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with complete solutions



Class
8



SCIENCE

COMBINED FOR TERM I & 2

**FORMATIVE & SUMMATIVE
ASSESSMENT**



HIGHLIGHTS

- Strictly as per the NCERT Curriculum
- Chapterwise Synopsis for clarity of concepts
- Variety of questions from NCERT Textbooks
- Activities for Formative Assessment
- Summative Assessment Questions includes MCQs, VSA, SA and Long Answer Questions
- Includes HOTS & Value Based Questions
- Answers follow the marking scheme and the prescribed word limit



CBSE Continuous and Comprehensive Evaluation (CCE)

QUESTION BANK

WITH COMPLETE SOLUTIONS



Science

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8

For Term I and 2

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Science Syllabus Class-VIII

Questions	Key Concepts	Resources	Activity/Processes
<p>1. FOOD</p> <p>Crop production</p> <p>Crop production : How are different food crops produced?</p> <p>What are the various foods we get from animal sources?</p> <p>Micro-organisms</p> <p>What living organisms do we see under a microscope in a drop of water? What helps make curd? How does food go bad? How do we preserve food?</p>	<p>Crop production</p> <p>Soil preparation, selection of seeds, sowing, applying fertilizers, irrigation, weeding, harvesting and storage; nitrogen fixation, nitrogen cycle.</p> <p>Micro organisms – useful and harmful.</p>	<p>Interaction and discussion with local men and women farmers about farming and farm practices; visit to cold storage, go-downs; visit to any farm/nursery/garden.</p> <p>Microscope, kit materials; information about techniques of food preservation.</p>	<p>(Periods - 22)</p> <p>Preparing herbarium specimens of some crop plants; collection of some seeds etc; preparing a table/chart on different irrigation practices and sources of water in different parts of India; looking at roots of any legume crop for nodules, hand section of nodules.</p> <p>Making a lens with a bulb; Observation of drop of water, curd, other sources, bread mould, orange mould under the microscope; experiment showing fermentation of dough – increase in volume (using yeast) – collect gas in balloon, test in lime water.</p>
<p>2. Materials</p> <p>Materials in daily life</p> <p>Are some of our clothes synthetic? How are they made? Where do the raw materials come from?</p> <p>Do we use other materials that are synthetic?</p> <p>Do we use cloth (fabric) for purposes other than making clothes to wear? What kind of fabric do we see around us? What are they used for?</p> <p>Different kinds of materials and their reactions.</p> <p>Can a wire be drawn out of wood?</p> <p>Do copper or aluminium also rust like iron?</p> <p>What is the black material inside a pencil?</p> <p>Why are electrical wires made of aluminium or copper?</p> <p>How things change/react with one another</p> <p>What happens to the wax when a candle is burnt? Is it possible to get this wax back?</p>	<p>Synthetic clothing materials.</p> <p>Other synthetic materials, especially plastics; usefulness of plastics and problems associated with their excessive use.</p> <p>There are a variety of fibrous materials in use. A material is chosen based on desired property.</p> <p>Metals and non-metals.</p> <p>Combustion, flame.</p>	<p>Sharing of prior knowledge, source materials on petroleum products.</p> <p>Collection of material from neighbourhood or should be part of the kit.</p> <p>Kit items.</p> <p>"The Chemical History of a Candle", by M. Faraday, 1860.</p>	<p>(Periods - 26)</p> <p>Survey on use of synthetic materials.</p> <p>Discussion.</p> <p>Testing various materials – for action of water, reaction on heating, effect of flame, electrical conductivity, thermal conductivity, tensile strength.</p> <p>Simple observations relating to physical properties of metals and non-metals, displacement reactions, experiments involving reactions with acids and bases.</p> <p>Introduction of word equations.</p> <p>Experiments with candles.</p>

