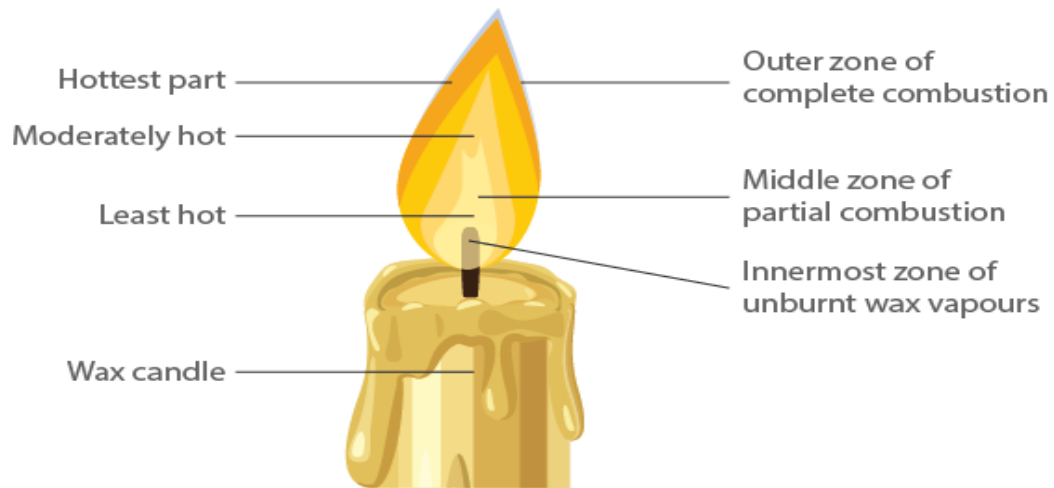


# Subject: Science

## Class: VIII

# NOTES



## Chapter 1 Crop Production and Management

### Exercise Questions

1. Select the correct word from the following list and fill in the blanks.

float, water, crop, nutrients, preparation

(a) The same kind of plants grown and cultivated on a large scale at a place is called \_\_\_\_\_.

(b) The first step before growing crops is \_\_\_\_\_ of the soil.

(c) Damaged seeds would \_\_\_\_\_ on top of water.

(d) For growing a crop, sufficient sunlight and \_\_\_\_\_ and \_\_\_\_\_ from the soil are essential.

Soln:

(a) The same kind of plants grown and cultivated on a large scale at a place is called the **crop**.

(b) The first step before growing crops is the **preparation** of the soil.

(c) Damaged seeds would **float** on top of the water.

(d) For growing a crop, sufficient sunlight and **water** and **nutrients** from the soil are essential.

2. Match items in column A with those in column B.

A	B
(i) Kharif crops	(a) Food for cattle
(ii) Rabi crops	(b) Urea and superphosphate
(iii) Chemical fertilisers	(c) Animal excreta, cow dung urine and plant wastes
(iv)	(d) Wheat, gram, pea

<b>Organic manure</b>	
	<b>(e) Paddy and maize</b>

**sol:-**

(i) Kharif crops.	(e) Paddy and maize.
(ii) Rabi crops.	(d) Wheat, gram, pea.
(iii) Chemical fertilisers.	(b) Urea and superphosphate.
(iv) Organic manure.	(c) Animal excreta, cow dung urine and plant wastes.

**3. Give two examples of each.**

**(a) Kharif crop**

**(b) Rabi crop**

**Soln:**

Kharif crops- Paddy and maize

Rabi crops- Wheat and Pea

**4. Write a paragraph in your own words on each of the following.**

**(a) Preparation of soil**

**(b) Sowing**

**(c) Weeding**

**(d) Threshing**

**Soln:**

a) Preparation of the soil is the first step in agriculture. Preparation of the soil is done to loosen the soil, which is essential for the root penetration into the soil. This allows the roots to breathe easily. Loosening of the soil allows the growth of earthworms and microorganisms, which will help to keep the soil fertile by adding humus

to the soil. Loosening of soil also brings nutrient-rich soil to the top layer, which is essential for the growth of plants.

b) Sowing is an important process in crop production. First, healthy seeds are selected before sowing. After selecting healthy seeds sowing is done by either traditional methods or by using equipment's seed drill.

c) Removal of unnecessary plants from the field is called weeding. Weeds compete with crop plants for nutrients and water. This will reduce the yield of the desired crops. Weeds also interfere while harvesting and gets mixed with crops. Some weeds are poisonous to animals and humans. Tilling is a common method which helps removal of weeds before sowing crops, manual methods like physical removal of plants are used to remove weeds. Weedicides are sprayed to get rid of weeds, but this method may affect the health of farmers because of chemicals used as weedicides.

d) Process of separating the chaff from the crop is known as threshing. Threshing is carried by a machine called 'combine' which is a harvester as well as a thresher. Threshing is also done by winnowing where to blow of wind is used to separate the chaff from crops.

### 5. Explain how fertilisers are different from manure.

**Soln:**

<b>Fertilizers</b>	<b>Manure</b>
Fertilizer is an inorganic substance.	Manure is an organic substance.
Fertilizers are prepared artificially.	Manure is obtained by decomposition of animal, plant and human waste.
Prepared in factories.	Prepared in fields.
Does not provide	Provide humus to the soil.

Humus to the soil.	
Rich in plant nutrients.	Relatively less plant nutrients.
Long term usage has adverse effects on soil.	Long term usage improves soil fertility.

**6. What is irrigation? Describe two methods of irrigation which conserve water.**

**Soln:**

The supply of water to crops at regular intervals is called irrigation. Methods of irrigation which conserve water are

- a) Drip Irrigation: Here the water goes drop by drop directly into the roots this method is very useful as it conserves the water and also helps in avoiding weeds.
- b) Sprinkler system: This method is in use in mainly uneven land where sufficient water is not available. The perpendicular pipes, having rotating nozzles on top, are joined to the main pipeline at regular intervals. When water is allowed to flow through the main pipe under pressure with the help of a pump, it escapes from the rotating nozzles. It gets sprinkled on the crop as if it is raining.

**7. If wheat is sown in the Kharif season, what would happen? Discuss.**

**Soln:**

Wheat crops may get destroyed if sown in Kharif season because of unfavourable temperature, pests and adaptable conditions for the plants to grow. Kharif come during the rainy season, hence it is not a wise idea to grow wheat in Kharif season.

**8. Explain how soil gets affected by the continuous plantation of crops in a field.**

**Soln:**

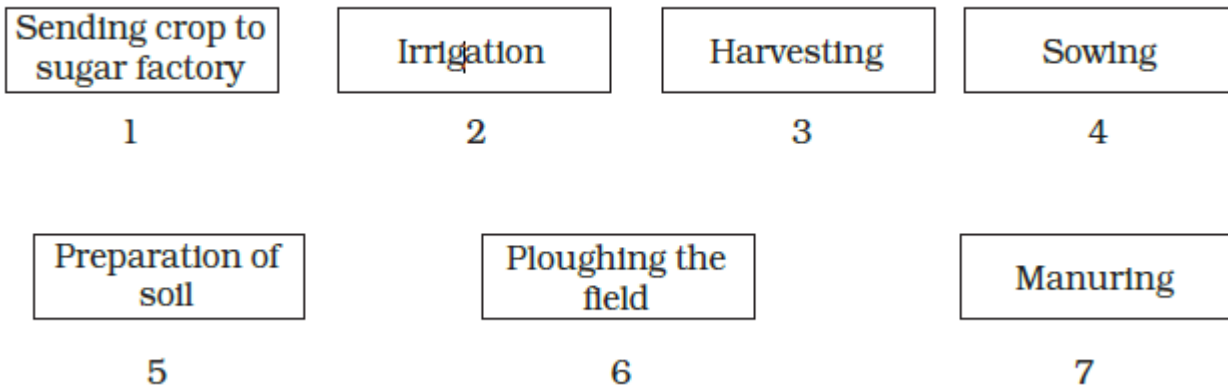
Plants require nutrients for their growth. Without optimum nutrients plants will die. Continuous plantation of crops results in depletion of certain nutrients like Nitrogen, Phosphorus, Potassium etc. This results in the decrease of yield due to loss of nutrients hence there should be a gap between crops in order to get a good yield.

**9. What are weeds? How can we control them?**

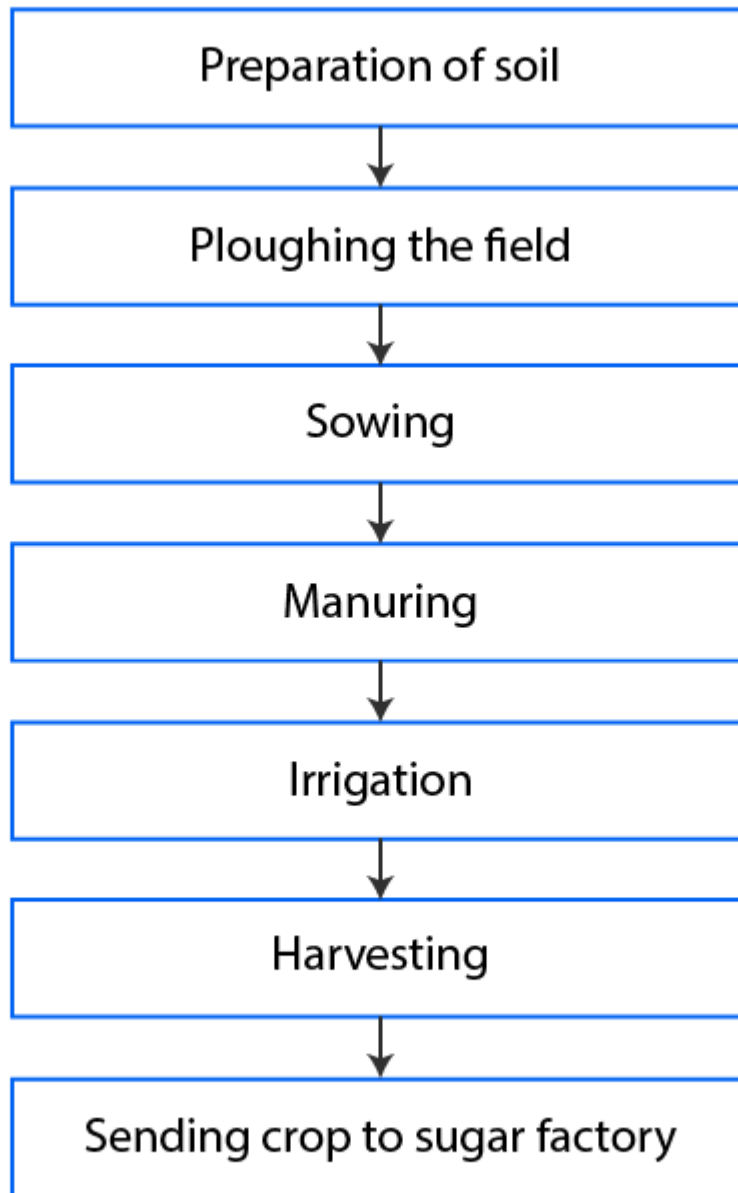
**Soln:**

In a field many other undesirable plants may grow naturally along with the crop. These undesirable plants are called weeds. Weeds can be controlled by methods called weeding. Tilling before sowing of crops helps in uprooting and killing of weeds, which may then dry up and get mixed with the soil. Weeds are also controlled by using certain chemicals, called weedicides.

**10. Arrange the following boxes in proper order to make a flow chart of sugarcane crop production.**



**Soln:**



### **FLOW CHART OF SUGARCANE CROP PRODUCTION**

**11. Complete the following word puzzle with the help of clues given below.**

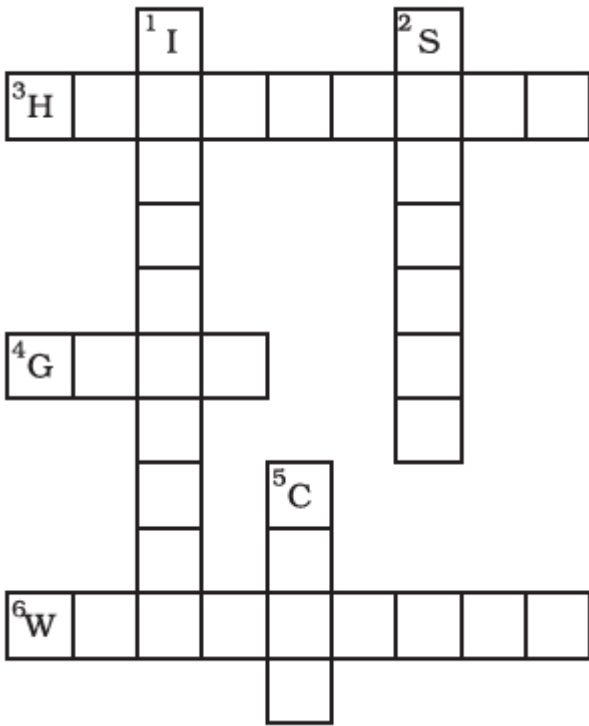
**Down**

- 1. Providing water to the crops.**
- 2. Keeping crop grains for a long time under proper conditions.**
- 5. Certain plants of the same kind grown on a large scale.**

**Across**

- 3. A machine used for cutting the matured crop.**
- 4. A rabi crop that is also one of the pulses.**

## 6. A process of separating the grain from chaff.



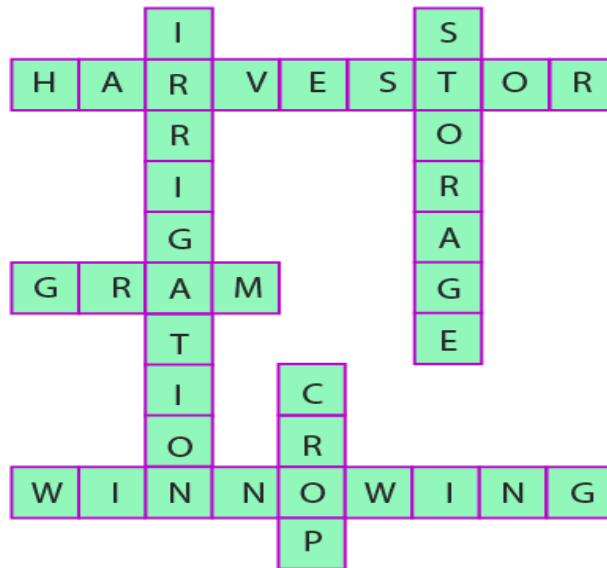
**Soln:**

**DOWN ↓**

1. IRRIGATION
2. STORAGE
5. CROP

**ACROSS →**

3. HARVESTOR
4. GRAM
6. WINNOWER





## Chapter 2 Microorganisms: Friend and Foe

### Exercise Questions

#### 1. Fill in the blanks.

- (a) Microorganisms can be seen with the help of a \_\_\_\_\_.
- (b) Blue green algae fix \_\_\_\_\_ directly from air and enhance fertility of soil.
- (c) Alcohol is produced with the help of \_\_\_\_\_.
- (d) Cholera is caused by \_\_\_\_\_.

#### Soln:

- a) Microscope
- b) Nitrogen
- c) Yeast
- d) Bacteria- *Vibrio cholera*

#### 2. Tick the correct answer.

- (a) Yeast is used in the production of  
(i) sugar (ii) alcohol (iii) hydrochloric acid (iv) oxygen
- (b) The following is an antibiotic  
(i) Sodium bicarbonate (ii) Streptomycin (iii) Alcohol (iv) Yeast
- (c) Carrier of malaria-causing protozoan is  
(i) female Anopheles mosquito (ii) cockroach (iii) housefly (iv) butterfly
- (d) The most common carrier of communicable diseases is  
(i) ant (ii) housefly (iii) dragonfly (iv) spider
- (e) The bread or idli dough rises because of  
(i) heat (ii) grinding (iii) growth of yeast cells (iv) kneading
- (f) The process of conversion of sugar into alcohol is called  
(i) nitrogen fixation (ii) moulding (iii) fermentation (iv) infection

#### Soln:

- a) (ii) alcohol
- b) (ii) Streptomycin

- c) (i) female Anopheles mosquito
- d) (ii) housefly
- e) (iii) growth of yeast cells
- f) (iii) fermentation

**3. Match the organisms in Column A with their action in Column B.**

<b>A</b>	<b>B</b>
<b>(i) Bacteria</b>	<b>(a) Fixing nitrogen</b>
<b>(ii) Rhizobium</b>	<b>(b) Setting of curd</b>
<b>(iii) Lactobacillus</b>	<b>(c) Baking of bread</b>
<b>(iv) Yeast</b>	<b>(d) Causing malaria</b>
<b>(v) A protozoan</b>	<b>(e) Causing cholera</b>
<b>(vi) A virus</b>	<b>(f) Causing AIDS</b>
	<b>(g) Producing antibodies</b>

**Sol:-**

<b>A</b>	<b>B</b>
<b>(i) Bacteria</b>	<b>(e) Causing cholera</b>
<b>(ii) Rhizobium</b>	<b>(a) Fixing nitrogen</b>
<b>(iii) Lactobacillus</b>	<b>(b) Setting of curd</b>
<b>(iv) Yeast</b>	<b>(c) Baking of bread</b>

(v) A protozoan	(d) Causing malaria
(vi) A virus	(f) Causing AIDS

**4. Can microorganisms be seen with the naked eye? If not, how can they be seen?**

**Soln:**

Microorganisms cannot be seen by the naked eye because they are very small. They can be seen by using a microscope.

**5. What are the major groups of microorganisms?**

**Soln:**

Major group of microorganisms are as follows

1. Bacteria
2. Fungi
3. Protozoans
4. Algae
5. Viruses

**6. Name the microorganisms which can fix atmospheric nitrogen in the soil.**

**Soln:**

Rhizobium

**7. Write 10 lines on the usefulness of microorganisms in our lives.**

**Soln:**

Uses of microorganisms are listed below

- They are helpful in cleaning up of the environment. For example, the organic wastes (vegetable peels, remains of animals, faeces, etc.) are broken down into harmless and usable substances by bacteria.
- Curd contains several microorganisms. Of these, the bacterium, Lactobacillus promotes the formation of curd. It multiplies in milk and converts it into curd.

- Bacteria are also involved in the making of cheese, pickles and many other food items.
- Bacteria and yeast are also helpful for fermentation of rice idlis and dosa batter.
- Yeast reproduces rapidly and produces carbon dioxide during respiration. Bubbles of the gas fill the dough and increase its volume. This is the basis of the use of yeast in the baking industry for making breads, pastries and cakes.
- Microorganisms are used for the large scale production of alcohol, wine and acetic acid (vinegar).
- Antibiotics are being produced from bacteria and fungi.
- Microorganisms are helpful in producing vaccines against disease-causing agents.
- Some bacteria (Fig. 2.7) are able to fix nitrogen from the atmosphere to enrich the soil with nitrogen and increase its fertility.
- Microorganisms decompose dead organic waste of plants and animals to convert them into simple substances. These substances are again used by other plants and animals. Thus, microorganisms can be used to degrade the harmful and smelly substances and thereby clean up the environment.

