from the middle hole falls a little ahead and the stream from the hole near the bottom of the glass falls the farthest. This shows that the pressure in liquids increases with the depth of the liquid.



9. State the effects of force.

Ans. A force has following effects:

(a) It can stop a moving object.
(b) It can move an object lying at rest.
(c) It can change the speed of an object.
(d) It can change the direction of an object.
(e) It can change the shape of an object.

I. Give reasons for the following.

1. A rolling ball stops after moving some distance.

Ans. A rolling ball stops after moving some distance due to the friction exerted by the ground which opposes the motion of the ball.

2. Every object left above the surface of the earth without a support, falls downwards.

Ans. Every object left above the surface of the earth without a support, fall downwards because of the gravity of the earth which pulls every object towards the surface of the earth.

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

1. Kick, push, pull, electrostatic force, hit

Ans. Electrostatic force; It is a kind of force while rest are different actions causing force.

2. Gravitational force, electrostatic force, throw, magnetic force

Ans. Throw; It is an action carried out by applying a contact force while rest are noncotact forces.

K. Skill-based questions.

1. The pillars holding the track of metro trains have a broad base. Why?

Ans. The broad base of a pillar helps distribute the pressure over a large area and hence, prevents the pillar from sinking into the ground.

2. It is difficult to cut an onion with a blunt knife. Why?

Ans. It is difficult to cut an onion with a blunt knife because the force applied on the knife will be distributed over a large area and the pressure applied on the onion would decrease.

3. Why do heavy vehicles have broad tyres?

Ans. Heavy vehicles have broad tyres so that the force exerted by heavy weight of the vehicles is distributed over a large area and the pressure on the road is decreased. This helps to move easily on the road without sinking into the ground.

L. Activity/Project–Do as directed.

Perform an activity to show the existence of atmospheric pressure.

Ans. Do it yourself.

Think Zone

1. What is the role of air pressure in the filling of a syringe with a liquid medicine by a doctor?

Ans. The air pressure plays an important role in the filling of a syringe as the liquid medicine rushes into the syringe when air pressure inside it decreases on pulling the piston out.

2. **Why do people with high blood pressure sweat a lot?**

Ans. People with high blood pressure sweat a lot because the pressure of their body fluid becomes more than the atmospheric pressure. This forces the water to ooze out easily.

3. **There is a famous saying in Hindi which means that a sword cannot replace a needle. Give reason for the saying in the light of Physics.**

Ans. In the light of physics, the pressure applied on needle gets concentrated on its tip, i.e., on a very small area and hence, it pierces the cloth easily. But to make the sword cut a surface, we have to apply much higher pressure due to larger surface area of the cutting edge of the sword. Hence, a sword cannot replace a needle.

11 Friction

ANSWERS

Check Point 1

Fill in the blanks.

1. Friction always _opposes_ motion.
2. Force of friction acts in a direction _opposite_ to motion.
3. Friction _transforms_ the energy of motion into heat energy and noise.
4. _Friction_ is caused due to roughness of two surfaces in contact and trying to move.

Check Point 2

Fill in the blanks.

1. _Friction_ depends upon the area of surfaces in contact.
2. More _roughness_ and more surface area in contact means more friction.
3. Rolling friction is _less_ than sliding friction.
4. Lubrication and polishing help in _reducing_ friction.
5. Oil, grease and graphite are some _lubricants_.
6. A spring balance can _measure_ friction.

Check Point 3

1. **Fill in the blanks.**
   (a) Fluid friction is also known as _drag_.
   (b) Anything which can flow is known as a _fluid_.
   (c) To hold an object firmly, _friction_ between the object and the hand is important.
   (d) Walking and stopping wouldn't be possible without _friction_.
2. **Define.**
   (a) Drag
   (b) Streamlined shape

Ans. (a) The force of friction offered by fluids is known as drag.

Ans. (b) A body shape which is long, pointed and slopy at its two ends to reduce the difficulty in moving through liquids and gases, is called streamlined shape.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. Friction can be reduced by using
(a) fine powder (b) lubricating (c) ball bearings (d) all of these ✓

2. The force of attraction between molecules of different kinds is known as
(a) asperities (b) adhesion ✓
(c) perfect smooth (d) none of these

3. The force required to make an object slide is a measure of friction occured.
(a) sliding ✓ (b) static (c) rolling (d) none of these

4. Larger be the area of contact, more is the
(a) pressure (b) force (c) friction ✓ (d) none of these

5. This friction is also known as drag.
(a) static (b) sliding (c) rolling (d) fluid ✓

6. A spring balance consists of
(a) spring (b) scale (c) movable pointer (d) all of these ✓

7. The friction is directly proportional to this of the sliding object.
(a) mass ✓ (b) weight (c) volume (d) force

B. Fill in the blanks.

1. Sliding friction is *slightly less* than static friction.

2. Surface of glass is *smoother* than the surface of wood.

3. Friction is caused due to *interlocking* of the irregularities of the two surfaces in contact.

4. Friction helps in *stopping* and *moving*.

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

1. The energy of motion is transferred into heat and noise by friction. *True*

2. The streamlined shape of objects increases the effect of drag around them. *False*

3. Friction exerted on an object depends upon its mass. *True*

4. Friction can be reduced by polishing the two surfaces in contact. *True*

5. Friction can be increased by lubricating the two surfaces in contact. *False*

D. Answer in one word.

1. This instrument is used to measure friction. *Spring balance*

2. This is also known as fluid friction. *Drag*

3. These small metal balls kept in between two moving parts of a machine reduce the friction. *Ball bearings*

E. Define these terms.

1. Rolling friction

Ans. The friction that comes into play in between the two moving parts with wheels, rollers or balls between them is called rolling friction.

2. Drag

Ans. The force of friction offered by fluids is known as drag.

3. Fluid

Ans. Any substance that can flow is called a fluid.

F. Differentiate between the following.

1. Dry friction and drag

Ans. Friction between two solid objects is called dry friction, whereas friction due to fluids is called drag.

2. Sliding and rolling frictions

Ans. Sliding friction is the frictional force exerted by a surface on an object when the object is actually sliding on the surface. On the other hand, rolling friction is the friction that comes into play between two moving parts with wheels, rollers or balls between them.

G. Answer these questions.

1. Describe the nature of friction. Explain the cause of friction.

Ans. Friction is a natural force which acts between two surfaces in contact. It is a force which pulls a moving object in the opposite direction of motion. It slows down motion and dampens the energy. It can transfer the energy of a moving body into heat energy and sound energy.

The roughness of two surfaces in contact is the main cause of friction.

2. What are the factors that affect friction between two solid surfaces?

Ans. Friction depends on the following factors:

(a) **Roughness of the two surfaces in contact:** Friction is more for rough surfaces than smooth ones.

(b) **Mass of sliding object:** Friction is large for sliding object having more mass than the one with less mass.

(c) **Surface area in contact:** Larger the area of contact, more is the friction.

(d) Friction also depends upon the nature of the material of the two surfaces.

3. What are the factors that affect the fluid friction?

Ans. The shape of objects which move through fluids affects the fluid friction. They have streamlined shape which is long, pointed and slopy at two ends. This shape reduces the fluid friction and allows the objects to pass easily and smoothly through the fluids.

4. Discuss the role of wheels in reducing friction.

Ans. The wheels reduce the friction as rolling friction is much less than the sliding friction.

5. Write the different methods of reducing friction.

Ans. Friction can be reduced by following methods:

(a) **Lubrication:** By applying lubricants such as oil, grease, graphite, etc. between the two surfaces, friction can be reduced.

(b) **Polishing:** It helps to reduce friction by reducing the irregularities and making the surfaces smooth.

(c) **Ball bearings:** Ball bearings reduce the friction between moving surfaces by changing sliding friction into rolling friction which is always less than sliding friction.

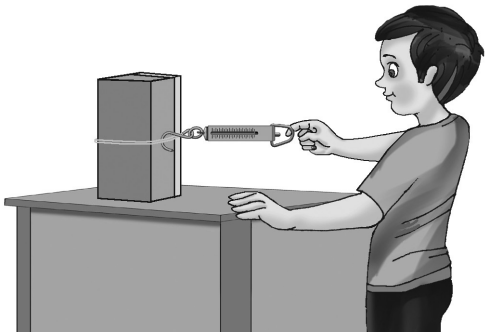
(d) **Using powder:** The powder forms a layer between the moving surfaces and hence, reduces the friction.

6. What are lubricants? Give three examples.

Ans. The materials used for lubrication are called lubricants. They are oil, grease and graphite.

7. Describe an experiment to measure friction between two solid surfaces.

Ans. Take a shoebox with the shoes inside it. Tie it up as shown in the figure and put it on a side of a tabletop.



Connect the hook of the spring balance to the string of the box and pull it, slowly increasing the force until the box begins to slide. Make sure, the spring balance is parallel to the surface on which the box of shoes is kept. The reading on the scale, when the box just begins to slide is a measure for the static friction, while the reading when the box continues to slide is the measure for the sliding friction.

8. Describe an activity to show that air exerts friction.

Ans. Take a piece of one-fourth sheet of a newspaper. Hold it a little high, say in front of your face. Just drop it without applying any force. Carefully observe, how does the paper fall downwards. You may notice that it sways sidewards and takes some time to reach the ground.

Now, crush this paper and roll into a ball, as compact as possible. Hold it at the same height (in front of your face) again and drop exactly as earlier. It quickly falls on the ground without swaying sidewards. This is because in the shape of a sheet, the newspaper had a large surface area in contact with the air around it. Thus, a large friction was exerted on it due to the air and its movement slowed down. On the other hand, when crushed in the form of a paper ball, the surface area was much reduced, and so was the effect of friction. This shows that air exerts friction.