Questions	Key Concepts	Resources	Activity/ Processes
<p>What happens to kerosene/natural gas when it is burnt?</p> <p>Which fuel is the best? Why?</p>	<p>All fuels release heat on burning. Fuels differ in efficiency, cost etc. Natural resources are limited. Burning of fuels leads to harmful by products.</p>	<p>Collecting information from home and other sources.</p>	<p>Collecting information. Discussions involving whole class.</p>
<p>3. The World of the Living</p> <p>Why conserve</p> <p>What are reserve forests/sanctuaries etc? How do we keep track of our plants and animals? How do we know that some species are in danger of disappearing? What would happen if you continuously cut trees?</p>	<p>Conservation of biodiversity / wild life/ plants; zoos, sanctuaries, forest reserves etc. flora, fauna endangered species, red data book; endemic species, migration.</p>	<p>Films on wild life, TV programmes, visit to zoo / forest area / sanctuaries etc.; case study with information on dis-appearing tigers; data on endemic and endangered species from MEF, Govt. of India, NGOs.</p>	<p>(Periods - 44)</p> <p>Discussion on whether we find as many diverse plants/animals in a 'well kept area' like a park or cultivated land, as compared to any area left alone. Discussion on depletion of wild life, why it happens, on poaching, economics.</p>
<p>The cell</p> <p>What is the internal structure of a plant – what will we see if we look under the microscope? Which cells from our bodies can be easily seen? Are all cells similar?</p>	<p>Cell structure, plant and animal cells, use of stain to observe, cell organelles— nucleus, vacuole, chloroplast, cell membrane, cell wall.</p>	<p>Microscope, onion peels, epidermal peels of any leaves, petals etc, buccal cavity cells, Spirogyra; permanent slides of animal cells.</p>	<p>Use of a microscope, preparation of a slide, observation of onion peel and cheek cells, other cells from plants e.g. Hydrilla leaf, permanent slides showing different cells, tissues, blood smear; observation of T.S. stem to see tissues; observing diverse types of cells from plants and animals (some permanent slides).</p>
<p>How babies are formed</p> <p>How do babies develop inside the mother? Why does our body change when we reach our teens? How is the sex of the child determined? Who looks after the babies in your homes? Do all animals give birth to young ones?</p>	<p>Sexual reproduction and endocrine system in animals, secondary sexual characters, reproductive health; internal and external fertilisation.</p>	<p>Counsellors, films, lectures.</p>	<p>Discussion with counsellors on secondary sexual characters, on how sex of the child is determined, safe sex, reproductive health; observation on eggs, young ones, life cycles.</p>
<p>4. Moving things, People and Ideas</p> <p>Idea of force</p> <p>What happens when we push or pull anything? How can we change the speed, direction of a moving object?</p> <p>How can we shape the shape of an object?</p>	<p>Idea of force-push or pull; change in speed, direction of moving objects and shape of objects by applying force; contact and non-contact forces.</p>	<p>Daily-life experience, kit items.</p>	<p>Observing and analysing the relation between force and motion in a variety of daily-life situations.</p> <p>Demonstrating change in speed of a moving object, its direction of motion and shape by applying force. Measuring the weight of an object, as a force (pull) by the earth using a spring balance.</p>