**8. Write a short paragraph on the harmful effects of microorganisms.**

**Soln:**

Microorganisms cause diseases in plants and animals Ex; Cholera in humans is caused by bacteria called *Vibrio cholera*. In animals, the virus causes foot and mouth diseases. Microorganisms spoil the foods by decomposing the food material. Some microorganisms spoil leather and clothes. Microorganisms are responsible for food poisoning.

**9. What are antibiotics? What precautions must be taken while taking antibiotics?**

**Soln:**

Chemical agents that kill or stop the growth of disease-causing microorganisms are called antibiotics. Antibiotics should be taken only

on the advice of a qualified doctor. Also, one must complete the course prescribed by the doctor.

## Chapter 3 Synthetic Fibres and Plastics

### Exercise Questions

1. Explain why some fibres are called synthetic.

**Soln:**

Some fibres are called as synthetic fibers because these are manmade fibers prepared by using chemicals. These are made of small units that join together to form long chains. Some of the examples of synthetic fibres are nylon, rayon, acrylic, polyester etc.

2. Mark the correct answer.

**Rayon is different from synthetic fibres because**

- (a) it has a silk-like appearance.
- (b) it is obtained from wood pulp.
- (c) its fibres can also be woven like those of natural fibres.

**Soln:**

**Answer is (b) it is obtained from wood pulp.**

3. Fill in the blanks with appropriate words.

(a) Synthetic fibres are also called \_\_\_\_\_ or \_\_\_\_\_ fibres.

(b) Synthetic fibres are synthesised from raw material called \_\_\_\_\_.

(c) Like synthetic fibres, plastic is also a \_\_\_\_\_

**Soln:**

(a) Synthetic fibres are also called **artificial** or **manmade** fibres.

(b) Synthetic fibres are synthesised from raw material called **petrochemicals**.

(c) Like synthetic fibres, plastic is also a **polymer**.

4. Give examples which indicate that nylon fibres are very strong.

**Soln:**

Following are the examples that indicate nylon fibres are very strong

- Parachutes and ropes of rock climbing are made of nylon
- Nylon is used in making seat belts, fishing nets and tyre cords.

- Nylon is used in making sports accessories like rackets.

**5. Explain why plastic containers are favored for storing food.**

**Soln:**

Because plastic is non-reactive and will not react with the ingredients of the food items.

**6. Explain the difference between thermoplastic and thermosetting plastics.**

**Soln:**

The difference between the thermosetting plastics and thermoplastics are

<b>Thermosetting plastic</b>	<b>Thermoplastic</b>
Cannot be bent, it will break if we attempt to bend thermo setting plastic	Thermoplastic can be bent easily
On heating thermosetting plastics, it cannot be softened. This is the reason it cannot be reshaped once it is molded.	On heating the thermoplastics, it becomes softened and can be molded and reshaped easily.

**7. Explain why the following are made of thermosetting plastics.**

**(a) Saucepan handles**

**(b) Electric plugs/switches/plug boards**

**Soln:**

**a)** Thermosetting plastics are used to make saucepan handles because they are bad conductors of heat and also on heating, these plastics do not get softened.

b) Bakelite is a kind of thermosetting plastic which is a bad conductor of heat and electricity. Because of this property it is used for making electric plugs, switches, plug boards, etc.

**8. Categorise the materials of the following products into 'can be recycled' and 'cannot be recycled'.**

**Telephone instruments, plastic toys, cooker handles, carry bags, ball point pens, plastic bowls, plastic covering on electrical wires, plastic chairs, electrical switches.**

**Soln:**

<b>Can be Recycled</b>	<b>Cannot be recycled</b>
Plastic chairs	Cooker handles
Plastic bowls	Electrical switches
Plastic toys	telephone
The plastic covering on electrical wires	
Carry bags	
Ballpoint pens	

**9. Rana wants to buy shirts for summer. Should he buy cotton shirts or shirts made from synthetic material? Advise Rana, giving your reason.**

**Soln:**

Rana should buy a cotton shirt for the summer and not a synthetic shirt. Cotton is a good absorber of water. So it can soak the sweat coming out of the body and expose it to the environment. Thus, it helps in evaporating the sweat and helps in cooling our body.

**10. Give examples to show that plastics are noncorrosive in nature.**

**Soln:**



Plastics are non-corrosive in nature, they do not react even if they come in contact with strong chemicals. For example, the cleaning chemicals that we use at home are stored in plastic bottles, instead of metal containers.

**11. Should the handle and bristles of a tooth brush be made of the same material? Explain your answer**

**Soln:**

The handle and bristle of a toothbrush should not be made of the same material as the handle of the toothbrush should be hard and strong while the bristle should be soft and flexible.

**12. 'Avoid plastics as far as possible'. Comment on this advice.**

**Soln:**

We should avoid plastics as far as possible because plastics are non-biodegradable in nature. Once introduced into the environment they cause pollution. If burnt they release poisonous gases and the plastic bags thrown in the garbage dump are swallowed by animals which chokes their respiratory system and causes fatalities in animals.

**13. Match the terms of column A correctly with the phrases given in column B**

<b>A</b>	<b>B</b>
<b>(i) Polyester</b>	<b>(a) Prepared by using wood pulp</b>
<b>(ii) Teflon</b>	<b>(b) Used for making parachutes and stockings</b>
<b>(iii) Rayon</b>	<b>(c) Used to make non-stick cookwares</b>
<b>(iv) Nylon</b>	<b>(d) Fabrics do not wrinkle easily</b>

**Soln:**

A	B
(i) Polyester	(d) Fabrics do not wrinkle easily
(ii) Teflon	(c) Used to make non-stick cookwares
(iii) Rayon	(a) Prepared by using wood pulp
(iv) Nylon	(b) Used for making parachutes and stockings

**14. 'Manufacturing synthetic fibres is actually helping conservation of forests'. Comment.**

**Soln:**

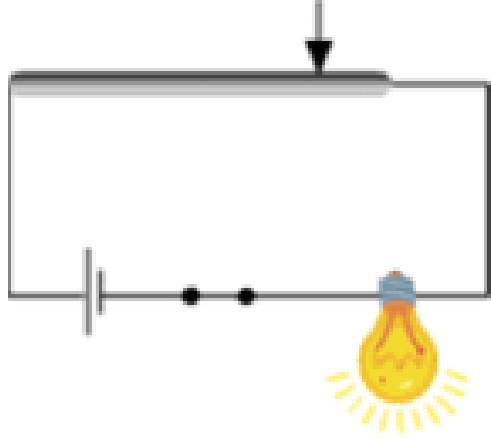
The manufacturing of synthetic fibers is helpful in the conservation of forests because if we use natural fibers, the raw materials for them have to be derived from the plants, which require cutting off lots of trees. Hence, manufacturing synthetic fibres proves to be helpful in the conservation of forests.

**15. Describe an activity to show that thermoplastic is a poor conductor of electricity**

**Soln:**

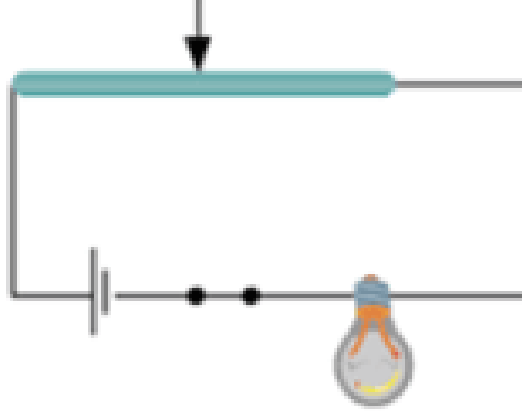
In order to show that thermoplastic is a poor conductor of electricity, we will design a circuit. For that, we need a bulb, some wires, a battery, a piece of metal and a plastic pipe (as shown in the figure below). After setting the experiment switch on the current, you will observe that the bulb glows in the former case. In the latter case, the bulb does not glow. Hence a plastic pipe (which is a thermoplastic) is shown to be a poor conductor of electricity.

**Metal**



**Glowing bulb**

**Thermo Plastic**



## Chapter 4 Materials: Metals and Non-Metals

### Exercise Questions

1. Which of the following can be beaten into thin sheets?

- (a) Zinc
- (b) Phosphorus
- (c) Sulphur
- (d) Oxygen

Soln:

Answer is a) Zinc

Explanation:

Here, Zinc is a metal with malleability and ductility whereas Phosphorus, Sulphur and Oxygen are nonmetals which lack malleability and ductility.

2. Which of the following statements is correct?

- (a) All metals are ductile.
- (b) All non-metals are ductile.
- (c) Generally, metals are ductile.
- (d) Some non-metals are ductile.

Soln:

Answer is (c) Generally, metals are ductile.

Explanation:

Ductility is a property where a substance can be drawn into thin wires, Generally, metals are ductile with mercury as the exception.

3. Fill in the blanks.

- (a) Phosphorus is a very \_\_\_\_\_ non-metal.
- (b) Metals are conductors of heat and \_\_\_\_\_ .
- (c) Iron is \_\_\_\_\_ reactive than copper.
- (d) Metals react with acids to produce \_\_\_\_\_ gas.

Soln:

- (a) Phosphorus is a very **reactive** non-metal.

(b) Metals are **good** conductors of heat and **electricity**.

(c) Iron is **more** reactive than copper.

(d) Metals react with acids to produce **hydrogen** gas.

**4. Mark 'T' if the statement is true and 'F' if it is false.**

(a) **Generally, non-metals react with acids. ( )**

(b) **Sodium is a very reactive metal. ( )**

(c) **Copper displaces zinc from zinc sulphate solution. ( )**

(d) **Coal can be drawn into wires. ( )**

**Soln:**

a) False

b) True

c) False

d) False

**5. Some properties are listed in the following table. Distinguish between metals and non-metals on the basis of these properties.**

<b>Properties</b>	<b>Metals</b>	<b>Non-metals</b>
<b>1. Appearance</b>		
<b>2. Hardness</b>		
<b>3. Malleability</b>		
<b>4. Ductility</b>		
<b>5. Heat Conduction</b>		
<b>6. Conduction of Electricity</b>		

**Soln:**

<b>Properties</b>	<b>Metals</b>	<b>Non-metals</b>
<b>1. Appearance</b>	Lustrous	Dull
<b>2. Hardness</b>	Hard	Soft

<b>3. Malleability</b>	Have property of Malleability	Do not have a property of Malleability
<b>4. Ductility</b>	Have property of Ductility	Do not have the property of Ductility
<b>5. Heat Conduction</b>	Good conductor of Heat	Bad Conductor of Heat
<b>6. Conduction of Electricity</b>	Good conductor of Electricity	The bad conductor of Electricity

**6. Give reasons for the following.**

**(a) Aluminium foils are used to wrap food items.**

**(b) Immersion rods for heating liquids are made up of metallic substances.**

**(c) Copper cannot displace zinc from its salt solution.**

**(d) Sodium and potassium are stored in kerosene**

**Soln:**

a) Aluminium is malleable and can be drawn into thin sheets hence Aluminium foils are used to wrap food items

b) Immersion rods for heating liquids are made up of metallic substances because metals are good conductors of heat and electricity.

c) Copper cannot displace zinc from its salt solution because Zinc is more reactive than copper.

d) Sodium and Potassium are highly reactive metals which readily reacts with atmospheric Oxygen to catch fire hence Sodium and Potassium are stored in kerosene.

**7. Can you store the lemon pickle in an aluminium utensil? Explain.**

**Soln:**

Pickle consists of acids which react with Aluminium metal to produce salt and Hydrogen. Hence pickle is not stored in aluminium utensil.

**8. Match the substances given in Column A with their uses given in Column B.**

<b>A</b>	<b>B</b>
<b>(i) Gold</b>	<b>(a) Thermometers</b>
<b>(ii) Iron</b>	<b>(b) Electric wire</b>
<b>(iii) Aluminium</b>	<b>(c) Wrapping food</b>
<b>(iv) Carbon</b>	<b>(d) Jewellery</b>
<b>(v) Copper</b>	<b>(e) Machinery</b>
<b>(vi) Mercury</b>	<b>(f) Fuel</b>

**Soln:**

<b>A</b>	<b>B</b>
(i) Gold	(d) Jewellery
(ii) Iron	(e) Machinery
(iii) Aluminium	(c) Wrapping food
(iv) Carbon	(f) Fuel
(v) Copper	(b) Electric wire
(vi) Mercury	(a) Thermometers

**9. What happens when**

**(a) Dilute sulphuric acid is poured on a copper plate?**

**(b) Iron nails are placed in a copper sulphate solution?**

**Write word equations of the reactions involved.**

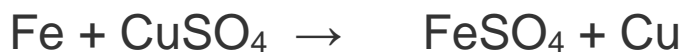
**Soln:**

(i) No reaction occurs when dilute sulphuric acid is poured on a copper plate. However, when concentrated sulphuric acid is poured on a

copper plate, hydrogen gas evolves along with the formation of blue coloured copper sulphate crystals. The chemical reaction for the reaction between concentrated sulphuric acid and copper is:



ii) Iron being more reactive displaces copper from copper sulphate. In this reaction, the blue colour of copper sulphate fades and there is a deposition of copper on the iron nail.



**10. Saloni took a piece of burning charcoal and collected the gas evolved in a test tube.**

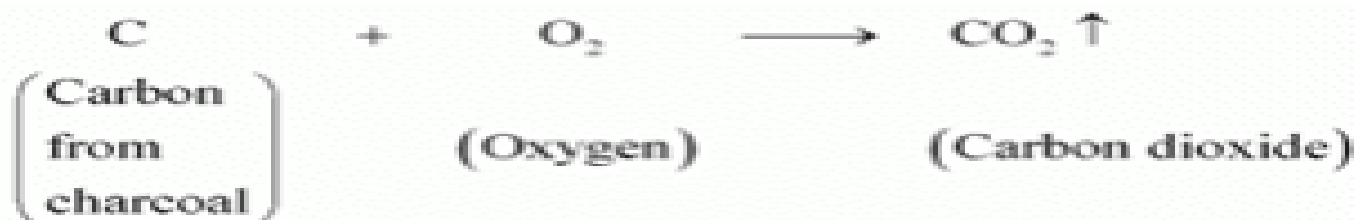
**(a) How will she find the nature of the gas?**

**(b) Write down word equations of all the reactions taking place in this process.**

**Soln:**

a) In a test tube containing gas, add a few drops of water. Now cover the test tube and shake well. After shaking, test the solution with blue litmus. It will change from blue to red. Thus, gas is acidic in nature.

b) Charcoal reacts with oxygen to form carbon dioxide gas.



**11. One day Reeta went to a jeweller's shop with her mother. Her mother gave old gold jewellery to the goldsmith to polish. Next day when they brought the jewellery back, they found that there was a slight loss in its weight. Can you suggest a reason for the loss in weight?**

**Soln:**

In order to polish the gold ornament, it is to be dipped into a liquid called aqua regia (a mixture of hydrochloric acid and nitric acid). On getting dissolved in the environment of aqua regia, the outer layer of gold



dissolves and an inner shiny layer appears. The dissolving of the layer causes a reduction in the weight of the jewellery.

## Chapter 5 Coal and Petroleum

### Exercise Questions

1. What are the advantages of using CNG and LPG as fuels?

**Soln:**

The advantages of using CNG and LPG as fuels are as follows

- CNG and LPG burn easily.
- CNG and LPG give a lot of heat energy when burnt.
- CNG and LPG can be transported easily through pipelines.
- CNG and LPG are clean fuels and they do not release smoke when burnt.

2. Name the petroleum product used for surfacing of roads.

**Soln:**

Bitumen is used for surfacing of roads.

3. Describe how coal is formed from dead vegetation. What is this process called?

**Soln:**

Dense forests got buried under the soil due to natural processes, millions of years ago. More and more soil got deposited over them and they got compressed more. This led them to get exposed to very high temperature and pressure. They slowly got converted into coal under these extreme conditions. The whole process of formation of coal from dead vegetation is known as carbonization.

4. Fill in the blanks.

(a) Fossil fuels are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

(b) Process of separation of different constituents from petroleum is called \_\_\_\_\_.

(c) Least polluting fuel for a vehicle is \_\_\_\_\_.

**Soln:**

(a) Fossil fuels **Coal, Petroleum, and natural gas.**

(b) Process of separation of different constituents from petroleum is called **refining.**

(c) Least polluting fuel for a vehicle is **Compressed Natural Gas (CNG)**.

**5. Tick True/False against the following statements.**

(a) Fossil fuels can be made in the laboratory. (T/F)

(b) CNG is more polluting fuel than petrol. (T/F)

(c) Coke is the almost pure form of carbon. (T/F)

(d) Coal tar is a mixture of various substances. (T/F)

(e) Kerosene is not a fossil fuel. (T/F)

**Soln:**

a) False

b) False

c) True

d) True

e) False

**6. Explain why fossil fuels are exhaustible natural resources.**

**Soln:**

The process of formation of fossil fuels requires millions of years. Dead vegetation and animals that get buried deep inside the earth require high temperature and pressure for the formation of fossil fuels, which cannot be done in the laboratory. Thus, fossils are limited. Therefore, the use of fossil fuels at a rapid rate will lead to their exhaustion.

**7. Describe the characteristics and uses of coke.**

**Soln:**

**Characteristics:**

i) Coke is tough.

ii) Coke is porous.

iii) Coke is black in colour.

**Uses:**

i) In the manufacture of steel.

ii) In the extraction of metals (as a reducing agent).

**8. Explain the process of the formation of petroleum.**

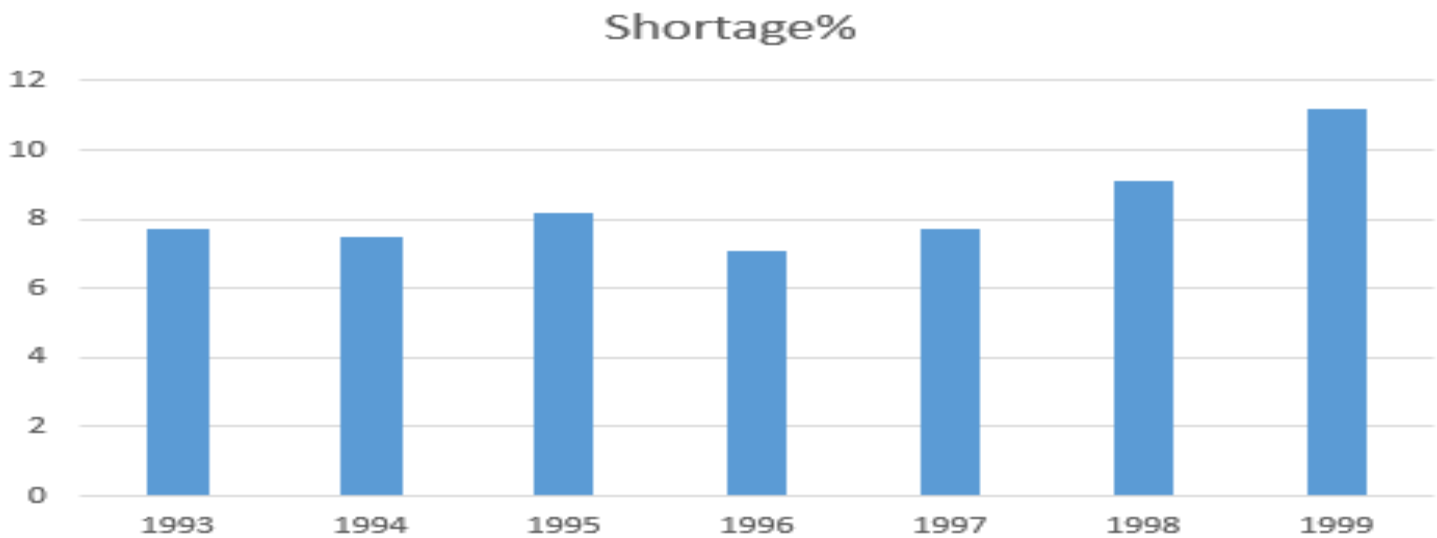
### Soln:

Dead organisms that got buried in the sea millions of years ago got covered with layers of sand and clay. Due to lack of air, high temperature and high pressure, these dead organisms got transformed into petroleum and natural gas.