9. Explain the importance of friction. Describe friction as a 'necessary evil.'

Ans. Friction is essential in our everyday life. We are able to walk, hold things, write, etc. because of friction. On the other hand, it also gives undesirable results. For example, we walk on a surface comfortably because of friction between the surface and the soles of our shoes. At the same time, the soles of shoes are worn-out with time by rubbing action on the surface due to friction. Thus, we can say that friction is a necessary evil.

H. Give reasons for the following.

1. The handles of motorcycle are covered with a towel material or a rubber sheet with spikes.

Ans. Handles of motorcycles are covered with a rubber sheet having spikes on it so as to increase friction between the palm and handles so as to provide a good grip to the driver.

2. **The bathroom slippers with rubbed off soles are recommended to be immediately replaced.**

Ans. The bathroom slippers with rubbed off soles offer less friction while walking. One may get slipped and hurt. So, such slippers are recommended to be immediately replaced.

3. **The shape of the aircrafts is streamlined.**

Ans. The streamlined body of aircrafts reduces the friction offered by air and thus, helps it to move easily through the air.

4. **The moving parts of machines are oiled from time to time.**

Ans. Oiling of a machine parts reduces friction and helps in smooth working. It also prevents wear and tear of parts of the machine.

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

1. **Oil, grease, sand, graphite.**

Ans. Sand; It is an abrasive while rest are lubricants.

2. **Sliding friction, static friction, rolling friction, fluid friction.**

Ans. Fluid friction; It is exerted by fluids while rest are offered by solid surfaces.

3. **Roller bearing, ball bearing, wheels, wooden block.**

Ans. Wooden block; It will increase friction while rest will decrease friction and make movement easy.

J. Skill-based questions.

1. **Maglev trains move without touching the ground and hence face no friction due to ground. But there is another friction experienced by these trains. Name that.**

Ans. Maglev trains experience friction due to air through which they move.

2. **If you write on a piece of plane glass sheet with a piece of chalk. The writing does not show clear. Why?**

Ans. The surface of plane glass is smooth and hence, it does not offer much friction to the chalk. Hence, a very less amount of chalk is deposited on it which makes the writing very dull.

K. Activity/Project–Do as directed.

Perform an activity to show that friction depends upon surface area.

Ans. Do it yourself.

Think Zone

1. **Aircrafts do not flap their wings but they fly. How?**

Ans. Aircrafts do not flap their wings but they fly because they have powerful engines which provide push to fly in the air.

2. **Fishes have streamlined bodies. Why?**

Ans. Fishes move inside the water. The water offers much friction. So to reduce the friction offered by water while swimming, fishes have streamlined bodies.

Sound

12

ANSWERS

Check Point 1

1. Fill in the blanks.

(a) Sound is produced by a _vibrating_ source.

(b) Musical instruments can be classified according to their parts which _vibrate_.

(c) The vibrating part in percussion instruments is their _stretched skin_.

(d) In string instruments, the sound is controlled by the _thickness_ and _tightness_ of the strings.

(e) A shehnai is an example of _wind_ instrument.

2. Name different types of musical instruments and state two examples for each type.

Ans. Different types of musical instruments with two examples are given below:

(a) String instruments: Sitar, violin

(b) Percussion instruments: Bongo, congo

(c) Wind instruments: Trumpet, clarinet

(d) Keyboard instruments: Piano, harmonium

(e) Electronic instruments: Synthesiser, electric guitar

3. What is organology?

Ans. Study of musical instruments is called organology.

4. What is the sound producing organ in our body called?

Ans. The sound producing organ in our body is called larynx or voice box.

Check Point 2

Fill in the blanks.

1. Sound needs a _medium_ for its propagation.

2. Sound can travel through _solids_, _liquids_ and _gases_.

3. The speed of sound in air, under normal conditions is _340 m/s_ approximately.

Check Point 3

Fill in the blanks.

1. The number of vibrations completed in one second is known as _frequency_.

2. The S.I. unit to measure _time period_ of a vibration is a second.

3. The audible range of frequencies for human ear is _20 Hz_ to _20,000 Hz_

4. Frequencies below 20 Hz are known as *infrasounds*.
5. Pleasant and refreshing sounds are known as *music*.
6. Sounds of city traffic and factory machinery are a source of *noise*.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. The time taken to complete one vibration is called
   (a) amplitude (b) time period ✓ (c) frequency (d) pitch
2. The sensation of frequency is called
   (a) vibration (b) time period (c) pitch ✓ (d) amplitude
3. The audible range of frequencies for human ear is 20 Hz to
   (a) 15,000 Hz (b) 20,000 Hz ✓ (c) 16,000 Hz (d) 17,000 Hz
4. The level of sound is measured in
   (a) decibel ✓ (b) kilohertz (c) hertz (d) metre
5. Unpleasant, irritating and tiring sounds are called
   (a) music (b) low pitch (c) noise ✓ (d) high pitch
6. The speed of light in air is
   (a) 3×10^7 m/s (b) 3×10^8 m/s ✓ (c) 3×10^6 m/s (d) 3×10^9 m/s
7. This is odd one among the following.
   (a) dholak (b) tabla (c) congo (d) trumpet ✓

B. Fill in the blanks.

1. Sound cannot propagate through *vacuum*.
2. Among gases, liquids and solids, sound has the slowest speed in *gases*.
3. Human ear cannot hear sound of frequency *below 20 Hz*.
4. The S.I. unit for measuring frequency is *Hertz (Hz)*.
5. The sound producing organ in humans is called the *larynx*.
6. The shrillness of a sound depends on its *pitch*.

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

1. Sound can travel through space (above atmospheric layer). *False*
2. Noise pollution is a source of keeping good health. *False*
3. The loudness of a sound depends upon its amplitude. *True*
4. The shrill sounds are high pitch sounds. *True*
5. Dolphins can hear frequencies much higher than what humans can hear. *True*

D. Match the columns.

Column A	Column B
1. Harmonium	(a) wind instrument
2. Trumpet	(b) string instrument
3. Bass drum	(c) electronic instrument
4. Synthesiser	(d) keyboard instrument
5. Guitar	(e) percussion instrument

E. Answer in one word.

1. The sensation of frequency. *Pitch*
2. Vibration of frequencies above 20,000 Hz. *Ultrasounds*
3. A pleasant and soothing sound. *Music*
4. The S.I. unit to measure the level of sound. *Decibel (dB)*

F. Define these terms.

1. Frequency

Ans. The number of vibrations (oscillations) made by an object in one second is termed as frequency.

2. Amplitude

Ans. The maximum displacement of a particle or an object from its mean position to its either side is termed as its amplitude.

3. Music

Ans. The soothing, pleasant and refreshing sound is called music.

4. Noise

Ans. The irritating, unpleasant and tiring sound is called noise.

G. Differentiate between the following.

1. Infrasound and ultrasound

Ans. The sounds below 20 hertz are called infrasounds, whereas those above 20,000 hertz are called ultrasounds.

2. String and percussion instruments

Ans. In string instrument, the vibrating part is metal string, whereas in percussion instrument, it is stretched skin.

H. Answer these questions.

1. Name the different types of musical instruments and name the vibrating part in each type.

Ans. Musical instruments are of following types:

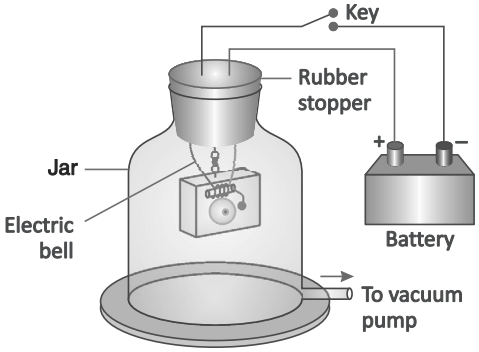
(a) **String instruments:** Vibrating part is metal string.
(b) **Percussion instruments:** Vibrating part is stretched skin.
(c) **Wind instruments:** Vibrating part is air column (wind).
(d) **Keyboard instruments:** Vibrating part is metal strip below the keys.
(e) **Electronic instruments:** Sound produced by electronic circuit.

2. How is sound produced by humans? Describe.

Ans. In humans, the sound is produced by an organ called larynx or voice box which is located at the upper end of the windpipe. The larynx has vocal cords. When the lungs force out air through the larynx, the vocal cords vibrate and produce sound. The volume of sound produced is controlled by increasing or decreasing the amount of air passing through the voice box.

3. Describe an experiment to show that sound cannot travel through vacuum.

Ans. Place an electric bell in an air-filled jar fitted with a vacuum pump. Switch the bell on. You can hear the ringing sound of the bell. Now, suck out the air from the jar using a vacuum pump. Now, switch on the electric bell. You cannot hear the sound this time because air is removed which is needed by the sound to travel. This shows that sound cannot travel through vacuum.



4. Show experimentally that sound can travel through solids.

Ans. While you are sitting on your chair, in your classroom, tap so gently on your desk that hardly any tapping sound is audible to you. Continue tapping in the same manner and bend down your head sideways, to touch one of your ears to the top of the desk. The moment your ear touches the desk, you are able to hear a loud tapping sound. This shows that sound can travel through solids.

5. What is noise pollution? Discuss the causes and effects of noise pollution.

Ans. Noise pollution is the unwanted and displeasing human created sound that disrupts the environment.