Questions	Key Concepts	Resources	Activity/ Processes
Friction What makes a ball rolling on the ground slow down?	Friction – factors affecting friction, sliding and rolling friction, moving; advantages and disadvantages of friction for the movement of automobiles, airplanes and boats/ships; increasing and reducing friction.	Various rough and smooth surfaces, ball bearings.	Demonstrating friction between rough/smooth surfaces of moving objects in contact, and wear and tear of moving objects by rubbing (eraser on paper, card board, sand paper). Activities on static, sliding and rolling friction. Studying ball bearings. Discussion on other methods of reducing friction and ways of increasing friction.
Pressure Why are needles made pointed? Why does a balloon burst if too much air is blown into it? Why does an inverted glass/ bottle/pitcher resist being pushed down into water? How can air/liquids exert pressure?	Idea of pressure; pressure exerted by air/liquid; atmospheric pressure.	Daily-life experiences; Experimentation-improvised manometer and improvised pressure detector.	Observing the dependence of pressure exerted by a force on surface area of an object. Demonstrating that air exerts pressure in a variety of situations. Demonstrating that liquids exert pressure. Designing an improvised manometer and measuring pressure exerted by liquids. Designing improvised pressure detector and demonstrating increase in pressure exerted by a liquid at greater depths.
Sound How do we communicate through sound? How is sound produced? What characterises different sounds?	Various types of sound; sources of sound; vibration as a cause of sound; frequency; medium for propagation of sound; idea of noise as unpleasant and unwanted sound and need to minimise noise.	Daily-life experiences; kit items; musical instruments.	Demonstrating and distinguishing different types (loud and feeble, pleasant/ musical and unpleasant/ noise, audible and inaudible) of sound. Producing different types of sounds, using the same source. Making a 'Jal Tarang'. Demonstrating that vibration is the cause of sound. Designing a toy telephone. Identifying various sources of noise. (unpleasant and unwanted sound) in the locality and thinking of measures to minimise noise and its hazards (noise-pollution).
5. How Things Work Electric current and circuits Why do we get a shock when we touch an electric appliance with wet hands?	Water conducts electricity depending on presence/ absence of salt in it. Other liquids may or may not conduct electricity.	Rubber cap, pins, water, bulb or LED, cells, various liquids.	(Periods - 14) Activity to study whether current flows through various liquid samples (tap water, salt solution, lemon juice, kerosene, distilled water if available). 

Questions	Key Concepts	Resources	Activity/ Processes
What happens to a conducting solution when electric current flows through it?	Chemical effects of current.	Carbon rods, beaker, water, bulb, battery.	Emission of gases from salt solution. Deposition of Cu from copper sulphate solution. Electric pen using KI and starch solution.
How can we coat an object with a layer of metal?	Basic idea of electroplating.	Improvised electrolytical cell, CuSO_4	Simple experiment to show electroplating.
6. Natural Phenomena Rain, thunder and lightning What is lightning? What safety measures should we take against lightning strikes?	Clouds carry electric charge. Positive and negative charges, attraction and repulsion. Principle of lightning conductor.	Articles on clouds and lightning; kit items.	(Periods - 26) Discussion on sparks. Experiments with comb and paper to show positive and negative charge. Discussion on lightning conductor.
Light What are the differences between the images formed on a new utensil and an old one? Why is there this difference? When you see your image in the mirror it appears as if the left is on the right—why? Why don't we see images on all surfaces around us? What makes things visible? How do we see images of our back in a mirror? Why do we sometimes see colours on oil films on water? What is inside our eye that enables us to see? Why are some people unable to see?	Laws of reflection. Characteristics of image formed with a plane mirror. Regular and diffused reflection. Reflection of light from an object to the eye. Multiple reflection. Dispersion of light.] Structure of the eye. Lens becomes opaque, light not reaching the eye. Visually challenged use other senses to make sense of the world around. Alternative technology available. Role of nutrition in relation to blindness	Mirror, source of light, ray source (mirror covered with black paper with a thin slit). Plane glass, candle, scale. Experience. Mirrors and objects to be seen. Plane mirror, water. Model or chart of the human eye. Experiences of children; case histories. Samples of Braille sheets.	Exploring laws of reflection using ray source and another mirror. Locating the reflected image using glass sheet and candles. Discussion with various examples. Activity of observing an object through an object through a straight and bent tube; and discussion. Observing multiple images formed by mirrors placed at angles to each other. Making a kaleidoscope. Observing spectrum obtained on a white sheet of paper/wall using a plane mirror inclined on a water surface at an angle of 45° . Observing reaction of pupil to a shining torch. Demonstration of blind spot. Description of case histories of visually challenged people who have been doing well in their studies and careers. Activities with Braille sheet.