**9. The following table shows the total power shortage in India from 1993–1999. Show the data in the form of a graph. Plot shortage percentage for the years on the Y-axis and the year on the X-axis.**

S.No.	Year	Shortage (%)
1.	1993	7.7
2.	1994	7.5
3.	1995	8.2
4.	1996	7.1
5.	1997	7.7
6.	1998	9.1
7.	1999	11.2

### Soln:



## Chapter 6 Combustion and Flame

### Exercise Questions

1. List conditions under which combustion can take place.

**Soln:**

The burning of a substance in the presence of oxygen is defined as combustion.

The conditions under which combustion can take place are

- The presence of air or oxygen.
- The presence of fuel plays a significant role.
- Ignition temperature is maintained (It is defined as the substance that catches fire at its lowest temperature.)

2. Fill in the blanks.

(a) Burning of wood and coal causes \_\_\_\_\_ of air.

(b) A liquid fuel, used in homes is \_\_\_\_\_ .

(c) Fuel must be heated to its \_\_\_\_\_ before it starts burning.

(d) The fire produced by oil cannot be controlled by \_\_\_\_\_ .

**Soln:**

(a) Burning of wood and coal causes **Pollution** of air.

(b) A liquid fuel, used in homes is **Kerosene**.

(c) Fuel must be heated to its **Ignition Temperature** before it starts burning.

(d) The fire produced by oil cannot be controlled by **Water**.

3. Explain how the use of CNG in automobiles has reduced pollution in our cities.

**Soln:**

**CNG played an important role in reducing pollution among automobiles for the following reasons**

- CNG is comparatively a cleaner fuel.
- The CNG can be an alternative for diesel, petrol and propane/LPG.

- It usually contains a few undesirable gases than the other fuels mentioned above.
- The combustion of fuels like petroleum causes many unburnt carbon particles along with carbon monoxide, which leads to respiratory diseases.

#### **4. Compare LPG and wood as fuels**

**Soln:**

**Wood**

- It is considered as a traditional fuel used for both domestic and industrial purposes.
- Wood produces a lot of smoke which pollutes the atmosphere and cause respiratory diseases.
- The usage of wood to a large extent causes deforestation.
- The calorific value of wood ranges between 17000 to 22000 kJ/kg
- However, wood may be used as a furnace, stove or fireplace indoors while it is used for a campfire, furnace outdoors.

**LPG**

- The usage LPG (Liquefied petroleum gas) has replaced wood.
- It doesn't release smoke and other pollutants.
- It is a cleaner fuel.
- The fuel efficiency of LPG is more than that of wood.
- The calorific value of LPG is 55000 kJ/kg.
- Hence, LPG is the most preferred choice.

#### **5. Give reasons.**

**(a) Water is not used to control fires involving electrical equipment.**

**(b) LPG is a better domestic fuel than wood.**

**(c) Paper by itself catches fire easily whereas a piece of paper wrapped around an aluminium pipe does not.**

**Soln:**

**a)**

- Water is a good conductor of electricity.
- If added to an electrical fire, the water would just spread the electricity further.
- The person dousing the fire might get an electric shock

**b)**

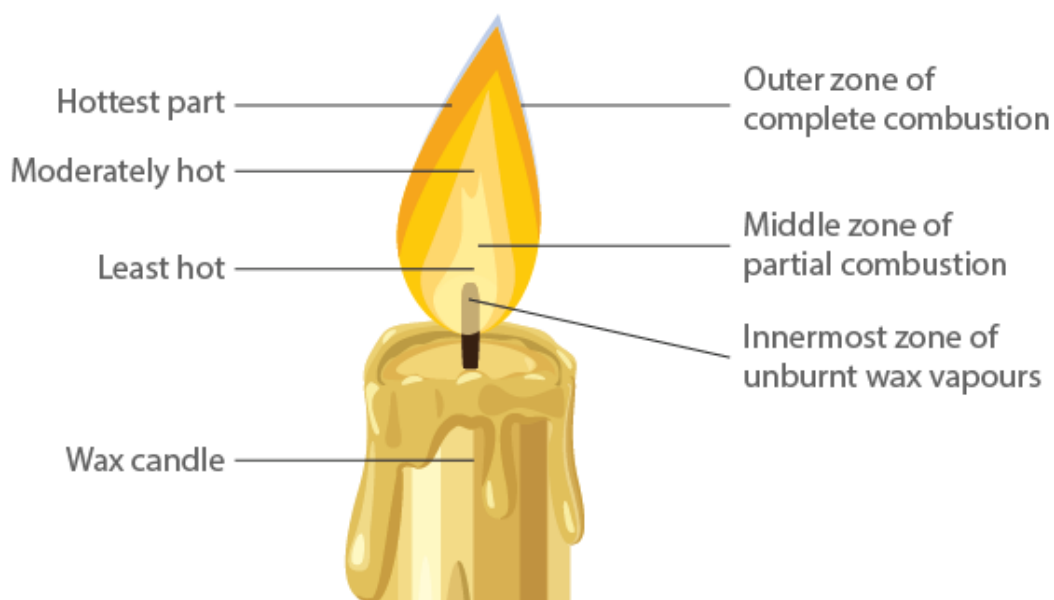
- LPG being a cleaner fuel than wood doesn't release smoke and other pollutants.
- Wood, on the other hand, releases a lot of smoke and fumes polluting the atmosphere causing pollution and leading to respiratory diseases.
- Hence, LPG is a better domestic fuel than wood.

**c)**

- The paper by itself catches fire easily because of its low ignition temperature.
- The piece of paper wrapped around an aluminium pipe doesn't catch fire because aluminium is a good conductor of electricity.
- While the paper wrapped around an aluminium pipe results in an increase in ignition temperature. So, there is a transfer of heat from paper to the aluminium pipe. Hence it doesn't catch fire.

## 6. Make a labelled diagram of a candle flame.

**Soln:**



**7. Name the unit in which the calorific value of a fuel is expressed.**

**Soln:**

Calorific value is defined as the energy contained in the fuel. It is expressed in the form kJ/kg

kJ=kilo joules and kg=kilogram

**8. Explain how CO<sub>2</sub> is able to control fires.**

**Soln:**

CO<sub>2</sub> is a non-combustible gas and extinguishes fire in two ways:

(i) It is heavier than oxygen and it covers the fire like a blanket and cuts off the contact between oxygen and fuel.

(ii) In cylinders, CO<sub>2</sub> is kept in the liquid form. When released, it expands enormously. This brings down the temperature of the fuel, which helps in controlling the fire.

**9. It is difficult to burn a heap of green leaves but dry leaves catch fire easily. Explain.**

**Soln:**

A heap of green leaves contains a lot of moisture in it, hence its ignition temperature is high. Therefore, it does not catch fire easily.

But dry leaves have no moisture content in it, hence its ignition temperature is low. Therefore, it catches fire easily.

**10. Which zone of a flame does a goldsmith use for melting gold and silver and why?**

**Soln:**

The goldsmith mainly uses non-luminous flame which is termed to be the outermost part of the flame. This part of the flame is used because the outermost flame undergoes complete combustion and is considered as the hottest part of the flame.

**11. In an experiment, 4.5 kg of a fuel was completely burnt. The heat produced was measured to be 180,000 kJ. Calculate the calorific value of the fuel.**

**Soln:**

Heat produced by 4.5kg of fuel =180000KJ



$$\text{Heat produced by 1kg of fuel} = \frac{180000}{4.5} = 40000 \text{ KJ/Kg}$$

Hence, The calorific value of the fuel is 40,000 KJ/Kg.

**12. Can the process of rusting be called combustion? Discuss.**

**Soln:**

The process of rusting cannot be called combustion due to the following reasons : ... No energy is obtained in a rusting process. Combustion is a chemical process in which a combustible substance reacts with oxygen to produce heat and light whereas in rusting, a metal reacts with oxygen to produce metallic oxide.

**13. Abida and Ramesh were doing an experiment in which water was to be heated in a beaker. Abida kept the beaker near the wick in the yellow part of the candle flame. Ramesh kept the beaker in the outermost part of the flame. Whose water will get heated in a shorter time?**

**Soln:**

The water placed in the outermost part of the flame will be heated in a short time since it is a non-luminous flame and is regarded as the hottest part of the flame. So Ramesh's beaker will be heated first. However, Abida who placed the beaker in the luminous flame (yellow flame) is comparatively less hot.

## Chapter 7 Conservation of Plants and Animals

### Exercise Questions

#### 1. Fill in the blanks.

(a) A place where animals are protected in their natural habitat is called \_\_\_\_\_ .

(b) Species found only in a particular area is known as \_\_\_\_\_ .

(c) Migratory birds fly to faraway places because of \_\_\_\_\_ changes.

#### Soln:

(a) A place where animals are protected in their natural habitat is called **Sanctuary**.

(b) Species found only in a particular area is known as **endemic**.

(c) Migratory birds fly to faraway places because of **climatic** changes.

#### 2. Differentiate between the following.

(a) Wildlife sanctuary and biosphere reserve

(b) Zoo and wildlife sanctuary

(c) Endangered and extinct species

(d) Flora and fauna

#### Soln:

(a)

<b>Wildlife sanctuary</b>	<b>Biosphere Reserve</b>
An area within which wild animals are protected from external dangers like hunting	An area constructed for the conservation of biodiversity
Adequate habitat and protection are provided for the wild animals living in a sanctuary	Several life forms like plants, animals, and micro-organisms conservation are possible in a reserve

Eg: Corbett national park

Eg: Nilgiri Biosphere reserve

(b)

**Zoo**

**Wildlife Sanctuary**

Animals are kept in artificially constructed facilities for public exhibition.

An area within which wild animals are protected from external dangers like hunting.

It is an artificial habitat and the animals may or may not adapt to the new conditions.

The animals are conserved within their natural habitat itself. So, they won't have a problem with their surroundings.

(c)

**Endangered Species**

**Extinct Species**

The species which are on the verge of extinction are called as Endangered species.

The species of animals or plants that no longer exist are called Extinct species.

Eg: Bengal Tiger, Blue Whale, etc.

Eg: Caribbean monk seal, Great Auk, Passenger

pigeon.

(d)

<b>Flora</b>	<b>Fauna</b>
It is the collective name for the plant life from a particular area.	It is the collective name for the animal life from a particular area
Eg: Spurge and Hogweed from the Nilgiris region	Eg: Langur, Tiger, Tahr from the Nilgiris region.

### **3. Discuss the effects of deforestation on the following.**

**(a) Wild animals**

**(b) Environment**

**(c) Villages (Rural areas)**

**(d) Cities (Urban areas)**

**(e) Earth**

**(f) The next generation**

**Soln:**

**(a) Effects of deforestation on wild animals:**

Removal of trees and plant life from a particular area for the construction of industries, agriculture or for other such purposes is termed as Deforestation. Plantlife forms an integral part of the ecosystem and these plants form the natural habitat of various animals of that ecosystem. Destroying the plant life will ultimately threaten the existence of animals in that particular ecosystem and may lead to their extinction.

**(b) Effects of deforestation on the environment:**

In plants, Photosynthesis takes place by the absorption of CO<sub>2</sub> from the earth's atmosphere. The percentage of CO<sub>2</sub> in the atmosphere increases rapidly if the plant life of an area is destroyed. Increased concentrations of CO<sub>2</sub> result in the trapping of excessive heat radiations

within the Earth's atmosphere contributing to global warming. This results in the rise of the temperature of the Earth and disturbs the water cycle which occurs in nature. Hence, rainfall pattern changes leading to droughts and floods.

**(c) Effects of deforestation on villages:**

The soil particles are held together in a place by the roots of the plants, trees and other vegetation. In the event of water flow or a high-speed wind over the top layer of the soil, the soil particles get removed easily as there are no plants to hold it in place. Thus, soil erosion is increased by deforestation activities. Soil loses fertility and loses humus. Hence, a fertile land, fit for agriculture turns into a desert.

**(d) Effects of deforestation on cities:**

The risk of natural calamities like floods and drought in urban areas is increased by deforestation. It will also lead to global warming because of increased CO<sub>2</sub> levels in the atmosphere. This is a result of continuous pollution from automobiles and industries. The water cycle in the vicinity is also affected.

**(e) Effects of deforestation on Earth:**

Deforestation leads to increased chances and occurrences of desertification, droughts and floods. Carbon Dioxide level in the earth's atmosphere also increases which leads to global warming. The water cycle is disrupted and there is also an increased risk of natural calamities.

**(f) Effects of deforestation on the next generation:**

Our Environment is slowly changed by the activities of deforestation, both directly and indirectly. Soil erosion, global warming, desertification, drought, greenhouse effect, floods and many other problems are caused only because of deforestation. Ultimately, the next generation will be facing the consequences of deforestation.

**4. What will happen if**

**(a) we go on cutting trees**

**(b) the habitat of an animal is disturbed**

**(c) the top layer of soil is exposed**

**Soln:**

**(a) If we go on cutting the trees**

If we go on cutting the trees, the animals will lose their natural habitat as an essential part of their ecosystem are destroyed. This reduces the biodiversity of the affected areas. The temperature of the Earth also increases and gives way to global warming. Global warming, in turn, affects the water cycle. Hence, rainfall pattern changes leading to droughts and floods. Risks of soil erosion, global warming, desertification, greenhouse effect increases.

**(b) If the habitat of an animal is disturbed**

All the basic necessities for an animal, like food, water, shelter and protection is provided by the habitat in which the animal lives-in disturbing the habitat of the animal forces it to move to another place in search of food, water, shelter and protection. The animal, in due course, may get killed by other animals.

**(C) If the top layer of the soil is removed**

Removing the top layer of the soil gradually exposes the lower layers of the soil. The lower layers of the soil are hard and rocky in nature and are less fertile. This is because of the reduced quantity of humus. Soil erosion on a continued basis will turn it barren and infertile.

**5. Answer in brief.**

**(a) Why should we conserve biodiversity?**

**(b) Protected forests are also not completely safe for wild animals. Why?**

**(c) Some tribals depend on the jungle. How?**

**(d) What are the causes and consequences of deforestation?**

**(e) What is Red Data Book?**

**(f) What do you understand by the term migration?**

**Soln:**

(a) The number and variety of various life forms such as plants, animals and micro-organisms in the area are called Biodiversity. Both plants and animals have a mutual dependence on each other for their survival. As they are related to one another, destruction of one will automatically

destroy the other. Hence, biodiversity has to be conserved in order to maintain nature's balance.

(b) People who live near the forests depend on the resources of the forests in order to fulfil their day-to-day needs. Therefore, it is not safe for animals living in protected forests. The animals would be threatened by the presence of the human population. This results in the killing of wild animals and selling their products for huge sums of money.

(c) The forests provide food, fodder and other resources to the tribal people. It is inevitable for them to depend on forests and their resources for everyday needs.

(d) Causes of deforestation:

There are a lot of causes for deforestation. A few of them are listed below.

- I. In order to accommodate the ever-expanding urban population, forest areas are often cleared and converted into lands for various uses.
- II. For agricultural activities like crop cultivation and cattle grazing, forest lands are cleared.
- III. Firewood is a major product from the forests and it is one of the main reasons for cutting the trees on a large scale.

**Consequences of deforestation:**

There are a lot of fatal consequences caused by deforestation. A few of them are listed below.

1. Soil erosion
2. Loss of Biodiversity
3. Floods
4. Droughts
5. Global warming as a result of climate change
6. Disruption of the water cycle

(e) Red data book is basically a sourcebook which has an international list of all plant and animal species which are endangered, that is, on the verge of extinction. The International Union for Conservation of Nature and Natural resources (IUCN) maintains the books and adds/ removes the names of the species by conducting a comprehensive survey.

(f) The movement of an organism or a group of organisms from its natural habitat to another place on a standard basis at a particular time of each and every year is known as migration. The organisms do so in order to avoid uninhabitable conditions of climate or for the process of breeding.

**6. In order to meet the ever-increasing demand in factories and for shelter, trees are being continually cut. Is it justified to cut trees for such projects? Discuss and prepare a brief report.**

**Soln:**

No. Cutting trees in order to meet the ever-growing demands of the human population is not at all justified. There are a vast number of organisms like wild animals, insects, and birds living in the forests. The forests provide good quality air for both animals and humans. This is because of the process of plants respiration by which, they consume the harmful carbon dioxide and give out good quality Oxygen. Thus, keeping greenhouse gases and global warming under check. The roots of the flora of the forests help in preventing soil erosion. Natural Calamities such as floods and droughts could also be prevented by their presence. They help in increasing the soil's fertility and conserving the biodiversity of the ecosystem.

Overutilization of forests and its resources by cutting a large number of trees in order to satisfy the demands of the ever-increasing human population, leading to many long-term problems like

- Soil erosion
- Greenhouse effect
- Global warming
- Floods
- Droughts

Besides the above-listed problems, the effects of large-scale deforestation will be leaving an everlasting mark on the face of human civilization. The balance of nature is disturbed by the destruction of trees. Hence, it is of utmost priority and importance to conserve forests.

**7. How can you contribute to the maintenance of green wealth of your locality? Make a list of actions to be taken by you.**



**Soln:**

I can take care of the green cover of my locality by growing plants in my locality. I shall motivate the people of my neighbourhood to plant more trees and take care of the existing trees by creating awareness about the importance of plant life in an ecosystem. In order to make this possible, I would initiate the proceedings and organize weekly events on the same. Creating awareness among the children and youth would be of top priority as they will easily understand the issues that we are facing. Planting new trees is as important as looking after the existing ones. So, my volunteers and I would water the plants and trees on a regular basis.

**8. Explain how deforestation leads to reduced rainfall.****Soln:**

Removal of trees and plant life from a particular area for the construction of industries, agriculture and other purposes is termed as Deforestation. Photosynthesis in plant life, takes place by the absorption of  $\text{CO}_2$  from the earth's atmosphere. When the plant life is destroyed, the Carbon Dioxide levels in the atmosphere will increase drastically leading trap of heat radiation which causes global warming. This rise in temperature will affect the water cycle. Disturbance in the water cycle will lead to a chain of events and in the end, the rainfall pattern changes and results in droughts.

**9. Find out about national parks in your state. Identify and show their location on the outline map of India.****Soln:**

Periyar National park located in the state of Kerala.