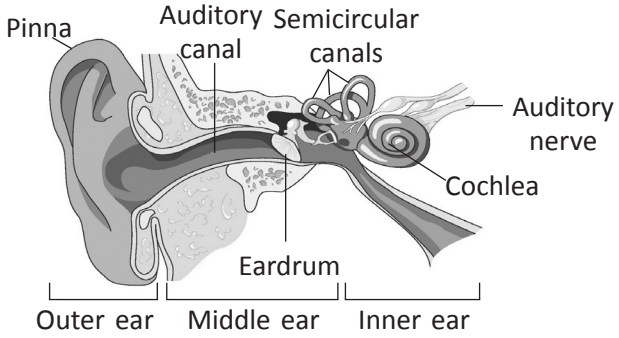
Causes of noise pollution: Main causes of noise pollution are trains, aircrafts, cars, buses, factory machines, construction works, power tools, office equipments, audio entertainment systems, etc.

Harmful effects of noise pollution: Noise can cause annoyance and aggression, hypertension, high stress level, hearing loss, sleep disturbance and tinnitus. Tinnitus can lead to forgetfulness, severe depression and at times, panic attacks. High noise pollution can cause cardiovascular disorders.

I. Draw and label the diagram.

1. Human ear

Ans.



2. Low pitch sound and high pitch sound

Ans. A sound with low pitch is shown as follows:

A sound of high pitch is shown as follows:

J. Give reasons for the following.

1. Sound cannot travel through vacuum.

Ans. Sound is produced by vibrations in particles of matter. Sound cannot travel through vacuum because there is no matter, i.e., air to create vibrations.

2. We can see the lightning much before we hear the thunder.

Ans. The speed of light in air is much greater than that of sound in air. Of light, it is 3×10^8 m/s and that of sound is 343 m/s. Hence, we see lightning much before we hear the thunder.

K. Skill-based questions.

1. How can extra loud sounds cause permanent hearing loss?

Ans. Extra loud sounds create very high frequency vibrations which may damage the eardrum, thus, causing permanent hearing loss.

2. Why can humans not listen to very low frequency vibrations?

Ans. Very low frequency vibrations are unable to cause vibrations in the eardrum. Hence, humans cannot listen to these vibrations.

3. How do ultrasound vibrations help in cleaning dishes?

Ans. Ultrasound vibrations are used to scrub the surfaces of dishes to clean them. This process does not require detergent to clean the dishes.

L. Activity/Project–Do as directed.

Perform an activity to show that sound travels through liquids.

Ans. Do it yourself.

Think Zone

Astronauts are not able to talk with each other on the surface of the moon. Why?

Ans. There is vacuum on the surface of the moon and as sound cannot travel through vacuum, astronauts are not able to talk with each other.

13 Chemical Effects of Current

ANSWERS

Check Point 1

Write true or false.

1. Nonmetals are good conductors of electricity. *False*
2. Whenever current flows through a material, it causes heating of the material. *True*
3. The full form of LED is Light Electrical Device. *False*
4. Pure water is a bad conductor of electricity. *True*
5. Tap water conducts electricity through it. *True*

Check Point 2

1. **What do you mean by electrolyte?**

Ans. The solution or paste which contains the electrodes and conducts electric current through itself is known as electrolyte.

2. **Who discovered the process of electrolysis?**

Ans. Johann Wilhelm Ritter discovered the process of electrolysis.

3. **What is electroplating?**

Ans. Depositing a thin layer of a metal on another metallic object with the help of electric current is known as electroplating.

4. **List the two main reasons for electroplating the objects.**

Ans. Two main reasons for electroplating the objects are: (a) to protect the metal underneath, and (b) to produce an attractive finish.

5. **Why is chrome-plating popular in the industry?**

Ans. Chrome-plating is popular in the industry because of its low cost, easy processing and the range of applications.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. The negative electrode of a voltameter is known as
   (a) anode (b) diode (c) cathode ✓ (d) none of these
2. This is used in industry for refining metals and extraction of metal from its ore.
   (a) electroplating (b) electrolysis ✓ (c) electrode (d) none of these

3. The apparatus used for electrolysis is called
   (a) ammeter (b) galvanometer (c) indicator (d) voltamteter ✓
4. LEDs are used in
   (a) torches (b) TV remotes (c) key chains (d) all of these ✓
5. This device is based on 'the magnetic effect of current'.
   (a) geyser (b) electric iron (c) generator ✓ (d) toaster
6. Decomposition of the chemical compounds present in the electrolyte is called
   (a) electroplating ✓ (b) electrolysis
   (c) electrolyte (d) electrode
7. This is the bad conductor of electricity.
   (a) rubber ✓ (b) copper (c) silver (d) gold
8. This is the best conductor of electricity.
   (a) gold (b) silver ✓ (c) copper (d) aluminium

B. Fill in the blanks.

1. Lemon juice is a *good* conductor of electricity.
2. Pure water is a *bad* conductor of electricity.
3. Causing chemical changes to a solution by passing electric current through it is known as *electrolysis*.
4. Human body is a good *conductor* of *electric* current.
5. During electroplating, a metal is deposited on the *negative* electrode.

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

1. During electrolysis, a chemical change is caused in the electrodes. *True*
2. A voltameter is used for electrolysis, including the electrodes and the electrolytes. *True*
3. Mustard oil is a good conductor of electricity. *True*
4. LED does not emit light. *False*
5. A metal is deposited on the anode during the process of electroplating. *False*

D. Answer in one word.

1. The positive electrode in the apparatus for electrolysis. *Anode*
2. A layer of metal deposited on an object of inferior metal, to enhance its look and life. *Electroplating*
3. The total set up for electrolysis including the container, the electrolyte and the electrodes. *Voltameter*
4. A solid dissolved in pure water. *Electrolyte*

E. Define these terms.

1. **Electrolysis**

Ans. The process of causing a chemical change in a solution by passing electric current through it, is called electrolysis.

2. Electroplating

Ans. The process of depositing a layer of desired metal on other material by passing electric current is called electroplating.

3. Electrolyte

Ans. The solution or paste which contains the electrodes and conducts the electric current through itself is known as electrolyte.

4. Anode

Ans. The electrode connected to the positive terminal of the battery is called anode or the positive electrode.

F. Answer these questions.

1. State the three possible effects of electric current passing through a solution.

Ans. When electric current is passed through a conducting solution, following three effects may occur:

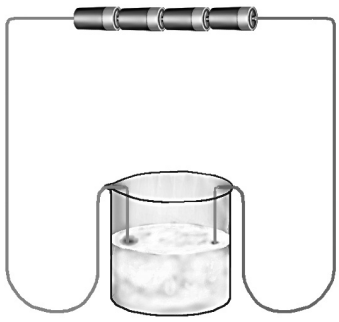
(a) Evolution of gas bubbles at the electrodes.

(b) Change in the colour of electrolyte and decomposition of chemical compounds present in the electrolyte.

(c) Deposition of metal at cathode.

2. How is electrolysis conducted? Explain.

Ans. Take four dry cells and put them in a cell holder so that the cells are joined together to produce a larger current. Take two thick copper wires and clean them with a sandpaper. Connect them to the battery made by you as shown in the figure, using ordinary connecting wires. Take two teaspoons of refined wheat flour and make a thin paste by mixing it in water. Put the ends of the two copper wires in this paste and leave the set-up for about 30 minutes. You will find a bluish-green appearance near the wire connected to the negative terminal of the battery. This change in colour of the wheat flour paste is due to a chemical change caused in it, due to the passage of electric current through it.



3. Write the main applications of electrolysis.

Ans. Electrolysis is used for refining impure metals into pure ones, extraction of metals from their ores and for electroplating.

4. Describe the process of electroplating. List some applications of electroplating.

Ans. Electroplating is a process of coating a layer of desired metal on an object of other metal with the help of electricity. In electroplating, the desired metal which is coated is made positive electrode, i.e., anode, whereas the metal to be coated is made negative electrode, i.e., cathode. The salt solution of desired metal is taken as electrolyte and then electric current is passed through it. The desired metal gets deposited on the object.

Electroplating has following applications:

(a) It is done to make cutlery items shiny.

(b) Electroplating of zinc metal called galvanisation and is done to protect steel articles from corrosion.

(c) Nickel and chrome plating on taps, bolts, fancy lights, etc. makes them attractive and shiny.

(d) Silver and gold plating is done on iron, copper, etc. for making cheaper jewellery.

5. Why is electroplating done? Give two reasons.

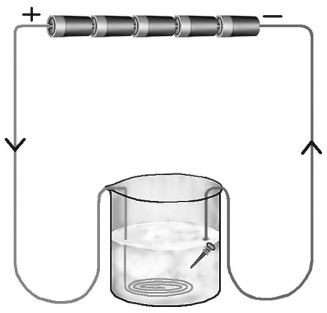
Ans. Electroplating is done to (a) protect the metal underneath, and (b) produce an attractive finish.

6. State the factors on which the amount of metal deposited during electroplating on the cathode depends.

Ans. The amount of metal deposited on the cathode during electroplating depends upon (i) the time for which the current is passed through the electrolyte and (ii) the amount of current which passes through the electrolyte.

7. Draw the labelled diagram of the apparatus used for electroplating an iron nail with copper.

Ans.



G. Give reasons for the following.

1. Iron is used for manufacturing window frames and grills.

Ans. Iron is a cheap, strong and easily available metal. So, it is used for manufacturing window frames and grills.

2. Chrome-plating is quite popular in the industry.

Ans. Chrome-plating is popular in the industry because of its low cost, easy processing and the range of applications.