Questions	Key Concepts	Resources	Activity/ Processes
Night sky What do we see in the sky at night? How can we identify stars and planets?	Idea about heavenly bodies/ celestial objects and their classification—moon, planets, stars, constellations. Motion of celestial objects in space; the solar system.	Observation of motion of objects in the sky during the day and at night; models, charts, role-play and games, planetarium.	Observing and identifying the objects moving in the sky during the day and at night. Observing and identifying some prominent stars and constellations. Observing and identifying some prominent planets, visible to the naked eye, (Venus, Mars, Jupiter) in the night sky and their movement. Design and preparing models and charts of the solar system, constellations, etc. Roleplay and games for understanding movement of planets, stars etc.
Earthquakes What happens during an earthquake? What can we do to minimise its effects?	Phenomena related to earthquakes.	Earthquake data; visit to seismographic centre.	Looking at structures/ large objects and guessing what will happen to them in the event of an earthquake; activities to explore stable and unstable structures.
7. Natural Resources Man's intervention in phenomena of nature What do we do with wood? What if we had no wood? What will happen if we go on cutting trees/grass without limit? What do we do with coal and petroleum? Can we create coal and petroleum artificially?	Consequences of deforestation: scarcity of products for humans and other living beings, change in physical properties of soil, reduced rainfall. Reforestation; recycling of paper. Formation of coal and petroleum in nature. (fossil fuels?). Consequences of over extraction of coal and petroleum.	Data and narratives on deforestation and on movements to protect forests. Background materials, charts etc.	Narration and discussions. Project- Recycling of paper. Discussion.
Pollution of air and water What are the various activities by human beings that make air impure? Does clear, transparent water indicate purity?	Water and air are increasingly getting polluted and therefore become scarce for use. Biological and chemical contamination of water; effect of impure water on soil and living beings; effect of soil containing excess of fertilizers and insecticides on water resources. Potable water.	Description of some specific examples of extremely polluted rivers.	Case study and discussion. Purification of water by physical and chemical methods including using sunlight. Discussion on other methods of water purification.

Sample Question Paper

Summative Assessment - I

Science

Class - VIII

Time : 2 : 30 Hrs.]

[M. M. 60

General Instructions :

1. Questions **1-6** carry **1** mark each.
 2. Questions **7-12** carry **2** marks each.
 3. Questions **13-16** carry **3** marks each.
 4. Questions **17-18** carry **5** marks each.
-

1. Name two Kharif crops.
2. What are natural resources ?
3. Which micro-organism is used for the production of alcohol through fermentation ?
4. What are the conditions essential for combustion ?
5. Name a synthetic fibre that resembles silk.
6. What is the nature of oxides of non metals ?
7. Give two examples to show that plastics are corrosive in nature.
8. Why sodium and potassium are stored in kerosene ?
9. Explain how petroleum is formed.
10. How deforestation leads to desertification ?
11. What are the three zones of a flame? Draw a labeled diagram of a candle flame.
12. Write the functions of mitochondria and chromosomes in a cell.
13. List the agricultural practices in sequence.
14. Why petroleum is called as "black gold" ?

Or

Differentiate between manures and fertilisers.

15. Draw a diagram of plant cell and label any six cell organelles. What is the function of nucleus in a cell ?

Or

What are antibiotics ? Name two antibiotics. Why antibiotics not effective against cold and flu ?