**10. Why should paper be saved? Prepare a list of ways by which you can save paper.**

**Soln:**

If one ton of clean white paper is to be produced, seventeen full-grown trees are cut down. Trees play a major role in maintaining a balance in nature. So, it is essential to save paper in order to protect the trees and avoid the impact of the loss of trees on the living organisms that depend on these trees.

Ways to save paper:

- Collection and recycling of used paper.
- Using both sides of a paper for writing.
- Spreading awareness about the importance of paper among school children and youth.

- Intelligent and proper use of paper.

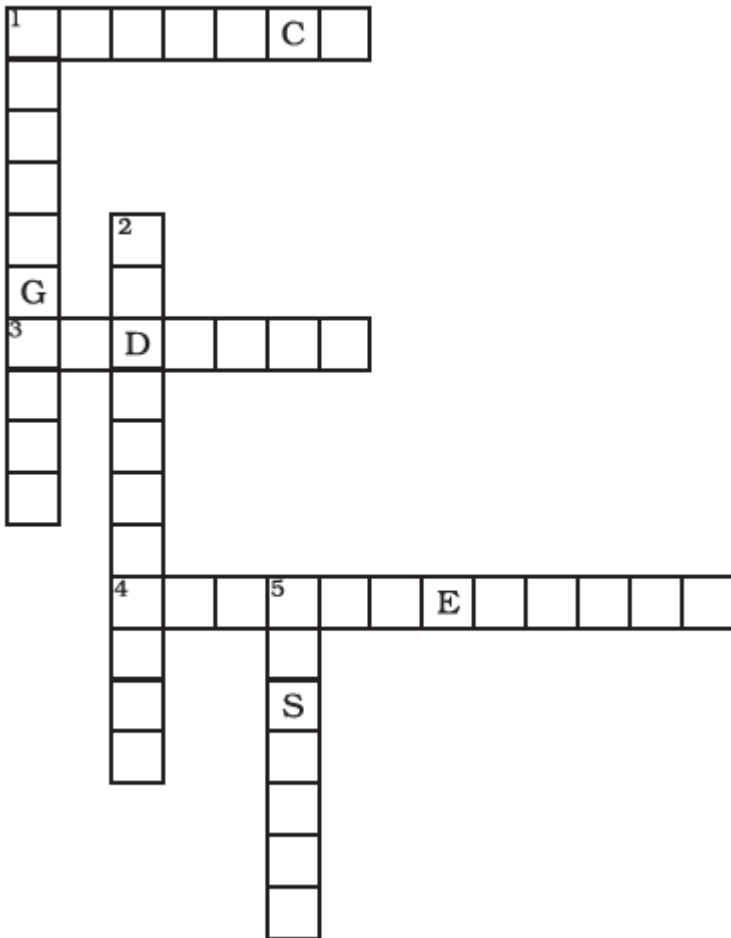
## 11. Complete the word puzzle.

### Down

1. Species on the verge of extinction.
2. A book carrying information about endangered species.
5. Consequences of deforestation.

### Across

1. Species which have vanished.
3. Species found only in a particular habitat.
4. Variety of plants, animals and microorganisms found in an area.



### Down

1. Endangered
2. Red Data Book
3. Deserts

### Across



## Chapter 8 Cell – Structure and Functions

### Exercise Questions

1. Indicate whether the following statements are True (T) or False (F).

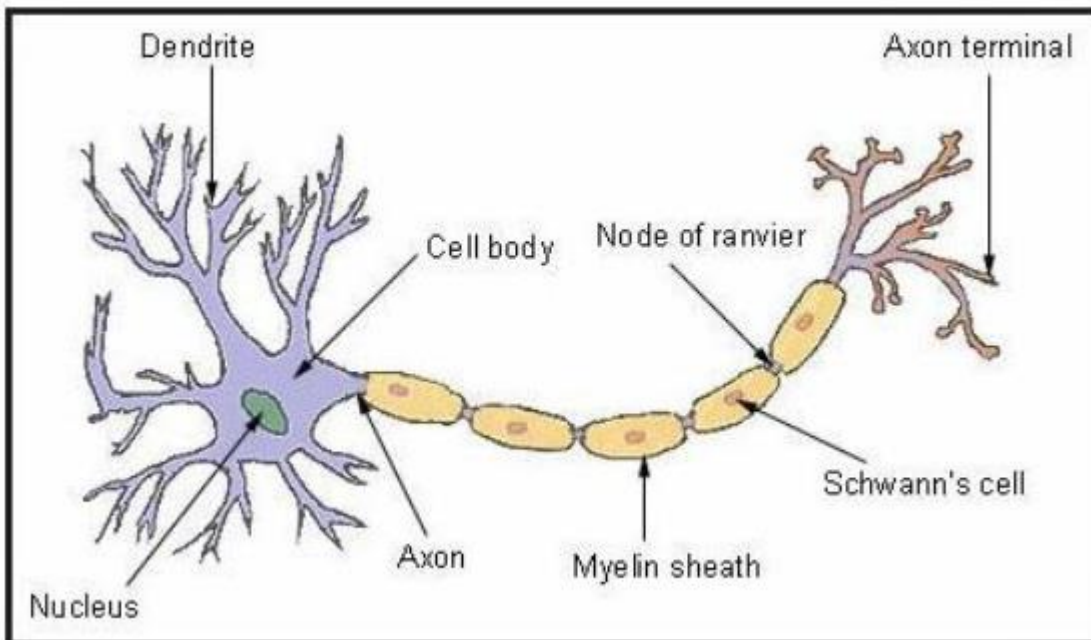
- (a) Unicellular organisms have one-celled body. (T/F)
- (b) Muscle cells are branched. (T/F)
- (c) The basic living unit of an organism is an organ. (T/F)
- (d) Amoeba has irregular shape. (T/F)

Soln:

- a) True
- b) False
- c) False
- d) True

2. Make a sketch of the human nerve cell. What function do nerve cells perform?

Soln:



The main function of the nerve cell is to transmit messages to the brain from receptor organs and vice versa. It has control over the working of different parts of the body.

3. Write short notes on the following.

## (a) Cytoplasm

## (b) Nucleus of a cell

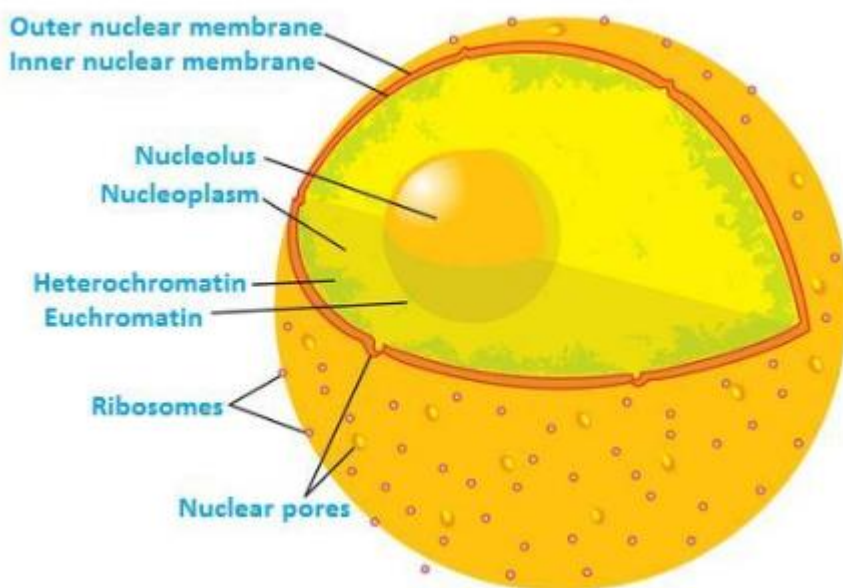
**Soln:**

(a) Cytoplasm:

The cytoplasm is a fluid that contains all the cell organelles such as the Mitochondria, Ribosomes, Golgi bodies, etc. It is present between the nucleus and the plasma membrane. It helps in the exchange of materials between cell organelles. It is made up of eighty percent water and is usually clear and colourless.

(b) The nucleus of a cell:

The Nucleus is a double-membrane bound cell organelle present in eukaryotic cells. It contains the DNA, the genetic material. It is the command centre of the cell and is spherical in shape. It has the following components:



- Nuclear membrane
- Nucleolus
- Chromosomes

### 1. ***Nuclear membrane:***

It has is a double-layered membrane. It separates the contents of the nucleus from the cytoplasm and acts as a wall. It has pores that allow the transfer of certain substances in and out of the cell.

## 2. **Nucleolus:**

It is a small dense spherical body. It is not bound by any membrane.

## 3. **Chromosome:**

These are thread-like structures that carry genes. All the necessary information required for the transfer of characteristics from the parents to the offspring are stored in the genes. Inheritance of characteristics is possible only because of chromosomes.

## 4. **Which part of the cell contains organelles?**

### **Soln:**

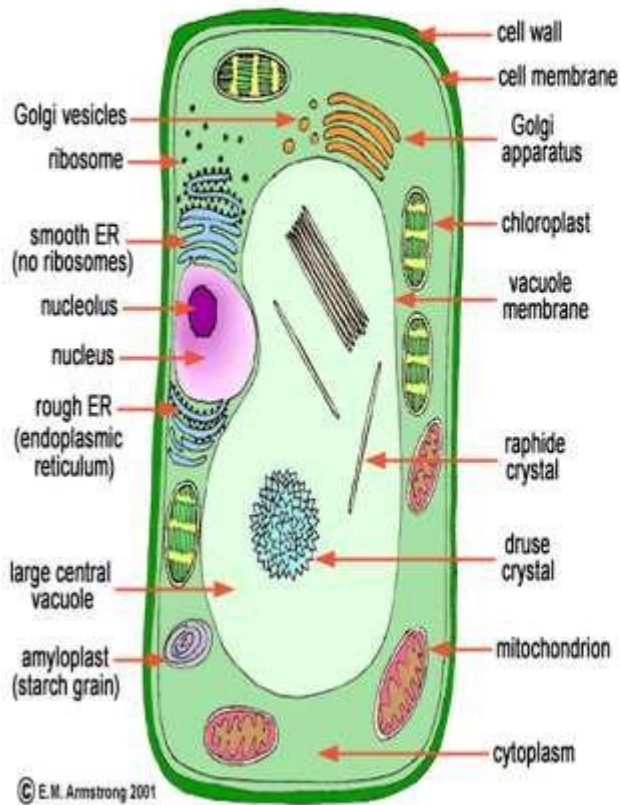
Various cell organelles are present in the cytoplasm. It is a clear and colorless fluid that contains organelles like Mitochondria, Ribosomes, Golgi bodies.

## 5. **Make sketches of animal and plant cells. State three differences between them.**

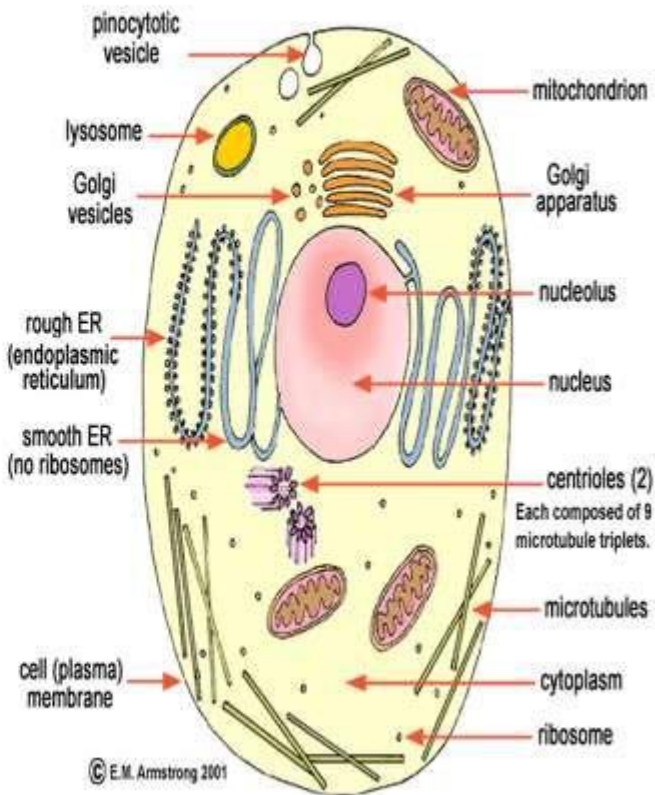
### **Soln:**

<b>Plant cell</b>	<b>Animal cell</b>
They are large in size	They are smaller than plant cells
The cell wall is present	The cell wall is absent
Vacuoles are large	Vacuoles are small
Plastids could be seen	Except for Euglena, Plastids could not be seen in animal cells.

## Plant Cell



## Animal Cell



### 6. State the difference between eukaryotes and prokaryotes.

#### **Prokaryotes**

Most of them are unicellular

There is no nuclear membrane. So, the nucleus is poorly defined.

Not all cell organelles are present

Nucleolus is absent

Eg: Blue-green algae, Bacteria

#### **Eukaryotes**

Most of them are multicellular

There is a nuclear membrane. So, the nucleus is well defined.

All the cell organelles are present.

Nucleolus is present

Eg: Plant, Animal cells and Fungi.



**7. Where are chromosomes found in a cell? State their function.**

**Soln:**

Chromosomes are thread-like structures present in the nucleus that carry genes. All the necessary information required for the transfer of characteristics from the parents to the offspring are stored in the genes. Inheritance of characteristics is possible only because of chromosomes.

**8. 'Cells are the basic structural units of living organisms'. Explain.**

**Soln:**

Various components of plants and animals are constituted by cells. It is the smallest unit of life and is capable of all living functions. They are the building blocks of life. That is the reason why cells are referred to as 'the basic structural and functional blocks of life'.

Cells exist in various shapes and sizes and perform a wide range of activities.

Their shapes and sizes are related to the function it performs.

**9. Explain why chloroplasts are found only in plant cells.**

**Soln:**

Chloroplasts are plastids required for the food making process, called photosynthesis, and thus they are only present in plant cells.

**10. Complete the crossword with the help of clues given below.**

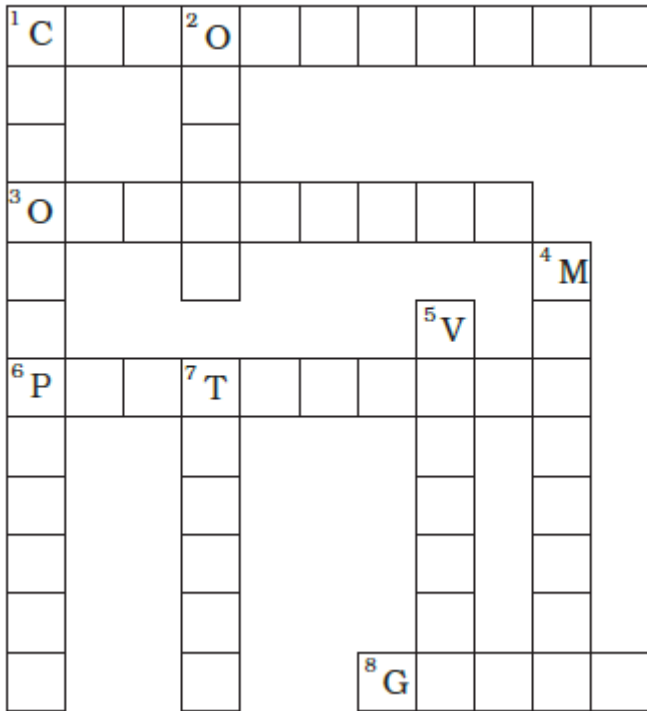
**Across**

- 1. This is necessary for photosynthesis.**
- 3. Term for component present in the cytoplasm.**
- 6. The living substance in the cell.**
- 8. Units of inheritance present on the chromosomes.**

**Down**

- 1. Green plastids.**
- 2. Formed by collection of tissues.**
- 4. It separates the contents of the cell from the surrounding medium.**
- 5. Empty structure in the cytoplasm.**

## 7. A group of cells.



**Soln:**

### **Across**

1. Chlorophyll
2. Organelle
3. Protoplasm
4. Genes

### **Down**

1. Chloroplasts
2. Organ
3. Membrane
4. Vacuole
5. Tissue

<sup>1</sup> C	H	L	<sup>2</sup> O	R	O	P	H	Y	L	L
H			R							
L			G							
<sup>3</sup> O	R	G	A	N	E	L	L	E		
R			N						<sup>4</sup> M	
O						<sup>5</sup> V			E	
<sup>6</sup> P	R	O	<sup>7</sup> T	O	P	L	A	S	M	
L			I				C		B	
A			S				U		R	
S			S				O		A	
T			U				L		N	
			E			<sup>8</sup> G	E	N	E	S

## Chapter 9 Reproduction in Animals

### Chapter 9 Exercise Questions

#### 1. Explain the importance of reproduction in organisms.

**Soln:**

Importance of reproduction in organisms is as follows

- Reproduction is termed to be a biological process in which organisms give birth to their off springs.
- It helps in maintaining the continuity of a particular race and helps in increasing the population of the species.
- Reproduction is meant for the survival of all living things.

#### 2. Describe the process of fertilisation in human beings.

**Soln:**

- Fertilization is defined as the process in which there is a fusion of male gamete and female gamete.
- The male gametes or sperms are released from the male reproductive organ called the penis.
- The sperms release and enter the female body through the vagina.
- From the vagina, sperms travel through the fallopian tubes where they meet the eggs.
- From there on, the process of fertilization takes place in the fallopian tube.
- The male gamete cell (sperm) and female gamete cell (egg) fuse together to form a zygote.
- The zygote divides rapidly to form a group of cells called morula, which becomes the embryo after approximately five days. The foetus is present for about eight weeks after the fertilization.

#### 3. Choose the most appropriate answer.

**(a) Internal fertilisation occurs**

**(i) in female body.**

**(ii) outside female body.**

**(iii) in male body.**

**(iv) outside male body.**

**(b) A tadpole develops into an adult frog by the process of**

**(i) fertilisation**

**(ii) metamorphosis**

**(iii) embedding**

**(iv) budding**

**(c) The number of nuclei present in a zygote is**

**(i) none**

**(ii) one**

**(iii) two**

**(iv) four**

**Soln:**

a) (i) in female body.

b) (ii) metamorphosis

c) (iii) two

**4. Indicate whether the following statements are True (T) or False (F).**

**(a) Oviparous animals give birth to young ones. ( )**

**(b) Each sperm is a single cell. ( )**

**(c) External fertilisation takes place in frog. ( )**

**(d) A new human individual develops from a cell called gamete. ( )**

**(e) Egg laid after fertilisation is made up of a single cell. ( )**

**(f) Amoeba reproduces by budding. ( )**

**(g) Fertilisation is necessary even in asexual reproduction. ( )**

**(h) Binary fission is a method of asexual reproduction. ( )**

**(i) A zygote is formed as a result of fertilisation. ( )**

**(j) An embryo is made up of a single cell. ( )**

**Soln:**

a) False

b) True

- c) True
- d) False
- e) True
- f) False
- g) False
- h) True
- i) True
- j) False

**5. Give two differences between a zygote and a foetus.**

**Soln:**

Zygote:

- It is the earliest stage of development
- It is formed by the fusion of male and female gametes
- It is a single cell
- The zygote divides several times to form an embryo
- The zygote normally lasts a week and then develop into its next stage.