H. Skill-based questions.

1. Can a plastic or wooden object be coated with a metal by electroplating? Give reason for your answer.

Ans. No, plastic or wooden object cannot be coated with a metal by electroplating because plastic and wood are insulators and do not allow electric current to pass through them. Only good conductors of electricity can be electroplated.

2. Copper is used to make electric wires and not the silver. Why?

Ans. Though silver is the best conductor of electricity, it is not used to make electric wires because it is very costly. On the other hand, copper is cheaper and hence, is used to make electric wires.

I. Activity/Project–Do as directed.

Perform an activity to show that some liquids conduct electricity while others do not.

Ans. Do it yourself.

Think Zone

1. **A magnetic compass placed near a current carrying wire shows deflection. Why?**

Ans. A current carrying wire produces magnetic field around it. So, a magnetic compass placed near a current carrying wire shows deflection.

2. **A student is using a tester made from a magnetic compass needle to test the conductivity of a few materials. There is a strong bar magnet left lying near the tester by mistake. How is it going to affect the working of the tester?**

Ans. In this case, the tester will not work properly because the magnetic field produced by the strong bar magnet will counteract the magnetic field produced by the current carrying wire.

Some Natural Phenomena

14

ANSWERS

Check Point 1

Fill in the blanks.

1. An _electroscope_ is used to detect charge on a body.
2. Like charges _repel_ each other.
3. Charges can flow through _good_ conductors.
4. The process of removing charge from a charged object is called _discharging_.
5. An object which gains electrons, becomes _negatively_ charged.
6. Charges flow from higher level to _lower_ level, till the charges on the two bodies become _equal_.

Check Point 2

1. **Fill in the blanks.**
   (a) The positively charged particles move towards the _upper part_ of the cloud.
   (b) Thunder is caused due to sudden _expansion of_ air.
   (c) During lightning, one should stay _away_ from doors and windows.
   (d) A _lightning conductor_ is made up of a thick and long metal rod, whose one end is buried under the earth.
   (e) _Lightning_ is flow of electricity from _clouds_ to the ground.
2. **Define the following.**
   (a) lightning, (b) lightning conductor.

Ans. (a) A huge electric spark taking place among clouds, sometimes between clouds and the earth is called lightning.
(b) A safety device fitted on top of high buildings to protect the building from lightning is called lightning conductor.

Check Point 3

Fill in the blanks.

1. The ground waves spread out due to sliding of earth's plates is called _seismic waves_.
2. The earth's crust is made up of _seven big plates_ joined together.

3. The molten material in the mantle undergoes *convection currents* due to huge temperature differences.
4. The temperature of the inner core of the earth is *5500°C*.
5. Houses in earthquake prone areas are made up of *mud* and *timber*.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. This layer of the earth has the largest temperature.
   (a) outer core (b) inner core ✓ (c) outer mantle (d) lower mantle
2. This range of magnitude of earthquake can be destructive.
   (a) 3.5–6 (b) 3.5–5.4 (c) 3.5–6.9 (d) 6.1–8.0 ✓
3. The earthquake is originated from
   (a) epicentre (b) mantle (c) focus ✓ (d) crust
4. The inner core is almost solid iron at
   (a) 4500°C (b) 5500°C ✓ (c) 3700°C (d) 5000°C
5. The instrument by which seismic waves can be detected and recorded is
   (a) barograph (b) radiograph (c) seismogrpah ✓ (d) cardiograph
6. Sparks of lightning cause immense
   (a) energy (b) heat ✓ (c) light (d) none of these
7. This is caused by sudden heating and expansion of the air.
   (a) hurricane (b) cyclone (c) thunder ✓ (d) lightning
8. Charges can flow through
   (a) metals ✓ (b) nonmetals (c) both (a) and (b) (d) none of these

B. Fill in the blanks.

1. The flow of electricity from clouds to the ground is called *lightning*.
2. A *lightning conductor* protects a building from the harmful effects of lightning.
3. The metal leaves of an electroscope move away from each other due to *discharging*.
4. A positively charged object has a deficiency of *electrons*.
5. The place where two plates of the earth meet together is called a *plate joint*.
6. The device which can detect and record seismic waves is called a *seismograph*.
7. Earthquakes of magnitudes 0-3 on Richter scale are completely *recorded and not felt*.
8. Moving *electrons* constitute electric current.

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

1. Lightning is caused due to the movement of the earth's plates. *False*
2. Clouds get charged when water and ice particles move inside them. *True*
3. Stationary or static charge means electric current. *False*
4. An electroscope can detect seismic waves. *False*
5. Earthing is a safety measure against leakage of electric current. *True*
6. Earthquakes above a magnitude of 6 on Richter scale are not fatal. *False*

D. Answer in one word.

1. The point on the earth's crust, just above the point in the deep crust from where the earthquake begins. *Epicentre*
2. A device which protects buildings against the damage from lightning. *Lightning conductor*
3. A device which can detect the presence of charge on a body. *Electroscope*
4. The type of charge, opposite to positive charge. *Negative charge*
5. An earthquake prone area. *Seismic zone*

E. Define these terms.

1. Earthquake

Ans. An earthquake is a sudden, sometimes, violent movement of parts of the earth's surface due to the release of energy from under the earth's crust.

2. Seismograph

Ans. Seismograph is an instrument used to detect and record seismic waves during an earthquake.

3. Convection currents

Ans. The movement of molten material in the mantle of the earth due to temperature difference is called convection currents.

F. Differentiate between the following.

1. Electric charge and electric current

Ans. Electric charge is a property of some particles of materials by which they exert force on one another, whereas the flow of electric charge is called electric current.

2. Epicentre and focus

Ans. The point on the surface of the earth, just above the point inside the earth where an earthquake originates, is called epicentre, whereas focus is the point inside the earth where an earthquake originates.

G. Answer these questions.

1. How does an object get charged? Explain.

Ans. An object gets charged by rubbing or touching with a charged body or by taking it near to a charged body. This causes transfer of charge from charged body to uncharged body.

2. How can an object become positively charged? Describe.

Ans. When two objects are rubbed together, the one that loses electrons becomes positively charged because electrons carry negative charge. By losing electrons, the object has less number of negative charge and becomes positively charged.

3. Why do the diverged leaves of an electroscope fall back on touching the top of the metal rod with hand? Name the phenomenon.

Ans. On touching the top of the metal rod with hand, the charge from the copper strips which were at high level of charge, flows to the hand which was at zero level charge. This removes the repulsion between diverged leaves and they fall back. The phenomenon is known as discharging.

4. How are lightning and thunder caused?

Ans. **Lightning:** The lightning is caused when clouds get charged by rapidly moving particles of water and ice inside them. The upper part of clouds gets positively charged while lower part has negative charge. The negative charge of clouds is attracted by positive charge on the ground. When attraction between these opposite charges becomes strong, electricity flows from the clouds to the ground. This causes lightning in the sky.

Thunder: When hot electrical discharge passes through air, the air becomes hot suddenly and expands quickly producing a loud noise. This is called thunder.

5. How is an earthquake caused? Describe.

Ans. An earthquake is caused by high pressure developed due to convection currents in the mantle of the earth. This high pressure makes two plates slide past each other at plate joint. This causes trembling and shaking of the ground, which is known as earthquake.

6. Explain the structure and working of a lightning conductor.

Ans. **Structure of lightning conductor:** It consists of a long metal rod, fixed with a side wall of the building to be protected such that its upper end protrudes much above the top of the building. The upper end of the rod is made into the shape of a trishul or is fragmented into large number of pointed rods. The lower end of the rod runs deep under the earth, where it is joined with an already buried huge copper plate.

Working of lightning conductor: When lightning strikes, the upper pointed ends of the lightning conductor quickly absorb the charges, the long metal rod gives them an easy path to flow down to earth and the copper plate helps in a quick distribution of charge.

7. What precautions should you follow, if caught outside during lightning?

Ans. Following precautions should be taken when caught outside during lightning:

(a) Do not stand under a tree for cover.
(b) Do not use umbrella, lawnmower, bicycle, etc.
(c) Do not stand near fences, benches or tall poles.
(d) Seek cover indoors quickly or in a car with closed windows.
(e) If swimming or boating, seek shelter on land quickly.
(f) Crouch low with head bent in between the arms and legs close together.

8. What precautions will you follow, if an earthquake occurs while you are in your home?

Ans. Following precautions should be taken at home during an earthquake:

(a) Attain minimum height by lying or sitting.
(b) Cover head with pillow, etc. or take shelter under a strong table.
(c) Stand at the corner of a room.
(d) Do not stand near the exterior walls of the house.
(e) Do not run out of the house.
(f) Hold on till the seismic waves are over.

9. How will you protect yourself during an earthquake, if you are caught while driving?

Ans. Following measures would be taken if caught in an earthquake while driving:

(a) Pull over to the side of the road, stop and set the parking brake.

(b) Avoid bridges, power lines, poles, signboards or hoardings, buildings and trees, as much as possible.

(c) Stay inside the vehicle until shaking stops.

(d) If a power line falls on your vehicle, stay in till a trained person removes it.

10. State the function of a seismograph.

Ans. A seismograph is used to detect and record seismic waves during an earthquake.

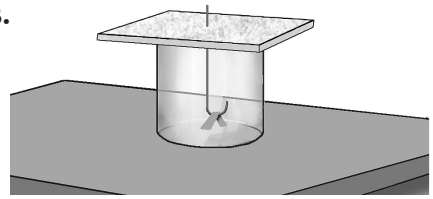
11. Describe the construction and working of an electroscope.