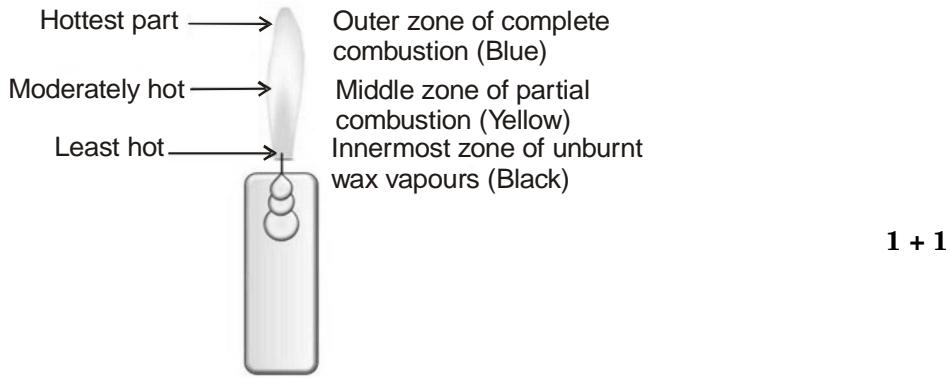
16. Why conservation of forests and wildlife sanctuary is necessary ?
17. Give five characteristics of plastics.
18. What is irrigation ? Explain any two methods of irrigation used in India.

Or

Explain different methods used for food preservation.

SOLUTIONS

1. Paddy and maize. $\frac{1}{2} + \frac{1}{2}$
2. The resources which we obtain from nature are called natural resources. Eg. sunlight, air etc. 1
3. Yeast. 1
4. Conditions necessary for combustion are:
 - (a) Presence of oxygen.
 - (b) Ignition temperature. $\frac{1}{2} + \frac{1}{2}$
5. Rayon. 1
6. Non-metals form acidic oxide. 1
7. Plastics do not react with water and air. They do not corrode easily. For example :
 - (a) Special plastic cookware is used in microwave ovens for cooking food. The heat does not affect the plastic vessel.
 - (b) Teflon is a special plastic on which oil and water do not stick. It is used for non-stick coating on cookwares. $1 + 1$
8. Sodium and potassium are kept in kerosene because they are highly reactive metals and reacts with air and water. 2
9. (a) Petroleum is formed from the organisms living in the sea.
- (b) As these organisms died, their bodies settled at the bottom of sea and got covered with layers of sand and clay.
- (c) Over millions of years ago, high temperature, pressure and absence of air transform these organisms into petroleum.
- (d) Natural gas is also formed along with it. $\frac{1}{2} \times 4$
10. (a) Deforestation changes the soil properties which also result in soil erosion. Removal of the top layer of the soil exposes the lower, hard and rocky layers.
- (b) This soil has less humus and is less fertile. Gradually the fertile land gets converted into deserts. $1 + 1$
11. The three zones of a flame are dark zone, luminous zone and non-luminous zone.



12. (a) Mitochondria provide the energy to the cell for carrying out various activities.
- (b) Chromosomes transfer the characters from parents to the next generation. $1 + 1$
13. Agricultural practices are :
 - (a) Preparation of soil
 - (b) Sowing
 - (c) Adding manures and fertilizers.
 - (d) Irrigation
 - (e) Protection from insects and pests
 - (f) Harvesting and storage $\frac{1}{2} \times 6$
14. Petroleum is a black oily liquid. Its fractional distillation yields a range of combustible fuels, petrochemicals, and lubricants. These petrochemicals are used in the manufacture of detergents, fibers (polyester, nylon, acrylic etc.), polythene and other man-made plastics.

Also, hydrogen gas obtained from natural gas, is used in the production of fertilisers (urea). Hence, petroleum is called 'black gold' due to its great commercial importance and appearance.