Foetus

- It is the last developmental stage of an organism
- The stage of the embryo that shows all the main recognizable body parts of a mature organism.
- The foetus stage occurs after the embryo stage.
- Foetus mainly undergoes internal development.

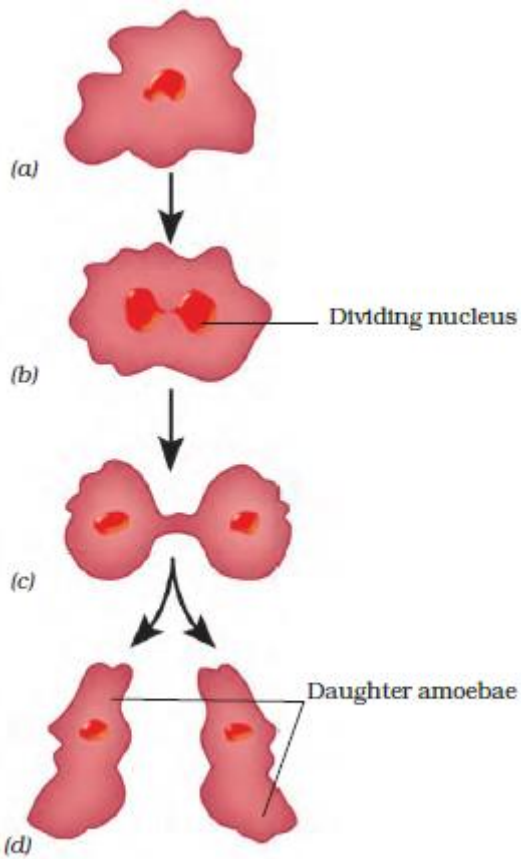
**6. Define asexual reproduction. Describe two methods of asexual reproduction in animals.**

**Soln:**

In this type of reproduction, the offspring arises from a single organism without the fusion of male and female gametes. It never changes the number of chromosomes.

**Binary fission in amoeba**

- It is a kind of asexual reproduction in which one cell divides into two halves.
- It is a unicellular organism that has a cell membrane, cell wall and cytoplasm.
- The division of the cell can take place on any plane.
- In this process, the nucleus of the amoeba first divides to form two daughter nuclei by the process called Karyokinesis.
- Finally, the division of the body into two halves having a nucleus respectively takes place.

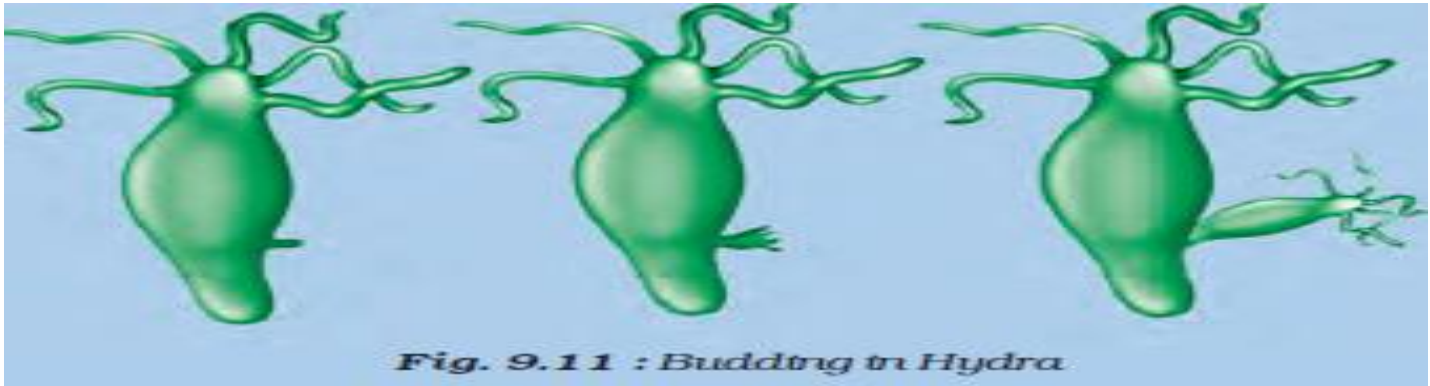


*Fig. 9.12 : Binary fission in Amoeba*

## Budding in hydra

- Organisms such as hydra, use regenerative cells for reproduction in the process of budding.
- The first step is the formation of buds, and it develops as a small outgrowth on the parent's body.
- As the bud enlarges, it receives the characteristics of the parent organism.

- Once it is developed, it may be detached from the parent body and develop into a new individual.
- In some rare cases, the buds may not be detached forming interconnected buds.
- There are also methods like fragmentation, multiple fission etc.



**7. In which female reproductive organ does the embryo get embedded?**

**Soln:**

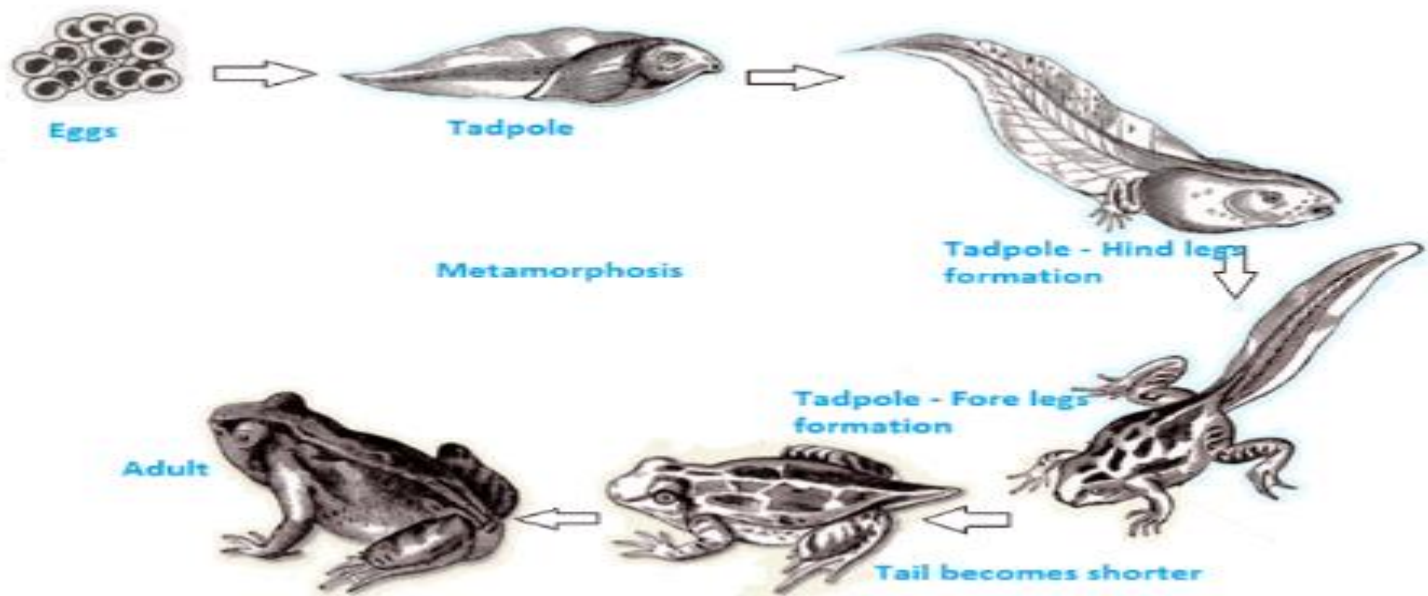
- In the female reproductive organ, the embryo gets attached to the uterus.
- Once it gets attached, there occurs the formation of body parts like legs, hands, eyes etc.
- The embryo is then called a foetus.

**8. What is metamorphosis? Give examples.**

**Soln:**

- It is defined as the process in which an animal's body structure abruptly changes through cell growth and differentiation.
- It is a biological process.
- Examples of this kind are frog and insects.





### **The life cycle of a frog:**

The tadpole emerging from the egg will have gills, tail, etc.

They can swim easily in water.

It undergoes abrupt changes and develops into a mature frog.

### **9. Differentiate between internal fertilisation and external fertilisation.**

**Soln:**

**Fertilization, in general, is defined as the fusion of a male and a female gamete.**

#### **Internal fertilization**

It occurs inside the female body.

There are high chances of survival of the offspring.

Internal fertilization protects the fertilized egg or embryo from harsh environments.

Examples are cow, humans, dogs, monkeys, etc.

#### **External fertilization**

It occurs outside the female body.

There are low chances of survival of the offspring.

Most aquatic animals use this type of fertilization and the advantage of external fertilization is that it produces a large number of offspring due to external hazards.

Examples are fish, frog, organisms etc.

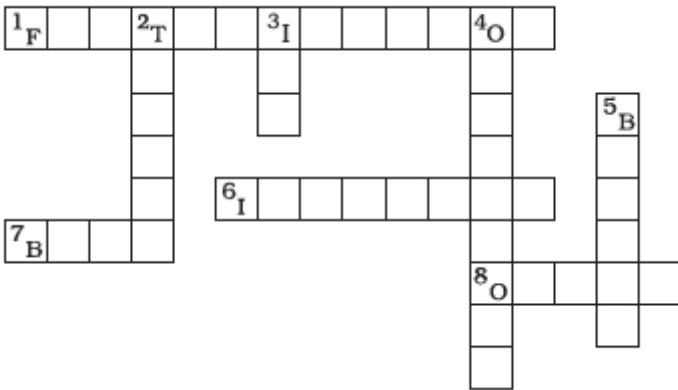
**10. Complete the crossword puzzle using the hints given below.**

**Across**

1. The process of the fusion of the gametes.
6. The type of fertilisation in hen.
7. The term used for bulges observed on the sides of the body of hydra.
8. Eggs are produced here.

**Down**

2. Sperms are produced in these male reproductive organs.
3. Another term for in vitro fertilisation.
4. These animals lay eggs.
5. A type of fission in amoeba



Soln:

**Across**

- 1) Fertilization
- 6) Internal
- 7) Buds
- 8) Ovary

**Down**

- 2) Testis
- 3) Zygote
- 4) Oviparous
- 5) Binary



## Chapter 10 Reaching the Age of Adolescence

### Exercise Questions

**1. What is the term used for chemical secretions of endocrine glands responsible for changes taking place in the body?**

**Soln:**

The chemical substance secreted by the endocrine glands is called Hormones. Hormones are responsible for the changes taking place in the body.

**2. Define adolescence.**

**Soln:**

The time period which comes between the beginning of adulthood and puberty is called Adolescence. In this time period, the body undergoes different changes alongside reproductive maturity. It starts somewhat at the age of 11 and ends at the age of 18 or 19. This period of adolescence may differ from person to person.

**3. What is menstruation? Explain**

**Soln:**

The process of shedding of the uterine lining on a regular monthly basis is called menstruation. It starts at puberty and in the reproductive cycle of the female body. The uterus prepares itself to receive a fertilized egg on every month. Due to this the inner lining of the uterus becomes thick and is supplied with blood to nourish the embryo. If the egg is not fertilized, then the lining of the uterus breaks down and gets released in the form of blood through the vagina. The time period for this is about 2 to 8 days every month. This monthly cycle is known as the menstrual cycle.

**4. List changes in the body that take place at puberty**

**Soln:**

The changes that take place at the time of puberty are as follows:

- a) The height and weight of the body will suddenly increase
- b) The hair seems to appear in the areas such as legs, hands, face and underarms

- c) In female, the enlargement of the ovary takes place and starts producing matured eggs and on the other hand in males, the testis grows and starts producing sperms
- d) In males, the shoulder broadens and chest becomes wide, whereas in females the region below the waist becomes wider.
- e) Acne seems to appear because of the excessive secretion of the oil from the skin.
- f) In boys, the larynx becomes prominent under the influence of hormones, the vocal cord becomes longer and thicker resulting in a hoarse voice.

**5. Prepare a Table having two columns depicting names of endocrine glands and hormones secreted by them.**

**Soln:**

<b>Endocrine Glands</b>	<b>Hormones</b>
Testis	Testosterones
Ovary	Oestrogen
Pituitary	Growth hormone
Adrenal	Adrenalin
Thyroid	Thyroxin
Pancreas	Insulin

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

**Soln:**

The chemical substances produced by the sex organs are called sex hormones. For example, in females, the sex hormones produced by the ovary is called oestrogen and in males, the sex hormones produced by the testis is called testosterone.

Some of the functions performed by the sex hormones:

**Oestrogen:** This hormone is responsible for the development of secondary sexual characters in females like enlargement of breasts, development of female reproductive organs, etc.

**Testosterone:** this hormone brings the secondary sex character in boys such as the growth of beard, the voice becomes hoarse, development of the reproductive organs etc.

**7. Choose the correct option.**

**(a) Adolescents should be careful about what they eat, because**

**(i) proper diet develops their brains.**

**(ii) proper diet is needed for the rapid growth taking place in their body.**

**(iii) adolescents feel hungry all the time.**

**(iv) taste buds are well developed in teenagers.**

**(b) Reproductive age in women starts when their**

**(i) menstruation starts.**

**(ii) breasts start developing.**

**(iii) body weight increases.**

**(iv) height increases.**

**(c) The right meal for adolescents consists of**

**(i) chips, noodles, coke.**

**(ii) chapati, dal, vegetables.**

**(iii) rice, noodles and burger.**

**(iv) vegetable cutlets, chips and lemon drink.**

**Soln:**

a) (ii) proper diet is needed for the rapid growth taking place in their body.

b) (iii) body weight increases.

c) (ii) chapati, dal, vegetables.

**8. Write notes on—**

**(a) Adam's apple.**

**(b) Secondary sexual characters.**

### **(c) Sex determination in the unborn baby.**

**Soln:**

a) **Adam's apple:** In human males, the larynx grows larger at the time of puberty and can be seen as a protruding part of the throat. This protrusion is known as Adam's apple. In boys under the influence of sex hormones, the larynx becomes prominent. Due to this, the vocal cord becomes thicker and longer which causes the voice hoarse. On the other hand in females, the larynx is of small size and is hardly visible. Therefore, girls have a high pitched voice while the boys have a deep voice.

### **9. Word game :**

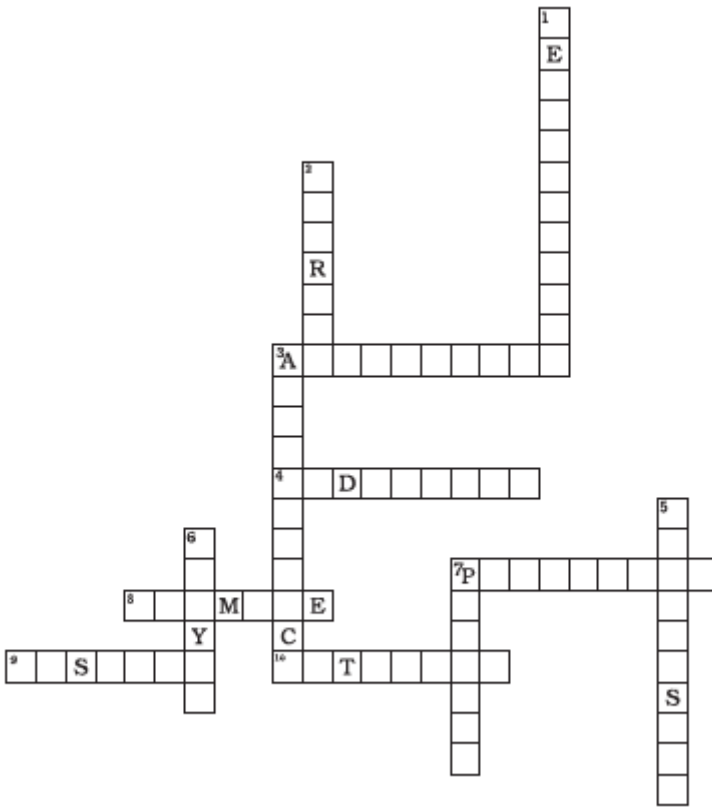
**Use the clues to work out the words.**

**Across**

- 3. Protruding voice box in boys**
- 4. Glands without ducts**
- 7. Endocrine gland attached to brain**
- 8. Secretion of endocrine glands**
- 9. Pancreatic hormone**
- 10. Female hormone**

**Down**

- 1. Male hormone**
- 2. Secretes thyroxine**
- 3. Another term for teenage**
- 5. Hormone reaches here through blood stream**
- 6. Voice box**
- 7. Term for changes at adolescence**



**Soln:**

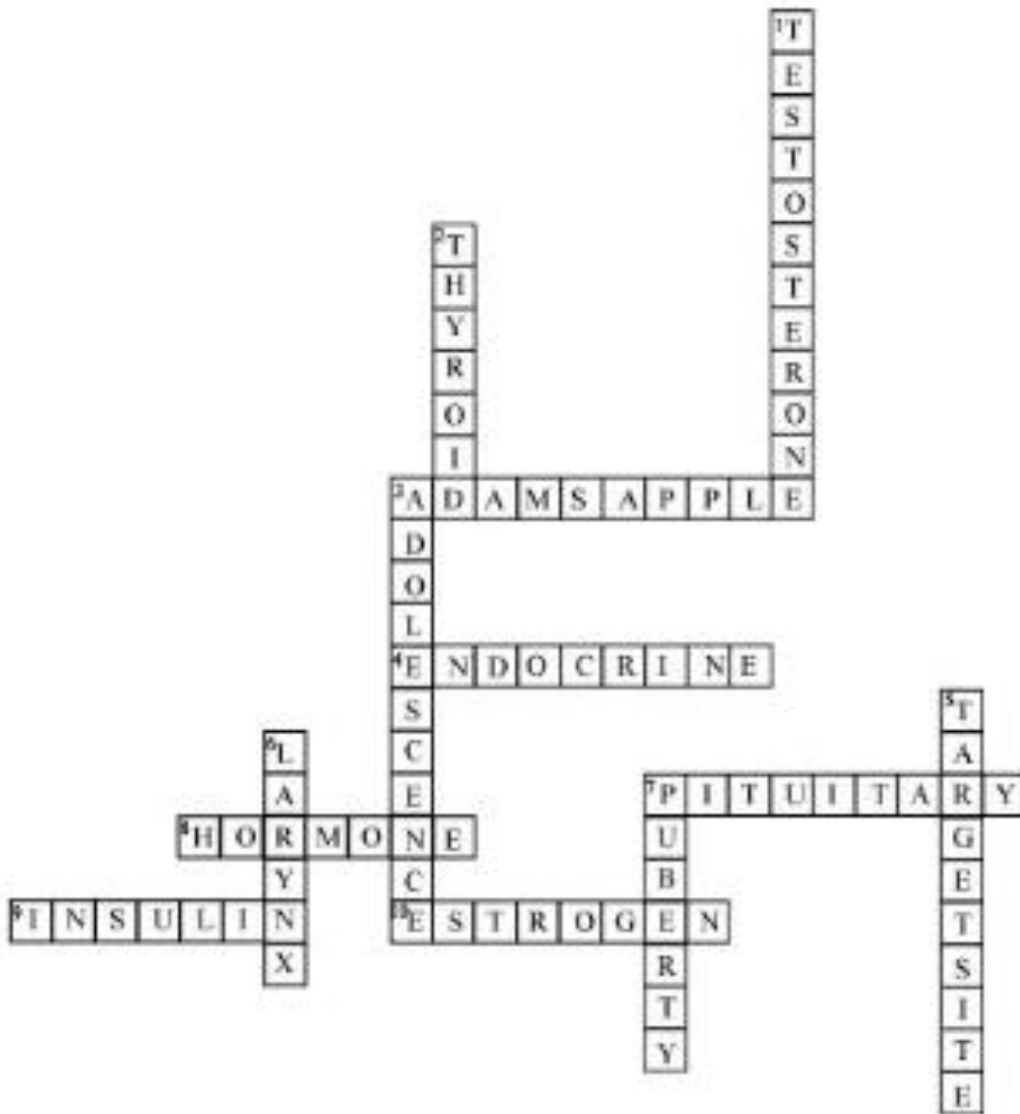
**Across**

- 1. Adam's apple
- 2. Endocrine
- 3. Pituitary
- 4. Hormone
- 5. Insulin
- 6. Estrogen

**Down**

- 1. Testosterone
- 2. Thyroid
- 3. Adolescence
- 4. Target site
- 5. Larynx
- 6. Puberty





## Chapter 11 Force and Pressure

## Exercise Questions

**1. Give two examples each of situations in which you push or pull to change the state of motion of objects**

**Soln:**

Examples of situations in which you push or pull to change the state of motion of objects.