Ans. An electroscope consists of two thin metal strips connected to a metal knob by a rod. When a charged object is touched with the knob of electroscope, some charge from the object is transferred to metal strips through the metal rod. The metal strips repel each other due to having similar charge.

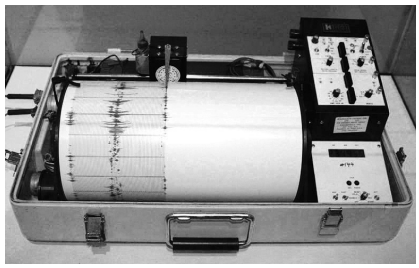
H. Draw and label the diagram.

1. An electroscope

Ans.

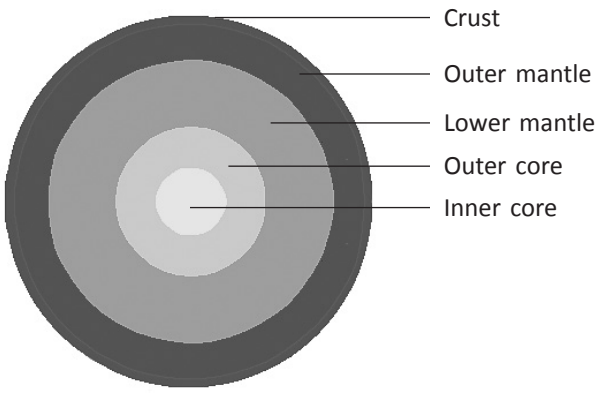


2. A seismograph



3. The various layers of the earth

Ans.



I. Give reasons for the following.

1. The top of a lightning conductor is made sharply pointed.

Ans. The top of a lightning conductor is made sharply pointed because when lightning strikes, these pointed ends quickly absorb the charge and let it flow down to the earth.

2. The houses in seismic zones are made up of mud and timber.

Ans. The houses in seismic zones are made up of mud and timber because they cause less damage on falling while heavy building materials like bricks, iron, etc. on falling, cause severe damage of life and property.

J. Skill-based questions.

1. There is an enormous number of lightning conductors installed all over the world. Why is it that the earth does not get charged?

Ans. The earth behaves as a huge reservoir of charges. The size of the earth is so large that when the heaviest charges are distributed over it, there is a negligible amount of charge at any point on the earth. That is why, it does not get charged.

2. Is it really completely safe to cover yourself under heavy and strong objects like a table during a harmful earthquake?

Ans. Covering under strong objects during a harmful earthquake is not really safe because it cannot save people in case the building collapses. But it can surely save people from the falling objects during an earthquake.

K. Activity/Project–Do as directed.

Perform an activity to show that like charges repel each other.

Ans. Do it yourself.

Think Zone

1. The top of a lightning conductor is always above the top of the building it is fitted with. Why?

Ans. The top of lightning conductor is always above the top of the building so as to receive the electric discharge and transfer it to the earth. This saves the building from damage.

2. One should not use umbrellas or lawnmowers during a thunderstorm. Why?

Ans. Umbrellas and lawnmowers are made up of metal and are high enough as compared to the nearby surface. In case of thunderstorm, these objects can attract the charge, causing harm to the user.

Light

15

ANSWERS

Check Point 1

1. **Fill in the blanks.**
   (a) The incident ray, the normal at the point of incidence and the *reflected* ray, all lie in the same *plane*.
   (b) The angle of incidence is always *equal* to the *angle* of reflection.
   (c) Uniform reflection from a smooth surface is called *regular* reflection.
2. **Define diffused reflection.**

Ans. When light falls on a rough surface, the reflected rays spread in different directions. This kind of reflection is called diffused reflection.

3. **Does light follow laws of reflection, during diffused reflection?**

Ans. Yes, light follows laws of reflection during diffused reflection.

4. **What is the difference between an incident ray and a reflected ray?**

Ans. A ray of light falling on a surface is called incident ray, whereas a ray of light travelling in a changed direction after reflection is called reflected ray.

Check Point 2

1. **Fill in the blanks.**
   (a) A *kaleidoscope* is a tube of mirrors, containing loose and small coloured objects, to show their *multiple* images.
   (b) An *infinite* number of images are formed by two plane mirrors, kept parallel to each other.
   (c) Reflected light can be *reflected* again. The phenomenon is called *multiple* reflection.
   (d) A periscope makes use of multiple *reflections* of light, and it is used to see objects at different *heights*.
   (e) The *white light* is made up of seven colours.

Check Point 3

1. **Fill in the blanks.**
   (a) The *iris* is a flexible, circular, ring-like muscle in the front part of the eye.
   (b) The eye lens is held by *ciliary muscles* in the eyeball.

(c) The ciliary muscles _relax_ to allow the eye lens to flatten.

(d) The _optic nerve_ carries the message of the image formed from the retina to the _brain_.

(e) The light sensitive cells on the retina are called _photoreceptors_.

(f) Each character of braille font contains an arrangement of _six_ dots.

(g)  represents letter _a_ in braille alphabet.

2. Define:

(a) Least distance of distinct vision,

Ans. The minimum distance at which a normal human eye can read or see without any strain is called least distance of distinct vision. It is 25 cm for a normal eye.

(b) Accommodation of ciliary muscles

Ans. Ciliary muscles relax and allow the eye lens to become flattened, in order to enable it to see distant objects. They press hard and thicken the lens, to enable it to see nearby objects clearly. This phenomenon is called accommodation of ciliary muscles.

(c) Blind spot

Ans. The point on the retina where the optic nerve is connected to it, lacks the photoreceptors and the image formed at this point is not sensed by the eye. This point is called the blind spot.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. For what fraction of a second does any object we see, leaves its impression on our retina?
(a) 1/61 (b) 1/14 (c) 1/18 (d) 1/16 ✓

2. White light consists of
(a) 8 colours (b) 7 colours ✓ (c) 9 colours (d) 5 colours

3. The bouncing back of light in the same medium is called
(a) dispersion (b) deflection (c) accommodation (d) reflection ✓

4. This part of the eyes lacks photoreceptors.
(a) retina (b) blind spot ✓ (c) pupil (d) cornea

5. This vitamin is required for proper functioning of the eyes.
(a) vitamin D (b) vitamin A ✓ (c) vitamin C (d) vitamin B

6. This part of eyes behaves as the screen.
(a) iris (b) pupil (c) cornea (d) retina ✓

7. This colour has the highest dispersion of light.
(a) blue (b) violet ✓ (c) red (d) yellow

8. This object allows light falling on it, to pass through.
(a) opaque (b) translucent (c) transparent ✓ (d) none of these

B. Fill in the blanks.

1. _White_ light is made up of seven colours.

2. Angle of incidence is always equal to the *angle* of *reflection*.
3. When light falls on an uneven surface, it results into *diffused* reflection.
4. An image formed by a plane mirror is always *laterally* inverted.
5. The image of an object seen is formed on the *retina* in human eye.
6. Retina contains *light sensitive* cells, which perceive colours.
7. Braille is a font made up of a set of *six* dots, *a little raised* from the surface of paper.

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

1. The angle of incidence is always equal to the angle of reflection. *True*
2. The ciliary muscles have to relax to enable us to see nearby objects. *False*
3. The blind spot has no photoreceptors. *True*
4. All nonluminous objects are seen due to reflection of light. *True*
5. Cornea carries the information of the image formed at the retina, to the brain. *False*
6. An image formed at the retina of human eye, leaves an impression for 1/10th of a second. *False*

D. Answer in one word.

1. A perpendicular to the reflecting surface, at the point of incidence. *Normal*
2. The angle between the reflected ray and normal. *Angle of reflection*
3. The muscles which hold the eye lens in the human eyeball. *Ciliary muscles*
4. The defect of eye in which a person can see distant objects clearly, but nearby objects are not seen clear. *Farsightedness (hypermetropia)*
5. Nonuniform reflection from an uneven surface. *Diffused reflection*

E. Define these terms.

1. Kaleidoscope

Ans. A kaleidoscope is a tube of mirrors, containing loose and small coloured objects, to show their multiple images.

2. Regular reflection

Ans. Reflection from a highly polished surface is called regular reflection. It reflects parallel beam of light in one direction, e.g., reflection from a plane mirror.

3. Nearsightedness

Ans. Nearsightedness is a defect of eye in which a person can see nearby objects clearly but is unable to see distant objects clearly.

4. Farsightedness

Ans. When a person can see distant objects clearly, but cannot see nearby objects clearly, the condition is called farsightedness.

F. Differentiate between the following.

1. Regular reflection and irregular reflection

Ans. Reflection from a highly polished surface is called regular reflection. On the other hand, reflection from a rough surface is called irregular or diffused reflection.

2. Rod cells and cone cells

Ans. Rod cells help to see in dark while cone cells help to see different colours.

G. Answer these questions.

1. State the laws of reflection.

Ans. The laws of reflection are as follows:

(a) When a ray of light falls on a plane smooth surface, it reflects in the same medium in such a way that the angle of incidence is equal to the angle of reflection.

(b) The incident ray, the reflected ray and the normal always lie in the same plane.

2. If an incident ray makes an angle of 40° with the normal, what will be the angle between the reflected ray and the normal?

Ans. 40° because as per the laws of reflection, angle of reflection is equal to angle of incidence.

3. What is the function of ciliary muscles in human eye?

Ans. Ciliary muscles help in the accommodation of the eye by changing the shape of the lens to see distant and nearby objects.

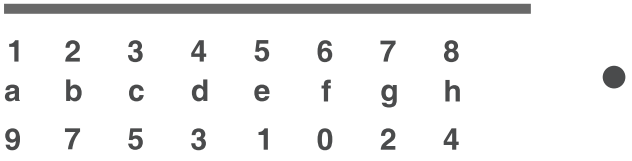
4. How is retina equipped to perceive an image of an object?