1. Pull situations

a) In order to open a drawer, we have to pull it. This action changes the state of motion of the drawer.

b) To draw water from the well, the rope is pulled. This action changes the state of motion of the bucket.

2. Push Situations

a) A football is pushed by the foot of a player. This action changes the state of motion of the ball.

b) In order to change the place of the heavy box from one room to another, we have to push it. This action changes the motion of the box.

**2. Give two examples of situations in which applied force causes a change in the shape of an object.**

**Soln:**

The forces which change the shape of an object are as follows:

i) By pressing the clay between the hands, it deforms.

ii) The shape of the plastic bottle changes by squeezing it.

**3. Fill in the blanks in the following statements.**

(a) To draw water from a well we have to \_\_\_\_\_ at the rope.

(b) A charged body \_\_\_\_\_ an uncharged body towards it.

(c) To move a loaded trolley we have to \_\_\_\_\_ it.

(d) The north pole of a magnet \_\_\_\_\_ the north pole of another magnet.

**Soln:**

1. To draw water from a well we have to **pull** at the rope.

2. A charged body **attracts** an uncharged body towards it.

3. To move a loaded trolley we have to **pull or push** it.
4. The north pole of a magnet **repels** the north pole of another magnet.

**4. An archer stretches her bow while taking aim at the target. She then releases the arrow, which begins to move towards the target. Based on this information fill up the gaps in the following statements using the following terms.**

**muscular, contact, non-contact, gravity, friction, shape, attraction**

**(a) To stretch the bow, the archer applies a force that causes a change in its \_\_\_\_\_.**

**(b) The force applied by the archer to stretch the bow is an example of \_\_\_\_\_ force.**

**(c) The type of force responsible for a change in the state of motion of the arrow is an example of a \_\_\_\_\_ force.**

**(d) While the arrow moves towards its target, the forces acting on it are due to \_\_\_\_\_ and that due to \_\_\_\_\_ of air**

**Soln:**

**(a) To stretch the bow, the archer applies a force that causes a change in its **shape**.**

**(b) The force applied by the archer to stretch the bow is an example of **muscular** force.**

**(c) The type of force responsible for a change in the state of motion of the arrow is an example of a **contact** force.**

**(d) While the arrow moves towards its target, the forces acting on it are due to **gravity** and that due to **friction** of air.**

**5. In the following situations identify the agent exerting the force and the object on which it acts. State the effect of the force in each case.**

**(a) Squeezing a piece of lemon between the fingers to extract its juice.**

**(b) Taking out paste from a toothpaste tube.**

**(c) A load suspended from a spring while its other end is on a hook fixed to a wall.**

**(d) An athlete making a high jump to clear the bar at a certain height**

**Soln:**

a) We make a muscular force to extract the juice of the lemon by squeezing it. As a result, the shape of the lemon gets changed.

b) To take out paste from the toothpaste tube we use our muscular force. This muscular force acting on the toothpaste tube leads to a change of its shape.

c) Here, the suspended load exerts a force on the spring and pushes the spring downwards. As a result, the spring gets stretched. Hence, its shape gets changed.

d) The feet of the athlete exert the muscular force on the ground, which pushes the ground. This allows him to jump over the bar. As a result, his state of motion gets changed.

**6. A blacksmith hammers a hot piece of iron while making a tool. How does the force due to hammering affect the piece of iron?**

**Soln:**

A blacksmith uses his muscular force while hammering a hot piece of iron. The muscular force changes the shape of the iron so that it can be given the desired shape.

**7. An inflated balloon was pressed against a wall after it has been rubbed with a piece of synthetic cloth. It was found that the balloon sticks to the wall. What force might be responsible for the attraction between the balloon and the wall?**

**Soln:**

When an inflated balloon rubbed with a piece of synthetic cloth, it becomes charged. A charged body attracts an uncharged body. When this charged balloon is pressed against a wall, it sticks to the wall. Thus, the electrostatic force acts between the charged balloon and the wall.

**8. Name the forces acting on a plastic bucket containing water held above ground level in your hand. Discuss why the forces acting on the bucket do not bring a change in its state of motion.**

**Soln:**

For holding the bucket of water above the ground, we use muscular force. This muscular force acts against the force of gravity that pulls the bucket towards the ground. The two forces are equal in magnitude but opposite in direction. Therefore, the net force on the bucket is zero. Hence, there is no change in the state of motion.

**9. A rocket has been fired upwards to launch a satellite in its orbit. Name the two forces acting on the rocket immediately after leaving the launching pad.**

**Soln:**

The force of gravity is the one which acts on the rocket to pull it towards the ground and the other one is the force of friction due to earth's atmosphere, which opposes its motion.

**10. When we press the bulb of a dropper with its nozzle kept in water, air in the dropper is seen to escape in the form of bubbles. Once we release the pressure on the bulb, water gets filled in the dropper. The rise of water in the dropper is due to**

**(a) pressure of water.**

**(b) gravity of the earth.**

**(c) shape of rubber bulb.**

**(d) atmospheric pressure**

**Soln:**

a) Due to the atmospheric pressure, there is a rise of water in the dropper.

When all the air escapes from the nozzle, the atmospheric pressure which is acting on the water forces the water to fill the nozzle of the dropper.

## Class 8 Chapter 12 Friction

### Exercise Questions

#### 1. Fill in the blanks.

- (a) Friction opposes the \_\_\_\_\_ between the surfaces in contact with each other.
- (b) Friction depends on the \_\_\_\_\_ of surfaces.
- (c) Friction produces \_\_\_\_\_.
- (d) Sprinkling of powder on the carrom board \_\_\_\_\_ friction.
- (e) Sliding friction is \_\_\_\_\_ than the static friction.

#### Soln:

- (a) Friction opposes the **motion** between the surfaces in contact with each other.
- (b) Friction depends on the **nature** of surfaces.
- (c) Friction produces **heat**.
- (d) Sprinkling of powder on the carrom board **reduces** friction.
- (e) Sliding friction is **lesser** than the static friction.

#### 2. Four children were asked to arrange forces due to rolling, static and sliding frictions in a decreasing order. Their arrangements are given below. Choose the correct arrangement.

- (a) rolling, static, sliding
- (b) rolling, sliding, static
- (c) static, sliding, rolling
- (d) sliding, static, rolling

#### Soln:

Answer is (c) static, sliding, rolling

#### 3. Alida runs her toy car on dry marble floor, wet marble floor, newspaper and towel spread on the floor. The force of friction acting on the car on different surfaces in increasing order will be

- (a) wet marble floor, dry marble floor, newspaper and towel.
- (b) newspaper, towel, dry marble floor, wet marble floor.
- (c) towel, newspaper, dry marble floor, wet marble floor.

**(d) wet marble floor, dry marble floor, towel, newspaper**

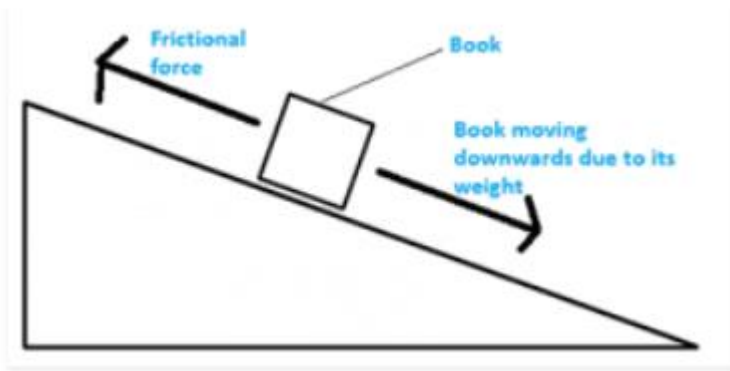
**Soln:**

Answer is (a) wet marble floor, dry marble floor, newspaper and towel.

**4. Suppose your writing desk is tilted a little. A book kept on it starts sliding down. Show the direction of frictional force acting on it.**

**Soln:**

When book slides down on the desk, a frictional force acts between the book and the surface of the desk. The direction of the friction force on the book is opposite to the direction of its motion and acts in an upward direction. It is shown in the diagram below.



**5. You spill a bucket of soapy water on a marble floor accidentally. Would it make it easier or more difficult for you to walk on the floor? Why?**

**Soln:**

It is possible to walk on the floor because of the friction present between our feet and the ground. For walking, we push the ground in a backward direction with our feet. The force of friction pushes it in the forward direction and allows us to walk. The force of friction decreases between the ground and the feet when there is soapy water spilt on the floor. Hence, it becomes difficult to walk on the soapy floor.

**6. Explain why sportsmen use shoes with spikes.**

**Soln:**

Sportsmen use shoes with spikes because of the better grip given by spikes while running. This is because the force of friction between the shoes and the ground increases with the help of spikes.

**7. Iqbal has to push a lighter box and Seema has to push a similar heavier box on the same floor. Who will have to apply a larger force and why?**

**Soln:**

Due to the interlocking of the irregularities on the two surfaces in contact, the force of friction arises. On the floor when a heavy object is placed, the interlocking of irregularities on the surface of the box and floor become strong. This is because the two surfaces in contact are pressed harder. Hence, more force is required to overcome the interlocking. Thus, to push the heavier box, Seema has to apply greater force than Iqbal.

**8. Explain why sliding friction is less than static friction**

**Soln:**

When irregularities present in the surfaces of two objects in contact get interlocked with each other, friction come into play. The time given in sliding for interlocking is very small. Thus, interlocking is not strong. Therefore, less force is required to overcome this interlocking. Due to this reason, sliding friction is less than static friction.

**9. Give examples to show that friction is both a friend and a foe.**

**Soln:**

Advantages of the friction

- a) Due to friction, we are able to walk.
- b) We are able to write because of the friction between the tip of the pen and paper.

Disadvantages of friction

- a) Because of friction, the tires and soles of shoes wear out.
- b) Friction produces heat between different parts of the machines. This can damage the machines.

**10. Explain why objects moving in fluids must have special shapes.**

**Soln:**

When a body moves through a fluid, it experiences an opposing force which tries to oppose its motion through the fluid. This opposing force is



known as the drag force. This frictional force depends on the shape of the body. By giving the objects a special shape, the force of friction acting on it can be minimized. Hence, it becomes easier for a body to move through the fluid.

## Chapter 13 Sound

### Exercise Questions

1. Choose the correct answer.

Sound can travel through

- (a) gases only
- (b) solids only
- (c) liquids only
- (d) solids, liquids and gases

**Soln:**

Answer is (d) solids, liquids and gases

**Explanation:**

For the sound to travel, it requires a medium. Solids, liquids and gases provide a medium through which sound can travel.

2. Voice of which of the following is likely to have a minimum frequency?

- (a) Baby girl
- (b) Baby boy
- (c) A man
- (d) A woman

**Soln:**

Answer is (c) A man

**Explanation:**

When compared to the voices of a baby boy, baby girl, and woman, the voice of a man has a lower pitch. As the pitch of a man is low, which is proportional to the frequency of a sound, the man's voice is of minimum frequency as compared with others.

3. In the following statements, tick 'T' against those which are true, and 'F' against those which are false.

- (a) Sound cannot travel in vacuum. (T/F)

**(b) The number of oscillations per second of a vibrating object is called its time period. (T/F)**

**(c) If the amplitude of vibration is large, sound is feeble. (T/F)**

**(d) For human ears, the audible range is 20 Hz to 20,000 Hz. (T/F)**

**(e) The lower the frequency of vibration, the higher is the pitch. (T/F)**

**(f) Unwanted or unpleasant sound is termed as music. (T/F)**

**(g) Noise pollution may cause partial hearing impairment. (T/F)**

**Soln:**

a) True- A medium is required for sound to travel

b) False- A vibrating object whose number of oscillations per second is known as its frequency. The time taken to complete one oscillation is called a time period.

c) False- The Square of the amplitude of vibration is proportional to the loudness of sound. Sound is loud when the amplitude of vibration is large. For feeble sound, the amplitude is small.

d) True- Sounds of all frequencies are not audible to human ears. The range of frequencies which are audible to human ears is between 20 Hz and 20,000 Hz. Sounds outside these frequencies are not audible to human ears.

e) False- Higher the frequency, higher is the pitch of the sound as the pitch is proportional to its frequency. For high pitched sound, its vibrating frequency is high and for low pitched sound, its vibrating frequency is small.

f) False- Music is a melodious and pleasing sound which is pleasant to hear. Noises are unpleasant sounds.

g) True-Noises are unwanted and unpleasant sounds, which cause temporary hearing impairment when heard continuously for a long period of time.

**4. Fill in the blanks with suitable words.**

**(a) Time taken by an object to complete one oscillation is called \_\_\_\_\_.**

**(b) Loudness is determined by the \_\_\_\_\_ of vibration.**

(c) The unit of frequency is \_\_\_\_\_

(d) Unwanted sound is called \_\_\_\_\_ .

(e) The shrillness of a sound is determined by the \_\_\_\_\_ of vibration.

**Soln:**

(a) Time taken by an object to complete one oscillation is called **time period**.

(b) Loudness is determined by the **amplitude** of vibration.

(c) The unit of frequency is **Hertz**.

(d) Unwanted sound is called **Noise**.

(e) The shrillness of a sound is determined by the **frequency** of vibration.

**5. A pendulum oscillates 40 times in 4 seconds. Find its time period and frequency**

**Soln:**

The number of oscillations per second of the vibrating body is known as the frequency of oscillation.

Frequency = Total number of oscillations

Total time taken

$$= 50/5$$

$$= 10 \text{ Hz}$$

Time period is the time taken to complete one oscillation. It is also the inverse of frequency.

Time period =  $1 / \text{Oscillating frequency}$

$$= 1/10$$

$$= 0.1 \text{ s}$$

$$\therefore \text{frequency} = 10 \text{ Hz}$$

Time period = 0.1 s

**6. The sound from a mosquito is produced when it vibrates its wings at an average rate of 500 vibrations per second. What is the time period of the vibration?**

**Soln:**

Time period is defined as the time taken to complete one oscillation. It is also the inverse of frequency.

Time period =  $\frac{1}{f}$

Oscillation frequency

Oscillation frequency = 500 Hz

Time period =  $\frac{1}{500} = 0.002 \text{ s}$

**7. Identify the part which vibrates to produce sound in the following instruments.**

**(a) Dholak**

**(b) Sitar**

**(c) Flute**

**Soln:**

a) Dholak- It consists of a head which is a stretched membrane. Vibrations are set into these stretched strings when the head is beaten gently, these vibrations produce sound and thus Dholak produces sound.

b) Sitar – It is a musical instrument. Stretched strings are part of it. Vibrations are produced when the string is plucked when played. These vibrations produce sound, thus sitar produces sound.

c) Flute – It's an instrument which has holes in it. It is a hollow pipe. The air inside the pipe is set into vibration when air is blown over its mouth and this produces a pleasant sound.

**8. What is the difference between noise and music? Can music become noise sometimes?**

**Soln:**

Music is sound which is pleasant to hear. Sounds from flutes, pianos and violins are pleasant to hear.

Noise are sounds which are unpleasant to hear.

Sounds which are unpleasant to hear are:

(a) Sounds from bus horns and truck horns.

(b) Electrical generator sounds.

(c) Gunshot sounds.

(d) Jackhammer sounds

Yes, sometimes when the music is played at high volumes, it becomes noise.

**9. List sources of noise pollution in your surroundings.**

**Soln:**

Noise pollution sources are

(a) Bus and car horns.

(b) Firecrackers and loudspeakers.

(c) High volumes in televisions and transistors.

(d) mixers at home

e) Sirens from factories

**10. Explain in what way noise pollution is harmful to human.**

**Soln:**

A number of health issues are associated with noise pollution. They are as follows

(a) Stress

(b) Headache

(c) Hearing loss

(d) Insomnia

(e) Hypertension

**11. Your parents are going to buy a house. They have been offered one on the roadside and another three lanes away from the roadside. Which house would you suggest your parents should buy? Explain your answer.**

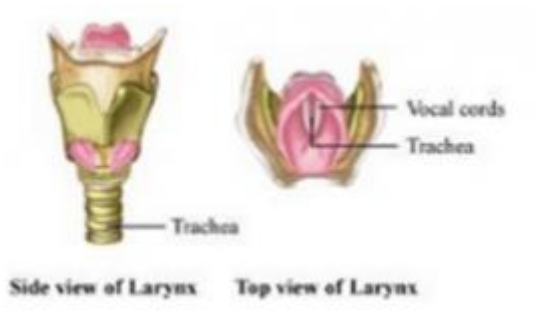
**Soln:**

It is better to buy the house which is three lanes away from the roadside as there will be less noise as compared to the one on the main road.

The noises can be caused by vehicles. As the distance between the source and the listener increases, the intensity of noise decreases. So it's better to buy the house which is three lanes away.

**12. Sketch larynx and explain its function in your own words.**

**Soln:**



When we swallow something, the larynx moves. There are two vocal cords inside the larynx. The air passes through a small gap which is present in between them. The lungs force the air into the gap when we speak and this vibrates the vocal cord, due to which sound is produced.

**13. Lightning and thunder take place in the sky at the same time and at the same distance from us. Lightning is seen earlier and thunder is heard later. Can you explain why?**

**Soln:**

Speed of the light is more than the speed of sound. Thus, lightning is seen first which is accompanied by thunder later.

## Chapter 14 Chemical Effects of Electric Current

### Exercise Questions

#### 1. Fill in the blanks.

- (a) Most liquids that conduct electricity are solutions of \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
- (b) The passage of an electric current through a solution causes \_\_\_\_\_ effects.
- (c) If you pass current through copper sulphate solution, copper gets deposited on the plate connected to the \_\_\_\_\_ terminal of the battery.
- (d) The process of depositing a layer of any desired metal on another material by means of electricity is called \_\_\_\_\_.