Ans. Retina acts as a screen for the image formation of the objects we see. It has light sensitive cells called rod and cones. When reflected light from an object enters eye, its inverted image is formed on the retina and rods and cones detect brightness and colours of the object respectively.

5. What is blind spot? Describe an activity to realize the presence of the blind spot.

Ans. Blind spot is the point on the retina where optic nerve is connected. No image is formed here.

The following chart contains a group of characters on the left-hand side and a black dot on the right.



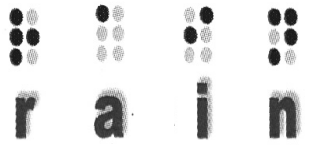
Keep your eyes about three or four times as far from the page, as the length of the line. To find the blind spot of the right eye, you will have to close the left eye. So, close your left eye and keeping your head motionless, look at each of the characters, one by one, until the black dot vanishes. The vanishing of black dot indicates the formation of the image of the black dot at the blind spot of the right eye.

6. What is Braille font? Explain.

Ans. Braille font is a set of characters in which each character is made up of six dots which are arranged in a rectangular pattern of three dots each in two columns. A dot may be raised at any of the six positions.

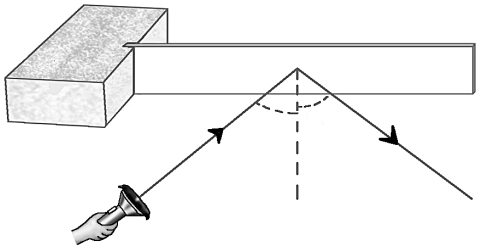
7. How will the word RAIN be written in the Braille font?

Ans. In Braille font, RAIN will be written as



8. Describe an activity to verify the laws of reflection.

Ans. Take a plane mirror and fix it in a slit made in a small thermocol cube, so that the mirror can stand vertically straight on a table. Take a 5 cm × 5 cm piece of black chart paper. Make a 1 mm wide and 1 cm long slit in the centre of the black paper and use this to cover the front of a torch. Now, when you light the torch, light will come out only from the slit on the black paper. Now, take an A-4 size sheet of white paper, mark a 10 cm long straight line in its centre, with a sharp pencil. Shade one side of the line. This line will represent the mirror. Place the plane mirror just over this line. Keep the torch in front of the mirror, at an angle, as shown in the figure and light it. Very carefully, mark the positions of the incident light and the reflected light. Put off the torch and remove the mirror.



With the help of a scale and pencil, produce the incident ray (position of incident light) and the reflected ray (position of the reflected light) to make them meet at the line representing the mirror. The point where the incident and reflected rays meet at the line representing the mirror, is called the point of incidence and also, the point of reflection. Draw a perpendicular to the line of mirror, at the point of incidence. This is the normal. Take a protractor and measure the angle of incidence (angle between the incident ray and the normal). Also, measure the angle of reflection (the angle between the reflected ray and the normal). Compare the measurements of the angle of incidence and the angle of reflection. You will find them equal. This verifies the laws of reflection.

9. Why does the pupil expand in dim light?

Ans. The pupil expands in dim light to allow more light to enter the eye for looking at an object.

10. How do cinematographers enable us to see movie films? What is the underlying principle?

Ans. In cinematography, still photographs are flashed at a speed of 24 photographs per second in front of the eyes of the viewers. This gives the effect of a moving film.

Cinematography is based on the principle that an image formed on the retina, persists for 1/16th of a second. So, if two images are flashed in front of our eyes within a time less than 1/16th of a second, our eyes will not be able to distinguish between the two.

11. What are the characteristics of the image formed by a plane mirror?

Ans. The characteristics of the image formed by plane mirror are as follows:

(a) Image is virtual, erect and of same size as the object.

(b) Image is formed at the same distance behind the mirror as the object is placed in front of it.

(c) Image shows lateral inversion, i.e., the left side of the object appears on the right side of the image and the right side of the object appears on the left of the image.

H. Give reasons for the following.

1. Seven colours are seen in a rainbow.

Ans. A rainbow is formed after a rain. When light rays pass through the droplets of water hanging in the air, they split into seven colours. So, seven colours are seen in a rainbow.

2. Braille is a font developed with raised dots.

Ans. Braille font is developed for the visually challenged people to read and write. These people cannot see but their other senses such as touch, smell and hearing are very strong. They normally have a feel of their surroundings by touching, smelling or hearing sounds. So, Braille font is developed with raised dots so that visually challenged people can read by touching them.

3. We don't see any objects when in total dark.

Ans. In total darkness, there is no reflection of light from an object to our eye. Therefore, we don't see any objects when in total dark.

4. The eyes blink, when we are exposed to bright light suddenly.

Ans. When we are in dim light or dark, our pupil is wide open to get more and more light. But when we are exposed to bright light, our eyes blink to reduce the amount of light entering the eye because pupil takes some time to reduce its size.

5. Some people develop difficulty in viewing nearby objects clearly or distant objects clearly.

Ans. Difficulty in viewing nearby or distant objects clearly may be due to malnutrition, lifestyle, old age or weakening of ciliary muscles to contract or relax for accommodation of eye.

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

1. Eyelid, retina, eye, lens, iris

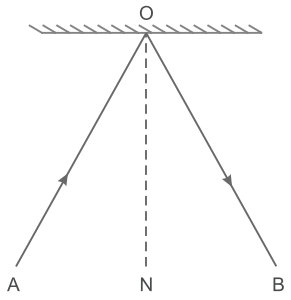
Ans. Eye; It is a sense organ while rest are the parts of it.

2. Slate and stylus, braille embosser, braille typewriter, paper and pen

Ans. Paper and pen; It is a means to write for common people while rest are means to read and write for visually challenged people.

J. Diagram-based questions.

1. Look at the figure.



(a) Identify the normal.

Ans. ON

(b) What is angle of incidence?

Ans. ∠ AON

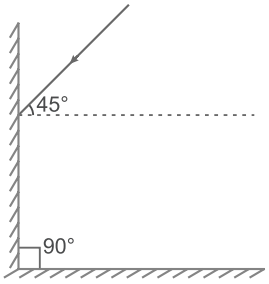
(c) What is angle of reflection?

Ans. ∠ NOB

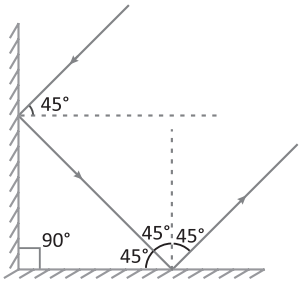
(d) How are angle of incidence and angle of reflection related?

Ans. They are equal.

2. Two plane mirrors are inclined at 90° to each other? A ray of light is incident on one of the mirrors as shown in the figure. Draw the reflected ray from the second mirror.



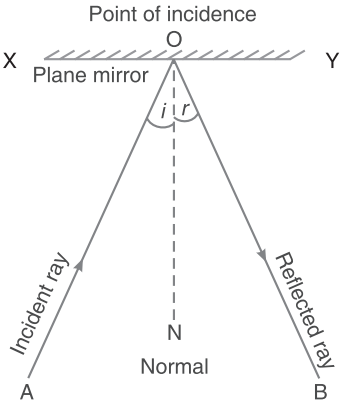
Ans.



K. Draw and label the diagram.

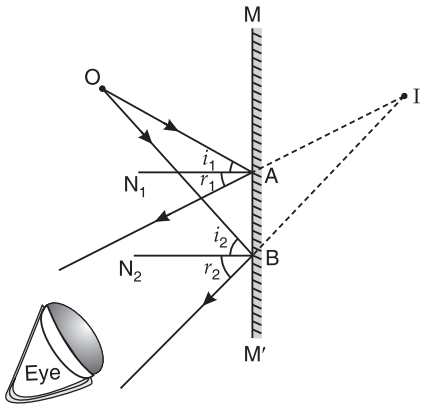
1. Draw a ray diagram to show an incident ray, a normal and corresponding reflected ray.

Ans.



2. Draw a ray diagram to show the image formation of an object kept in front of a plane mirror.

Ans.



L. Skill-based questions.

1. **The rays of light falling on a rough surface follow the laws of reflection and yet no image is obtained due to reflection from a rough surface. Justify the phenomenon.**

Ans. Though the reflection on a rough surface follows the laws of reflection, but the reflected rays never meet or appear to meet at a point due to irregular reflection. Hence, no image is obtained.

2. **What will happen if the light sensitive cells or photoreceptors are completely missing from the retina of a person's eyes?**

Ans. If the light sensitive cells or photoreceptors are completely missing from the retina of a person's eyes, the person will not be able to see at all.

3. **The normal rate of flashing the still pictures in front of human eyes to project a movie film at normal speed is 24 stills per second. To show a slow motion film, the rate of flashing stills should be more than or less than 16 stills per second? Give reason for your answer.**

Ans. For a slow motion film, the rate of flashing the stills should be more than 16 stills per second. It is because the image of an object persists on retina for 1/16 of a second and if the number of flashing is less than 16, it will become a still picture.

M. 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. **A very smooth, distempered wall reflects the light falling on it. Why doesn't a person standing in front of it, sees his or her image in it?**

Ans. The reflection takes place from the external surface of the wall and not from its internal surface. So, a person standing in front of a distempered wall, does not see his or her image in it.

2. **A transparent object/material allows the light falling on it, to pass through it. How does it make itself visible?**

Ans. A transparent object makes itself visible by diverting the light a little from its path.

Stars and the Solar System

16

ANSWERS

Check Point 1

1. Fill in the blanks.

(a) The different shapes of the bright part of the Moon are called *phases* of the Moon.

(b) When the Moon is seen as a full circular disc, it is called a *full* Moon.

(c) The decreasing size of the moon from full to a New Moon is called a *waning* Moon.

(d) The Moon, a week after the New Moon is called a *first quarter* Moon.

(e) The Moon has no *atmosphere* on it.

2. Define

(a) Full Moon

(b) New Moon

(c) Waning Moon

Ans. (a) When the moon appears as a full circular disc on a night, it is known as full moon.

(b) On the fifteenth night from the full moon, the moon is not visible at all. This is known as the new moon.

(c) The decreasing size of the moon, from the full moon to the new moon is called the waning moon.

Check Point 2

Fill in the blanks.

1. Ursa Major has *seven* prominent stars in it.

2. Pole Star is a part of *Ursa minor* constellation.

3. Another name for Pole Star is *north star*.

4. The constellation Orion resembles the shape of a *hunter*.

5. Stars appear to move from *east* to *west*, this is because the *Earth* rotates from west to east.

Check Point 3

1. Fill in the blanks.

(a) The *Sun* is in the centre of our solar system.

(b) There are *eight* planets in our solar system.

(c) Pluto is now known as a _dwarf_ planet.

(d) _Jupiter_ is the heaviest planet in our solar system.

2. Define

(a) Satellite

(b) Classical planet

Ans. (a) Any object that revolves around a planet is called a satellite.

(b) A classical planet is a heavenly body which is in an orbit around the Sun. It has sufficient mass for its self-gravity to overcome rigid body force so that it assumes a nearly round shape, and has cleared the neighbourhood around its orbit.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. The distance of the Sun from the Earth is

(a) 1.5×10^9 km (b) 1.5×10^8 km ✓

(c) 1.5×10^{10} km (d) 1.5×10^{11} km

2. The first Indian satellite was launched in

(a) 1976 (b) 1975 ✓ (c) 1978 (d) 1979

3. After how many years does Halley's comet repeat its visit?

(a) 72 years (b) 76 years ✓ (c) 74 years (d) 77 years

4. This constellation is also called 'the hunter'.

(a) Orion ✓ (b) Ursa Major

(c) Ursa Minor (d) none of these

5. The first Indian satellite was

(a) Aryabhatta ✓ (b) Sputnik–1 (c) Apollo–1 (d) none of these

6. This is the hottest planet.

(a) Mercury (b) Venus ✓ (c) Jupiter (d) Earth

7. These revolve between the orbits of Mars and Jupiter.

(a) meteors (b) asteroids ✓ (c) meteorites (d) craters

8. This is the nearest planet to the Sun.

(a) Mercury ✓ (b) Jupiter (c) Neptune (d) Earth

B. Fill in the blanks.

1. The surface of the moon that faces the Earth is called its _near side_.

2. The different colours of stars are indicative of their _temperatures_.

3. _Venus_ is the hottest planet of our solar system.

4. Comets are made up of _ice_ and _dust_.

5. Man-made objects made to revolve around a planet are called _artificial satellites_.

6. The ozone layer absorbs harmful _ultraviolet rays_ coming from the Sun.

7. The asteroid belt lies between the orbits of _Mars_ and _Jupiter_.

C. Match the columns.

Column A	Column B
1. Mercury	(a) constellation
2. The Sun	(b) comet
3. Orion	(c) the Moon
4. Halley's	(d) star
5. Phobos	(e) planet

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

1. A lunar month is equivalent to 39.5 days. *False*

2. The moon on a night next to a new moon is called a crescent moon. *True*

3. Pluto is the last planet of our solar system. *False*

4. Pole star indicates the geographical south direction. *False*

5. Planet Mars is also called the red planet. *True*

6. Aryabhatta was the first Indian satellite. *True*

E. Answer in one word.

1. Huge fire balls in the sky that convert hydrogen into helium at a temperature of about 10^7°C. *Stars*

2. The nearest celestial object to the Earth. *The Moon*

3. The star nearest to our Earth. *The Sun*

4. The last planet of our solar system. *Neptune*

5. The centre of the solar system. *The Sun*

F. Define these terms.

1. New moon

Ans. When the moon is not visible at all, it is known as new moon.

2. Artificial satellite

Ans. Satellite made by man is called artificial satellite.

3. Light year

Ans. Light year is a unit of distance. It is the distance travelled by light in one year which is equal to 9.46×10^{12} km.

4. Constellation

Ans. Constellation is a group of stars which resembles an already known shape, for example, Orion resembles the shape of a hunter.

G. Differentiate between the following.

1. A planet and a star

Ans. A heavenly body which revolves around the Sun in fixed elliptical path is called a planet, whereas a star is a huge and very hot glowing object.

2. A meteor and a comet

Ans. A meteor is a small rocky object which on entering the earth's atmosphere starts glowing due to friction of air. The moving meteor looks like a streak of light, therefore, called a shooting star or a falling star.

Comets are lumps of ice and dust, which periodically come into the centre of the solar system from somewhere outside. They have a long tail of dust and gases which is always directed away from the Sun.

3. A meteor and a meteorite

Ans. A meteor is a small rocky object which on entering the earth's atmosphere starts glowing due to friction of air. The moving meteor looks like a streak of light, therefore, called a shooting star or a falling star. On the other hand, big meteors which do not get completely evaporated in the Earth's atmosphere and their parts reach the Earth's surface are called meteorites.

4. Waxing moon and waning moon

Ans. The increasing size of the Moon from the new moon to the full moon is called waxing moon, whereas the decreasing size of the moon, from a full moon to the new moon is called waning moon.

H. Answer these questions.

1. Why does the Moon have phases?

Ans. The Moon has phases due to its position in relation to the Sun and the Earth. As the Moon revolves around the Earth, we see different shapes of the bright face of the Moon from different angles.

2. Why is the Earth most suitable planet for life on it?

Ans. Following conditions make the Earth most suitable planet for life on it:

(a) **The distance from the Sun:** The Earth is at the optimum distance from the Sun that it receives just a moderate amount of heat and light from the Sun.

(b) **Presence of atmosphere:** The Earth has a thick cover of atmosphere around it which:

(i) has oxygen essential for life to exist.

(ii) maintains a moderate temperature range during day and night.

(iii) has a thick layer of ozone which protects the Earth from the harmful ultraviolet rays of the Sun.

(c) **The appropriate amount of gravity:** The gravity of the Earth holds the water and the atmosphere to its surface.

3. How does the ozone layer protect the life on the Earth?

Ans. The ozone layer protects the life on the Earth by absorbing harmful ultraviolet rays coming from the Sun. Thus, it makes a protective blanket around the Earth.

4. What is a classical planet? Why is Pluto not called a planet now?

Ans. A classical planet is a heavenly body which is in an orbit around the Sun, has sufficient mass for its self-gravity to overcome rigid body force so that it assumes a nearly round shape, and has cleared the neighbourhood around its orbit. Pluto was considered a planet

till August 2006 because it possesses some of the characteristics of planets. But now, with discovery of some more objects like it, it is considered a dwarf planet.

5. Why do stars appear to move from east to west?

Ans. Stars appear to move from east to west in the night sky because the Earth relatively moves from west to east.

6. How can you locate the Pole Star with the help of the constellation Ursa Major?

Ans. Ursa Major at different times during the night, appears to rotate about the Polar Star. This helps to locate the Polar Star.

7. What is the significance of the Pole Star?

Ans. The Polar Star helps navigators and travellers in locating directions.

8. Name a star nearest to our Sun. What is distance from the Sun in light years? Calculate its distance in kilometres.

Ans. Proxima Centauri is the nearest star to the Sun. This low-mass star is located 4.3 light years away from the Sun. Its distance from the Sun in kilometres is over 40 million million kilometres (40×10^{12} km).

9. What is a lunar month?

Ans. The time period between two consecutive full moons is called a lunar month. It is approximately 29 days, 11 hours and 43 minutes.

10. Explain the phases Gibbous Waxing Moon and a Crescent Moon.

Ans. After first quarter phase, the phase of the moon in which illuminated part goes on increasing is called Gibbous Waxing Moon.

The phase of the moon, in which we see the illuminated part of the moon as thin curve which grows day by day is called Crescent Moon.

11. What is a parsec? Express 1 parsec in kilometres and light years.

Ans. Parsec is a unit to measure astronomical distances.

1 Parsec is equal to 3.2 light years.

1 Parsec in kilometres:

$\because$ 1 light year $= 9.46 \times 10^{12}$ km

$\therefore$ 3.2 light year $= 9.46 \times 3.2 \times 10^{12} = 30.272 \times 10^{12}$ km

I. Give reasons for the following.

1. The Moon is seen in different shapes every night throughout a month.

Ans. The Moon has phases due to its position in relation to the Sun and the Earth. As the Moon revolves around the Earth, we see different shapes of the bright face of the Moon from different angles.

2. The life of the Sun will come to an end after roughly 5,00,000 years from now.

Ans. The heat and light of the Sun is due to its very high temperature at its centre. It is caused by combining of hydrogen atoms into helium atoms. The life of the Sun will come to an end after roughly 5,00,000 years from now when all the hydrogen present in its core will be used up.

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

1. Ursa Major, Cassiopea, Pole star, Orion

Ans. Pole star; It is a star while rest are constellations.

2. Mars, Mercury, Neptune, Pluto, Venus

Ans. Pluto; It is a dwarf planet while rest are classical planets.