#### Soln:

- (a) Most liquids that conduct electricity are solutions of **acids**, **bases** and **salts**.
- (b) The passage of an electric current through a solution causes **chemical** effects.
- (c) If you pass current through copper sulphate solution, copper gets deposited on the plate connected to the **negative** terminal of the battery.
- (d) The process of depositing a layer of any desired metal on another material by means of electricity is called **electroplating**.

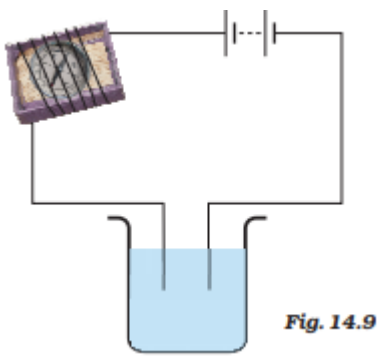
#### 2. When the free ends of a tester are dipped into a solution, the magnetic needle shows deflection. Can you explain the reason?

#### Soln:

The compass needle shows a deflection which concludes that current is flowing through the wire. The circuit becomes complete as the free ends of the tester are immersed inside the solution. So, the solution is conducting solution hence deflection is obtained in the compass needle.

#### 3. Name three liquids, which when tested in the manner shown in Fig.14.9, may cause the magnetic needle to deflect.



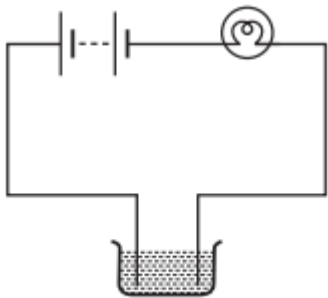


**Soln:**

- I. Saltwater
- II. Lemon juice
- III. Vegetable oil

These liquids can be taken in a beaker to show the passage of electricity as they will show a deflection in the magnetic needle.

**4. The bulb does not glow in the setup shown in Fig.14.10. List the possible reasons. Explain your answer.**



**Fig. 14.10**

**Soln:**

The possibility of the bulb not glowing maybe because of the following reasons:

- a. The liquid may be non-conducting. In this case, the circuit is incomplete and the current does not pass through the liquid.
- b. Electric current may be weak for the circuit is made up of a material which is not a good conductor of electricity or there is insufficient energy in the battery to generate electricity.

**5. A tester is used to check the conduction of electricity through two liquids, labelled A and B. It is found that the bulb of the tester glows brightly for liquid A while it glows very dimly for liquid B. You would conclude that**

**(i) liquid A is a better conductor than liquid B.**

**(ii) liquid B is a better conductor than liquid A.**

**(iii) both liquids are equally conducting.**

**(iv) conducting properties of liquid cannot be compared in this manner.**

**Soln:**

Liquid A is a better conductor than liquid B.

The conductivity of the solution determines the amount of current flowing through the solution. Greater the conductivity, greater will be the quantity current passing through the solution and lesser the conductivity, the quantity of current passing through will be correspondingly less. So, the conductivity of liquid A is more than the conductivity of liquid B.

**6. Does pure water conduct electricity? If not, what can we do to make it conducting?**

**Soln:**

Pure water does not conduct electricity as it does not contain any type of salts. Adding, a small amount of Common salt (Sodium Chloride ie., NaCl) will turn the water to a conducting medium.

**7. In case of a fire, before the firemen use the water hoses, they shut off the main electrical supply for the area. Explain why they do this.**

**Soln:**

In case of a fire, before the firemen use the water hoses, they shut off the main electrical supply for the area because water sprayed from the hose might conduct electricity which may come in contact with the electrical appliances which increases the chance of electricity passing through wire. This may hurt fire man.

**8. A child staying in a coastal region tests the drinking water and also the seawater with his tester. He finds that the compass needle deflects more in the case of seawater. Can you explain the reason?**

**Soln:**

The amount of dissolved salts present in the seawater is more than that of the drinking water. So, the sea water will be a better conductor than the drinking water. That is the reason behind the increased deflection of the needle in the seawater when compared with the drinking water.

**9. Is it safe for the electrician to carry out electrical repairs outdoors during heavy downpour? Explain.**

**Soln:**

No. It is not safe to repair electrical appliances outdoors during a heavy downpour. Rainwater is composed of a certain percentage of dissolved salts making it conductive. This may cause electric shocks and harm the electrician while working outdoors during heavy downpours.

**10. Paheli had heard that rainwater is as good as distilled water. So she collected some rainwater in a clean glass tumbler and tested it using a tester. To her surprise she found that the compass needle showed deflection. What could be the reasons?**

**Soln:**

Rainwater is composed of a certain percentage of dissolved salts making it conductive. This makes the deflection in the compass.

**11. Prepare a list of objects around you that are electroplated.**

**Soln:**

Chromium plating: This is done on exterior parts of automobiles in order to obtain a shiny appearance.

Gold Plating: Silver ornaments are coated with a thin layer of gold and the product are called Gold-plated Ornaments.

Zinc Plating: Iron used for Construction are coated with a Zinc layer in order to protect them from corrosion and rusting.

**12. The process that you saw in Activity 14.7 is used for purification of copper. A thin plate of pure copper and a thick rod of impure copper are used as electrodes. Copper from impure rod is sought to be transferred to the thin copper plate. Which electrode should be attached to the positive terminal of the battery and why?**

**Soln:**

The thick rod of impure copper plate is to be attached to the positive terminal of the battery because when electric current is passed through the copper sulphate solution, it gets dissociated into copper and sulphate. The free copper, being positively charged, gets drawn to the negative terminal of the battery and gets deposited on it. On the other hand the loss of copper from the solution is regained from the impure copper rod which is attached to the positive terminal of the battery.

## chapter 15 Some Natural Phenomenon

### Exercise Questions

Select the correct option in Questions 1 and 2.

1. Which of the following cannot be charged easily by friction?

- (a) A plastic scale
- (b) A copper rod
- (c) An inflated balloon
- (d) A woollen cloth.

**Soln:**

Answer is (b) A copper rod

**Explanation:**

Only non-conducting materials can be easily charged by friction. Copper is a highly conducting materials. Therefore, a copper rod cannot be charged easily by friction.

2. When a glass rod is rubbed with a piece of silk cloth the rod

- (a) and the cloth both acquire positive charge.
- (b) becomes positively charged while the cloth has a negative charge.
- (c) and the cloth both acquire negative charge.
- (d) becomes negatively charged while the cloth has a positive charge.

**Soln:**

Answer is (b) becomes positively charged while the cloth has a negative charge.

**Explanation:**

When two objects are rubbed against each other, they acquire opposite charges. By the law of convention, it is known that the rod acquires the positive charge and the cloth is acquiring the negative charge.

3. Write T against true and F against false in the following statements.

- (a) Like charges attract each other (T/F)

**(b) A charged glass rod attract a charged plastic straw (T/F)**

**(c) Lightning conductor cannot protect a building from lightning (T/F)**

**(d) Earthquakes can be predicted in advance (T/F)**

**Soln:**

a) False-Unlike charges attract each other while the like charges repel each other.

b) True-A charged plastic straw has a negative charge on its surface while the glass rod has positive charges on its surface. Unlike charges attract each other so, they both attract each other.

c) False -When lightning occurs, the atmospheric charges are transferred to the earth directly by a lightning conductor. Therefore the building is protected from lightning.

d) False-Even though the earthquake causes are known, there are no instruments that are invented to detect them in advance. Therefore earthquakes cannot be predicted in advance.

**4. Sometimes, a crackling sound is heard while taking off a sweater during winters. Explain.**

**Soln:**

When we take out sweater, Woolen sweater gets charged due to friction between the sweater and the body. This results in crackling sound.

**5. Explain why a charged body loses its charge if we touch it with our hand.**

**Soln:**

The charges get conducted to the earth through our body when we touch it and the conductor loses its charge. This phenomenon is known as electric discharge.

**6. Name the scale on which the destructive energy of an earthquake is measured. An earthquake measures 3 on this scale. Would it be recorded by a seismograph? Is it likely to cause much damage?**

**Soln:**

Richter scale is used to measure the destructive energy of an earthquake. The scale has a reading from 1 to 10.

An earthquake measuring 3 would be recorded by a seismograph.

The magnitude of scale 3 would not cause much damage. An Earthquake of magnitude 5 is considered destructive in nature.

### **7. Suggest three measures to protect ourselves from lightning**

**Soln:**

Various ways to protect ourselves from lightning are

(i) Always remain in a closed place and if you are in a car stay there until the lightning is over and keep the windows closed.

(ii) Never touch any electrical wires, telephone cables, metal pipes.

(iii) Never bath in running water, this may cause electric shock.

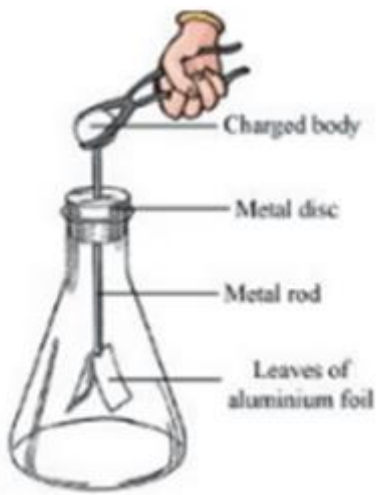
### **8. Explain why a charged balloon is repelled by another charged balloon whereas an uncharged balloon is attracted by another charged balloon?**

**Soln:**

The surface charge on the balloons are of the same nature hence they get repelled. When a charged balloon is brought near an uncharged balloon due to the induction of charges, it acquires charges which are opposite in nature with that of a charged balloon. As unlike charges attract each other, the uncharged balloon gets attracted by the charged balloon.

### **9. Describe with the help of a diagram an instrument which can be used to detect a charged body.**

**Soln:**



It consists of a metal rod on which two leaves of aluminium foil are fixed to one end and a metal disc at the other end. The leaves are kept inside a conical flask and it is corked to isolate it from the atmospheric air.

When a charged body comes in contact with the metal disc, the aluminium leaves move away from each other because some charges get transferred to aluminium leaves through the metal rod. This process is called charging by conduction. The charges on the leaves and the charged body are of same in nature and thus the leaves of aluminium repel each other. If the body is not charged then they would attract each other.

**10. List three states in India where earthquakes are more likely to strike.**

**Soln:**

Gujarat, Assam and Jammu & Kashmir are the three states where an earthquake is more likely to strike.

**11. Suppose you are outside your home and an earthquake strikes. What precaution would you take to protect yourself?**

**Soln:**

The following precautions should be taken when earthquake strikes

(a) Find and go to an open field and stay away from buildings, trees, electric wire and poles.

(b) If you are in a car, then drive to an open field and do not come out of your car.



**12. The weather department has predicted that a thunderstorm is likely to occur on a certain day. Suppose you have to go out on that day. Would you carry an umbrella? Explain.**

**Soln:**

No, one should not carry an umbrella during a thunderstorm. The thunderstorm is accompanied by lightning and the charges might travel from the cloud to the metal rod on the umbrella and might cause an electric shock to the person carrying it. So, it is not safe to carry an umbrella during lightning.

## Chapter 16 Light

### Exercise Questions

**1. Suppose you are in a dark room. Can you see objects in the room? Can you see objects outside the room? Explain.**

**Soln:**

If a person is inside the room where there is no light, it is then impossible to visualize the object inside the room but the object out of the room can be seen easily.

When light falls on eyes after reflecting from the object, it becomes visible. If the room is dark, then the object which is in the room reflects no light. Hence, the person is not able to see the objects in the room where there is no light.

**2. Differentiate between regular and diffused reflection. Does diffused reflection mean the failure of the laws of reflection?**

**Soln:**

S.No	Regular Reflection	Diffused Reflection
1.	It occurs when the surface is smooth.	It occurs when the surface is a rough surface.
2.	Reflected rays move in a particular direction.  Example: Reflection by the plane mirror	Reflected rays scattered in random directions.  Example: Reflection by the road surface.

The laws of reflection have not failed because each ray obeys the law of reflection. All the reflected rays are parallel to each other, whereas in diffused reflection the rays aren't parallel to the incident rays.

**3. Mention against each of the following whether regular or diffused reflection will take place when a beam of light strikes. Justify your answer in each case.**

**(a) Polished wooden table**

**(b) Chalk powder**

**(c) Cardboard surface**

**(d) Marble floor with water spread over it**

**(e) Mirror**

**(f) Piece of paper**

**Soln:**

a) The wooden table that has been a polished-Regular reflection

The surface that has been recently polished can be a good example of a smooth surface. The wooden table that has been polished has a surface that is smooth.

b) White Chalk powder that is used in school- Diffused reflection

Chalk powder spread on a surface is an example of an irregular surface. Hence, it is rough. Therefore, the diffused reflection will appear from chalk powder.

c) Cardboard surface- Diffused reflection

The surface of the cardboard is a kind of irregular surface. Hence, the diffused reflection will take place from a cardboard surface.

d) Marble floor – Regular reflection

Marble floor can be a good example of a surface that is regular.

Because water makes the ceramic glossy. Thus, the reflections that are regular occurs on this surface.

e) Mirror- Regular reflection

A mirror has a very smooth surface hence it gives a regular reflection.

f) Piece of paper- Diffused reflection

Although a piece of paper may look smooth, it has many irregularities on its surface. Because of this reason, it will give a diffused reflection.

**4. State the laws of reflection.**

**Soln:**

The law of reflection states that

a) The angle of reflection and the angle of incidence both are always equal to one another.

b) The reflected ray, the incident ray, and the normal to the reflective surface at the point of incidence all come on the same plane.

**5. Describe an activity to show that the incident ray, the reflected ray and the normal at the point of incidence lie in the same plane.**

**Soln:**

On a table, place a plane mirror perpendicular to the plane of the table. Make a small hole in a paper and hold it perpendicular to the plane of the table. Try to do this experiment in a dark room. Take one more piece of paper and place it on the table so that it makes contact with the mirror. Draw a line perpendicular to the mirror on the piece of paper which is on the table. Now beam light rays with the help of a torch through the small hole such that the beam of light hits the normal at the bottom of the mirror. The ray of light will be reflected in the light rays from the hole are incident on the mirror. Looking at the piece of paper on the table, we can easily show that the incident ray, the normal line and the reflected ray at the point of incidence lie in the same plane.

**6. Fill in the blanks in the following.**

**(a) A person 1 m in front of a plane mirror seems to be \_\_\_\_\_ m away from his image.**

**(b) If you touch your \_\_\_\_\_ ear with right hand in front of a plane mirror it will be seen in the mirror that your right ear is touched with \_\_\_\_\_.**

**(c) The size of the pupil becomes \_\_\_\_\_ when you see in dim light.**

**(d) Night birds have \_\_\_\_\_ cones than rods in their eyes.**

**Soln:**

**(a) A person 1 m in front of a plane mirror seems to be 2m away from his image.**

(b) If you touch your **left** ear with right hand in front of a plane mirror it will be seen in the mirror that your right ear is touched with the **left hand**.

(c) The size of the pupil becomes **large** when you see in dim light.

(d) Night birds have **fewer** cones than rods in their eyes.

**Choose the correct option in Questions 7 – 8**

**7. The angle of incidence is equal to the angle of reflection.**

**(a) Always**

**(b) Sometimes**

**(c) Under special conditions**

**(d) Never**

**Soln:**

Answer is (a) Always

**8. Image formed by a plane mirror is**

**(a) virtual, behind the mirror and enlarged.**

**(b) virtual, behind the mirror and of the same size as the object.**

**(c) real at the surface of the mirror and enlarged.**

**(d) real, behind the mirror and of the same size as the object.**

**Soln:**

Answer is (b) virtual, behind the mirror and of the same size as the object.

**9. Describe the construction of a kaleidoscope.**

**Soln:**

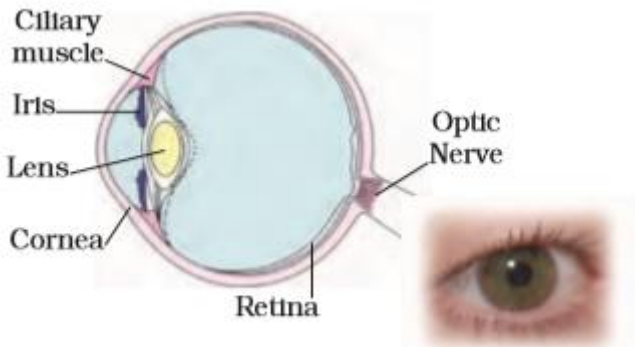
The construction of a kaleidoscope:

Take three rectangular mirror strips of dimensions 15cm x 4cm (l x b) and join them together to form a prism. A prism is fixed into a circular cardboard tube. The circular cardboard tube should be slightly longer than the prism. This circular tube is now closed at one end with a cardboard disc. This disc has a hole through which we can see. At the other end of the circular tube, a plane glass plate is fixed. It is important that this glass plate touches the prism mirrors. On this glass plate, several small and broken pieces of coloured glass are placed. This end

is now closed by a round glass plate allowing enough space for the coloured glass pieces to move.

**10. Draw a labelled sketch of the human eye.**

**Soln:**



*Fig. 16.14 : Human eye*

**11. Gurmit wanted to perform Activity 16.8 using a laser torch. Her teacher advised her not to do so. Can you explain the basis of the teacher’s advise?**

**Soln:**

Her teacher advised her not to do so because of the intensity of the laser light is very high, it is harmful to the human eyes. It can cause damage to the retina and leads to blindness. Hence, it is advisable not to look at a laser beam directly.

**12. Explain how you can take care of your eyes.**

**Soln:**

The following points help a person to take care of his eyes:

- a) Reading should not be done in bright light as well as in dim light.
- b) He should visit an eye specialist on a regular interval of time.
- c) If any small insects or dust particles enters his eyes, do not rub them but clean them immediately with cold water.
- d) He should avoid direct exposure of sunlight to the eye.
- e) While reading, there should be a distance of at least 25 cm between the eyes and the book.

**13. What is the angle of incidence of a ray if the reflected ray is at an angle of 90° to the incident ray?**

**Soln:**

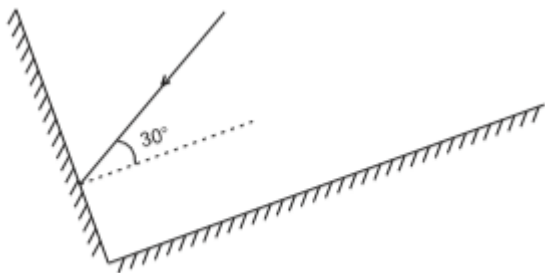
If the reflected ray is at the angle of  $90^\circ$  to the incident ray, then the angle of incidence is  $45^\circ$ . According to the law of reflection, the angle of incidence and the angle of reflection are equal. Therefore, the angle of incidence and the angle of reflection both are  $90/2=45^\circ$ .

**14. How many images of a candle will be formed if it is placed between two parallel plane mirrors separated by 40 cm?**

**Soln:**

If a candle is placed between two parallel plane mirror separated by 40 cm, then the multiple and infinite images will be formed due to the multiple reflections between the mirrors. The infinite numbers of images are formed when two mirrors are placed parallel to each other.

**15. Two mirrors meet at right angles. A ray of light is incident on one at an angle of  $30^\circ$  as shown in Fig. 16.19. Draw the reflected ray from the second mirror.**



**Fig. 16.19**

**Soln:**

The first law of reflection is used to obtain the path of reflected light. It can be observed that the given ray of light will reflect from the second mirror at an angle of  $60^\circ$ .