3. Venus, Mars, Uranus, Earth, Neptune

Ans. Venus; It rotates in a direction opposite to all other planets while rest planets rotate in the same direction.

4. New Moon, Quarter Moon, Gibbous Moon, Crescent Moon

Ans. New Moon; This phase of moon does not have illuminated part while rest phases have illuminated part in them.

K. Skill-based questions.

1. Why is Pluto not considered a planet of our solar system after August 2006?

Ans. Pluto was considered a planet till August 2006 because it possesses some of the characteristics of planets. But now with discovery of some more objects like it, it is considered a dwarf planet.

2. Why does the tail of a comet always point away from the Sun?

Ans. The tail of a comet always points away from the Sun because it is made up of hot gases which are released from the evaporating comet.

3. How do meteorites help in getting information about space?

Ans. A meteorite is the unevaporated mass of heavenly object which reaches the surface of the Earth. It provides information about the nature of matter present in the outer space.

L. Activity/Project–Do as directed.

Perform an activity to show that stars appear to move from east to west.

Ans. Do it yourself.

Think Zone

1. There is no life on the Moon. Why?

Ans. There is no life on the Moon because there is neither water nor air on it.

2. Planets never collide with each other during their revolution. Why?

Ans. All the planets revolve in their fixed orbits which are separated by long distances.

Pollution of Air and Water

17

ANSWERS

Check Point 1

Fill in the blanks.

Air pollutants	Sources	Adverse effects
Carbon monoxide	*Burning of fuels in industries, automobiles, etc.*	*Lowers the amount of oxygen in the blood, slows body reflexes, can cause death.*
Sulphur dioxide	*Burning of petrol and coal, thermal power plants, and petroleum refineries*	Bronchitis, Acid rain
Nitrogen dioxide	*Burning of fuels like coal, diesel and petrol*	Contributes in the formation of smog.
Excess carbon dioxide	*Burning of coal, wood, diesel and natural gas*	*Greenhouse effect* *Global warming*
Chlorofluorocarbons	Released from air-conditioners, refrigerators	*Damage the ozone layer*
SPM	*Burning of coal in thermal power plants and vehicular emissions*	*Irritation in nose, throat, eyes and respiratory tract*

Check Point 2

1. What is acid rain?

Ans. Rain containing acids dissolved in it is called acid rain.

2. Why should burning of dry leaves be discouraged?

Ans. Burning of dry leaves releases a lot of smoke and harmful gases which cause air pollution.

3. Name two greenhouse gases.

Ans. Carbon dioxide and methane.

4. What is global warming?

Ans. An increase in the Earth's temperature due to trapping of Sun's heat in the atmosphere is called global warming.

5. Do you think deforestation is also leading to global warming?

Ans. Yes, deforestation is also leading to global warming. As a result of deforestation, more carbon dioxide is being accumulated in the atmosphere. Carbon dioxide allows the Sun's rays to reach the Earth's surface but prevents the heat given out by the ground from escaping. This results in global warming.

Check Point 3

1. What is sewage?

Ans. Water containing wastes and contaminants like soaps, shampoos, detergents, etc., is called sewage.

2. What do you understand by water pollution?

Ans. The mixing of harmful substances like sewage, toxic chemicals from industries, animal wastes, human wastes, etc., with water is called water pollution.

3. What is meant by algal bloom?

Ans. The fertilisers that get washed away by rainwater into the waterbodies act as nutrients for green aquatic plants called algae and help them grow. These algae grow very fast and cover the entire water surface of lakes and ponds. This is termed as algal bloom.

4. How can we clean dirty water?

Ans. Dirty water can be cleaned by boiling, using candle filters and by chlorination.

PRACTICE TIME

A. MCQs–Choose the correct answers.

1. This method is used to make water safe for drinking.
(a) boiling (b) candle filters (c) chlorination (d) all of these ✓

2. Which of these gases is not an air pollutant?
(a) carbon dioxide (b) sulphur dioxide (c) oxygen ✓ (d) carbon monoxide

3. Air pollution is caused by
(a) burning of wood (b) burning of coal
(c) wastes extracted from industries (d) all of these ✓

4. This is one of the gases responsible for acid rain.
(a) sulphur dioxide ✓ (b) carbon monoxide
(c) carbon dioxide (d) all of these

5. This gas traps heat present in the earth's atmosphere.
(a) nitrogen (b) oxygen (c) carbon dioxide ✓ (d) hydrogen

B. Fill in the blanks.

1. *Carbon monoxide* is an air pollutant.

2. *Ozone* gas shields our earth from ultraviolet rays of the sun.

3. Smog is the combination of *smoke* and *fog*.

4. *Sulphur dioxide and nitrogen dioxide* are the main pollutants that may cause acid rain.

5. *Nitrogen dioxide* gas mixed in the air contributes in the formation of smog.

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

1. Presence of excess of sulphur dioxide gas leads to greenhouse effect. *False*
2. Air pollution occurs only by natural sources. *False*
3. Ozone layer protects us from harmful ultraviolet rays of the sun. *True*
4. Carbon dioxide lowers the amount of oxygen that enters the blood. *False*

D. Answer in one word.

1. Water fit for drinking *Potable*
2. Major greenhouse gas *Carbon dioxide*
3. Combination of smoke and fog *Smog*
4. A chemical used to purify water *Chlorine*

E. Define these terms.

1. Potable water

Ans. The water which is fit for drinking is called potable water.

2. Acid rain

Ans. The rain that contains acids dissolved in it is called acid rain.

3. Air pollution

Ans. Addition of harmful substances to air is called air pollution.

4. Greenhouse effect

Ans. The warming of the earth's surface due to the trapping of heat by carbon dioxide and some other gases present in the earth's atmosphere is called greenhouse effect.

F. Answer these questions.

1. How are chlorofluorocarbons harmful for us?

Ans. Chlorofluorocarbons damage the ozone layer in the atmosphere which saves us from harmful ultraviolet rays of the sun. Due to damaged ozone layer, we will be exposed to harmful ultraviolet rays and may suffer from skin cancer, eye diseases, etc.

2. What are the effects of acid rain?

Ans. The harmful effects of acid rain are as follows:

(a) Acid rain contaminates waterbodies and kills aquatic plants and animals.
(b) It damages the leaves of trees, plants, etc.
(c) It damages the buildings, monuments and statues made of marble and limestone.
(d) It makes the soil acidic.
(e) It corrodes metal work and damages railway lines and bridges made of steel.
(f) It causes health hazards to humans.

3. List four ways by which you can help in reducing (a) water pollution, (b) air pollution.

Ans. (a) Water pollution can be reduced by the following ways:

(i) The wastes from factories and domestic sewage should be treated before disposing them into waterbodies.

(ii) Fertilisers and pesticides should be used in appropriate amount to prevent them from getting washed away with rainwater.

(iii) Cattle dung and human excreta should not be allowed to mix with river or lake water.

(iv) Bathing, washing and throwing of garbage into river water should be prohibited.

(b) Air pollution can be reduced by the following ways:

(i) Using only unleaded petrol which does not release lead on burning.

(ii) Using CNG (Compressed Natural Gas) in vehicles as it is a cleaner fuel.

(iii) Commuting to the work place and back by public transport or by car pooling.

(iv) Getting pollution checked of the vehicles at regular intervals.

4. How does addition of fertilisers in the waterbody act as a pollutant?

Ans. Addition of fertilisers in the waterbody causes algal blooms. An algal bloom is the excessive growth of algae in the waterbody. These algal blooms decrease the amount of oxygen in the waterbody and kill the aquatic animals.

5. List any two ways by which water can be made safe for drinking?

Ans. Water can be made safe for drinking by following ways:

(a) **Boiling:** It kills the germs present in water.

(b) **Chlorination:** It is carried out by adding specified amount of chlorine tablets to water. Chlorination kills the germs which cause waterborne diseases.

G. Give reasons for the following.

1. Burning of dry leaves should be discouraged.

Ans. Burning of dry leaves releases a lot of harmful gases which cause air pollution. Hence, burning of dry leaves should be discouraged.

2. People should not defecate near the waterbodies.

Ans. Defecating near the waterbodies will add harmful microbes to the waterbodies and cause water pollution. Consumption of such water will cause diseases like cholera, hepatitis, etc.

H. Skill-based questions.

1. Increased level of carbon dioxide can lead to global warming. Is it a wise precaution to reduce the amount of carbon dioxide being released into the air? How can we do that?

Ans. Yes, it is a wise precaution to reduce the amount of carbon dioxide being released into the air. We can do this by reducing burning of coal, petrol and diesel and also by planting more and more trees.

2. Shalini is convincing her friend Shivani to install a CNG kit in her car. Can you say why?

Ans. This is because CNG is a cleaner fuel as compared to petrol. CNG helps in reducing air pollution. Therefore, it is wise to use CNG as a fuel in vehicles.

I. Activity/Project–Do as directed.

Perform an activity to show that acid rain damages buildings and monuments.

Ans. Do it yourself.

Think Zone

1. **Will planting of more trees help in reducing the problem of excess carbon dioxide in the atmosphere? Why?**

Ans. Yes, planting of more trees will help in reducing the problem of excess carbon dioxide in the air because trees take in carbon dioxide gas and utilise it for the process of photosynthesis and release oxygen into the air.

2. **How does greenhouse effect take place in nature?**

Ans. There are certain gases like carbon dioxide, methane, water vapour, etc. in our atmosphere which trap the heat coming from earth's surface and do not allow it to escape into outer space. This causes the warming of earth's surface which is termed as greenhouse effect.