**16. Boojho stands at A just on the side of a plane mirror as shown in Fig. 16.20. Can he see himself in the mirror? Also, can he see the image of objects situated at P, Q and R?**



**Fig. 16.20**

17. (a) Find out the position of the image of an object situated at A in the plane mirror (Fig. 16.21).

(b) Can Paheli at B see this image?

(c) Can Boojho at C see this image?

(d) When Paheli moves from B to C, where does the image of A move?

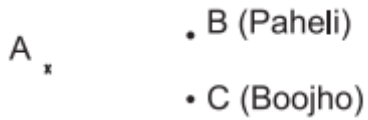


Fig. 16.21

**Soln:**

a) Image of an object placed at A is formed behind the mirror. The distance of the image from the mirror is equal to the distance of A from the mirror

b) Yes Paheli at B can see this image.

c) Yes Boojho at C can see this image.

d) Image of the object at A will not move. It will remain at the same position when Paheli moves from B to C.



## Chapter 17 Stars and the Solar System

### Exercise Questions

Choose the correct answer in Questions 1-3.

1. Which of the following is NOT a member of the solar system?

- (a) An asteroid
- (b) A satellite
- (c) A constellation
- (d) A comet

**Soln:**

Answer is (c) A constellation

**Explanation:**

A constellation is not a member of the solar system. These are the group of stars that forms a recognizable shape is known as Constellation.

2. Which of the following is NOT a planet of the sun?

- (a) Sirius
- (b) Mercury
- (c) Saturn
- (d) Earth

**Soln:**

Answer is (a) Sirius

**Explanation:**

Sirius is a star, not the planet of the solar system.

3. Phases of the moon occur because

- (a) we can see only that part of the moon which reflects light towards us.
- (b) our distance from the moon keeps changing.
- (c) the shadow of the Earth covers only a part of the moon's surface.
- (d) the thickness of the moon's atmosphere is not constant.

**Soln:**

Answer is (a) we can see only that part of the moon which reflects light towards us.

**Explanation:**

Moon does not have its own light. It is only be seen by us when sunlight falls on the moon and gets reflected towards us. So, we can only see the part of the moon on which the sunlight falls and reflects towards us.

**4. Fill in the blanks.**

- (a) The planet which is farthest from the Sun is \_\_\_\_\_ .
- (b) The planet which appears reddish in colour is \_\_\_\_\_ .
- (c) A group of stars that appear to form a pattern in the sky is known as a \_\_\_\_\_ .
- (d) A celestial body that revolves around a planet is known as \_\_\_\_\_ .
- (e) Shooting stars are actually not \_\_\_\_\_ .
- (f) Asteroids are found between the orbits of \_\_\_\_\_ and \_\_\_\_\_ .

**Soln:**

- (a) The planet which is farthest from the Sun is **Neptune**.
- (b) The planet which appears reddish in colour is **Mars**.
- (c) A group of stars that appear to form a pattern in the sky is known as a **Constellation**.
- (d) A celestial body that revolves around a planet is known as **satellite**.
- (e) Shooting stars are actually not **stars**.
- (f) Asteroids are found between the orbits of **Mars** and **Jupiter** .

**5. Mark the following statements as true (T) or false (F).**

- (a) Pole star is a member of the solar system. ( )
- (b) Mercury is the smallest planet of the solar system. ( )
- (c) Uranus is the farthest planet in the solar system. ( )
- (d) INSAT is an artificial satellite. ( )
- (e) There are nine planets in the solar system. ( )
- (f) Constellation Orion can be seen only with a telescope. ( )

**Soln:**

(a) False

Concept Insight: Pole Star is not a member of the Solar System.

(b) True

(c) False

Concept Insight: Neptune is the farthest planet in the solar system.

(d) True

(e) False

Concept Insight: There are eight planets in the Solar System. They are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

(f) False

Concept Insight: Constellation Orion can be seen during winters around late evenings. It is one of the most magnificent constellations in the sky, visible to the naked eyes.

**6. Match items in column A with one or more items in column B.**

<b>A</b>	<b>B</b>
<b>(i) Inner planets</b>	<b>(a) Saturn</b>
<b>(ii) Outer planets</b>	<b>(b) Pole star</b>
<b>(iii) Constellation</b>	<b>(c) Great Bear</b>
<b>(iv) Satellite of the Earth</b>	<b>(d) Moon</b>
	<b>(e) Earth</b>
	<b>(f) Orion</b>
	<b>(g) Mars</b>

**Soln:**

<b>A</b>	<b>B</b>
<b>(i) Inner planets</b>	<b>(g) Mars, (e) Earth</b>

(ii) Outer planets	(a) Saturn
(iii) Constellation	(c) Great Bear, Orion
(iv) Satellite of the Earth	(d) Moon

**7. In which part of the sky can you find Venus if it is visible as an evening star?**

**Soln:**

The planet Venus is found in the western part of the sky after sunset and is said to be known as an evening star.

**8. Name the largest planet of the solar system.**

**Soln:**

Jupiter is the largest planet of the solar system.

**9. What is a constellation? Name any two constellations.**

**Soln:**

The group of stars that forms a recognizable pattern in the sky is known as a constellation.

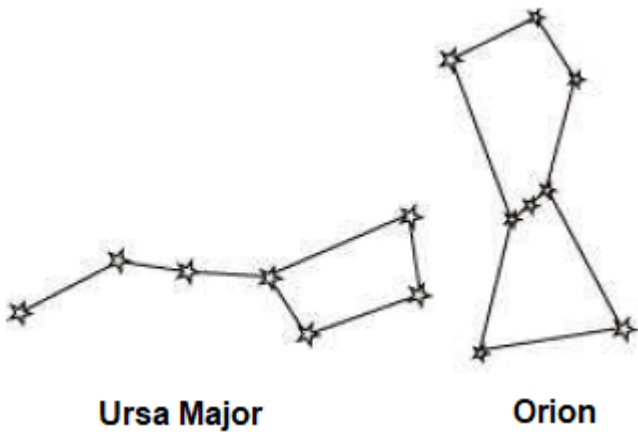
Two constellations are; Ursa Major and Orion

**10. Draw sketches to show the relative positions of prominent stars in (a) Ursa Major and (b) Orion**

**Soln:**

a) Orion seems to be like a hunter. The three bright stars appear in the belt, while five bright stars are arranged in the form of a quadrilateral.

b) Ursa Major seems to be like a big dipper. There are four stars in the bowl of the dipper and three bright stars in the handle.



**11. Name two objects other than planets which are members of the solar system.**

**Soln:**

a) Meteors

Meteors are small celestial objects that are seen as bright streaks of light in the sky. Due to the heat produced by the friction of the Earth's atmosphere, the Meteors are burnt out while entering in, this causes the bright streaks in the sky. They are not planets.

b) Asteroids

The Asteroids are the collection of a huge number of small objects; gasses and dust revolving around the sun. Between the orbits of Mars and Jupiter, they occupy the large gap. These are not planets. They are the celestial bodies and are known as Asteroids.

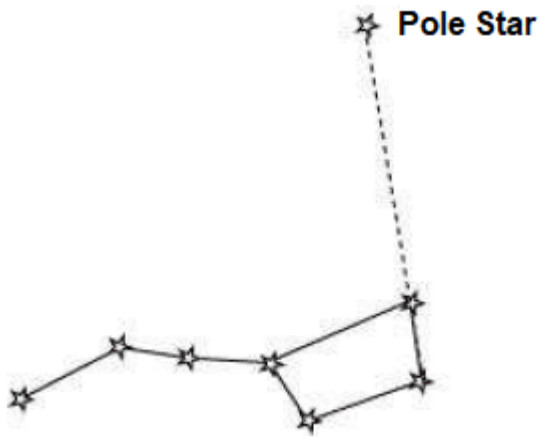
**12. Explain how you can locate the Pole Star with the help of Ursa Major.**

**Soln:**

For locating, the pole stars in the sky, first the big dropper or the Ursa Major constellation must be found . The bowl of the big dipper consists of the four bright stars.



Imagine the two stars at the end of this bowl. Then make an imaginary straight line towards the northern direction connecting these two stars.



This imaginary line meets the star called Pole star. The length of the imaginary line from the bowl is about five times the distance between the two stars of the bowl.

**13. Do all the stars in the sky move? Explain.**

**Soln:**

**No**, the earth rotates on its axis from west to east. Therefore, all the stars in the sky (except the pole star) seem to move from east to west. With reference to Earth, pole star in the sky does not seem to move because it is located above the axis of rotation of the Earth in the north direction. It seems to remain stationary at a point in the sky.

**14. Why is the distance between stars expressed in light years? What do you understand by the statement that a star is eight light-years away from the Earth?**

**Soln:**

The distance of the star from the earth and the distance between the stars are very huge. It is troublesome to express this distance in kilometre (km). Therefore, these huge distances are expressed in light-years. One light-year is equal to the distance travelled by the light in one single year. One light-year is equal to  $9.46 \times 10^{12}$  km.

A distance of the star from the Earth is eight light-years. This means the distance between them is equal to the distance travelled by the light in eight years, i.e. distance of the star is  $8 \times (9.6 \times 10^{12}) = 7.6 \times 10^{13}$  km away from Earth.

**15. The radius of Jupiter is 11 times the radius of the Earth. Calculate the ratio of the volumes of Jupiter and the Earth. How many Earths can Jupiter accommodate?**

**Soln:**

Let us consider Jupiter and Earth are two spheres with radii  $R$  and  $R'$  respectively. Given in the question that radius of Jupiter is 11 times the radius of the Earth.

So,  $R' = 11R$

Volume of sphere of radius  $r$  is given as  $= \frac{4}{3}\pi r^3$

Volume of Earth  $= \frac{4}{3}\pi R^3$

And, volume of Jupiter  $= \frac{4}{3}\pi (R')^3$

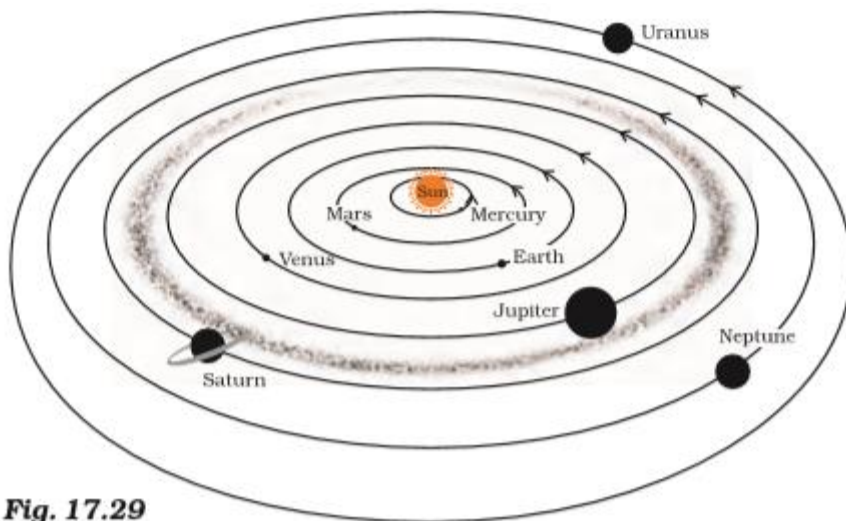
$= \frac{4}{3}\pi (11R)^3 = 1331 \left[ \frac{4}{3}\pi R^3 \right]$

The ratio of the volume of Jupiter and earth

$= \frac{\text{volume of Jupiter}}{\text{volume of Earth}} = \frac{1331 \left( \frac{4}{3}\pi R^3 \right)}{\frac{4}{3}\pi R^3} = 1331$

Therefore, this ratio suggests that Jupiter can fit 1331 number of Earth in it.

**16. Boojho made the following sketch (Fig. 17.29) of the solar system. Is the sketch correct? If not, correct it.**

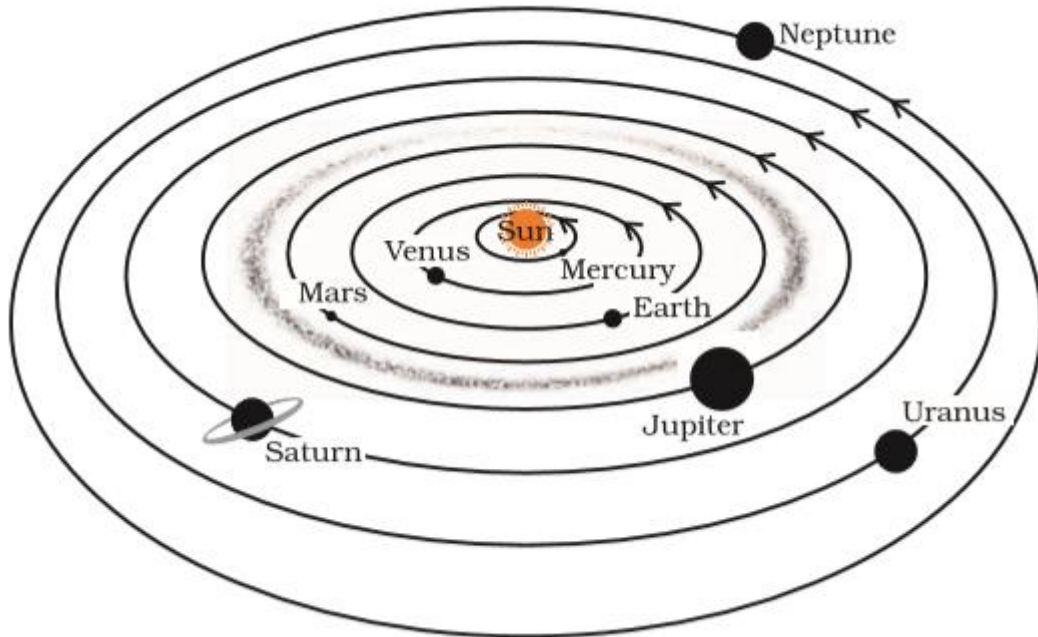


**Fig. 17.29**

**Soln:**

No, the diagram made by the Boojho is not correct, because in the solar system the sequence of the planets of their distance from the sun is like; Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and

Neptune. Here he had changed the positions of the planets Venus, Mars, Neptune and Uranus. Besides this, he had shown in the diagram that shows the Asteroids belt in the gap between the orbits of Saturn and Jupiter. This is incorrect. The Asteroids belt is located in the middle of the orbits of Jupiter and Mars. The correct diagram of the solar system is given below:



**Fig. 17.17 :** The solar system (not to scale)



## Chapter 18 Pollution of Air and Water

### Exercise Questions

**1. What are the different ways in which water gets contaminated ?**

**Soln:**

The different ways in which the water gets contaminated are:

**i) Industrial waste:** The harmful chemical wastes gets released by the industries into water sources .

**ii) Sewage waste:** kitchen, laundry and toilets release the waste materials and this pollutes water.

**iii) Agricultural chemicals:** Excessive amount of pesticides and fertilizers are used by the farmers for enhancing crop production. Rains and floods carry these harmful chemicals to water bodies which results in pollute water pollution.

**2. At an individual level, how can you help reduce air pollution?**

**Soln:**

The following are the steps we can take for reduction of air pollution:

i) We should avoid the usage of personal cars and opt for public transport as much as possible.

ii) We should properly dispose of the garbage and not burn it.

iii) For shorter distances, avoid vehicles.

iv) We should control the number of emissions from household chimneys and vehicles.

v) We should replace our vehicle fuel, diesel and petrol by LPG and CNG.

**3. Clear, transparent water is always fit for drinking. Comment.**

**Soln:**

No, we don't agree to the statement that clean water is always fit for drinking because water might appear clean but it may contain some disease-causing micro-organisms and several other dissolved impurities. Hence, we advise purifying the water by boiling or by any purifying system before drinking it.

**4. You are a member of the municipal body of your town. Make a list of measures that would help your town to ensure the supply of clean water to all its residents.**

**Soln:**

The following are the measures taken by us to ensure the supply of clean water to our town resident:

- a) We clean the area around the water pipes.
- b) The main water source has to be built in a clean surrounding and should be maintained properly.
- c) Chemical methods such as chlorination must be used for purifying water.

**5. Explain the differences between pure air and polluted air.**

**Soln:**

The composition of pure air contains 78% nitrogen, 21% oxygen and 0.03% carbon dioxide. Besides these, there are some other gases like methane, argon, ozone and water vapours'. The air is said to be polluted when the composition of air is altered by the addition of harmful substances or gases such as sulphur dioxide, carbon monoxide, nitrogen dioxide and particulate matter.

**6. Explain circumstances leading to acid rain. How does acid rain affect us?**

**Soln:**

Sulphur dioxide and nitrogen dioxide are the type of pollutants, which are released into the atmosphere by the burning of fossil fuels like diesel and coal. These pollutants react with the water vapours present in the atmosphere to form nitric acid and sulphuric acid respectively. By precipitation, these acids come down and form the acid rain.

Effects caused by the acid rain:

- a) It destroys the crops.
- b) Harmful for the building especially to those made of white marble like the Taj Mahal.

**7. Which of the following is not a greenhouse gas?**

**(a) Carbon dioxide**

**(b) Sulphur dioxide**

**(c) Methane**

**(d) Nitrogen**

**Soln:**

Answer is (d) Nitrogen

**8. Describe the 'Green House Effect' in your own words.**

**Soln:**

The greenhouse effect is the cause of global warming, i.e. overall increase in the temperature of the Earth. The greenhouse gases cause the greenhouse effect. Examples of greenhouse gases include methane, CO<sub>2</sub> and water vapour. When solar radiation reaches the Earth, some radiations are absorbed by the Earth and then released back to the atmosphere. Greenhouse gases present into the atmosphere trap these radiations and do not allow the heat to leave. This helps our planet in keeping warm and thus helps in human survival. However, an indiscriminate increase in level of greenhouse gases, it can lead to an excessive increase in the Earth's temperature leading to global warming.

**9. Prepare a brief speech on global warming. You have to deliver the speech in your class.**

**Soln:**

The increase in the average temperature of the Earth's surface is known as Global warming. It occurs due to the increased concentration of greenhouse gases in the atmosphere. The greenhouse gases include methane, CO<sub>2</sub>, and water vapour. These gases trap the solar radiations released back by the earth, which results in keeping our planet warm and helps in human survival. However, an increase in these gases can lead to an increase in the earth temperature resulting in global warming.

**10. Describe the threat to the beauty of the Taj Mahal.**

**Soln:**

The major threat to the Taj Mahal is the acid rain. When the acid rain falls on the Taj, which is completely made of marble, they react with marble to form a powder like substance which is then washed away by

the rain. This phenomenon is known as marble cancer. In addition, the soot particles emitted from the Mathura oil refinery located near Agra is leading to the yellowing of Taj Mahal marble.

**11. Why does the increased level of nutrients in the water affect the survival of aquatic organisms?**

**Soln:**

An increase in the level of nutrients in water body leads to an excessive increase in the population of algae in the water body. When these algae die, they serve as food for decomposers. A lot of oxygen is utilized in this process, consequently leading to a decrease in the level of oxygen dissolved in the water body. This in-turn causes fishes and aquatic organisms to die.

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