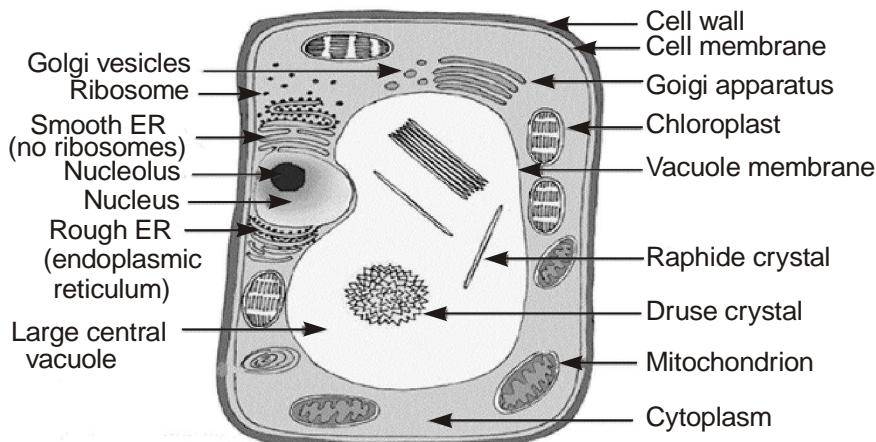
3

Or

Fertilizers	Manures
<ol style="list-style-type: none"> 1. Fertilizers can be organic (composed of organic matter), or inorganic (made of simple, inorganic chemicals or minerals). 2. A fertilizer is prepared in factories. 3. A fertilizer does not provide humus to the soil. 4. Fertilizers are very rich in plant nutrients like nitrogen, phosphorus and potassium. 5. Fertilizers are compounds given to plants to promote growth. 	<p>Manure is a natural substance obtained by the decomposition of cattle dung, human waste and plant residues.</p> <p>As it is naturally obtained so it can prepare in fields.</p> <p>Manure provides a lot of humus to the soil.</p> <p>Manure is less rich in plant nutrient in comparison to fertilizers.</p> <p>Manures enhances the water holding capacity of the soil and improves the texture of soil.</p>

3

15.



Nucleus : It is the control centre of the activities of the cell.

2 + 1

Or

The medicines that kill or stop the growth of disease-causing micro-organisms are called antibiotics such as penicillin, streptomycin, tetracycline, erythromycin, etc.

Antibiotics are not effective against cold and flu because these diseases are caused by virus.

1 + 1 + 1

16. Conservation of forests and wildlife sanctuary is necessary because they:

- (a) Balance the biosphere and biological diversity.
- (b) Control soil erosion and landslides.
- (c) Arrest rain torrents and maintain soil solubility.

1 × 3

17. Characteristics of plastics:

- (1) They are non-reactive.
- (2) They are light, strong and durable.
- (3) They are poor conductors of heat and electricity.
- (4) They are non-corrosive.
- (5) It can be used to make variety of objects including packing materials, utensils, medical instruments etc.

1 × 5**18. Irrigation** is an agricultural practice that involves providing water to crops through pipes, ditches, or streams and helps in germination of seeds and important for proper growth and development of flowers, fruits and seeds of plants

- (a) Traditionally we use different methods for lifted up the water from canal, lakes and wells. Some traditional ways are moat, chain pump, dekhli and rahat.
- (b) Modern methods we are use for irrigation are economical to use.

The various methods are :

- (i) *Sprinkler system* : Sprinkler Irrigation is a method of applying irrigation water, which is similar to rainfall. Water is distributed through a system of pipes usually by pumping.
- (ii) *Drip system* : It minimizes the use of water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters.

1 + 2 + 2***Or***

- (a) *Preservation by salt* : Common salt is used to preserve meat and fish, as it checks the growth of bacteria. Salting is also used to preserve amla, raw mangoes, tamarind, etc.
- (b) *Preservation by sugar* : Sugar is used as preservative as it reduces the moisture and inhibit the growth of bacteria. Mainly jams, jellies, squashes are preserved with the help of sugar.
- (c) *Preservation by oil and vinegar* : Oil and vinegar are used as a preservative for fruits, vegetables, pickles, fish, meat, etc. as it prevents their spoilage because bacteria cannot live in such an environment.
- (d) *Preservation by deep freezing* : It is the direct method for the prevention of bacterial growth. In this method, the food materials are cooled below 00C. Fruits, vegetables, meat, fish etc. can be easily preserved by this method.

5

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Sample Question Paper

Summative Assessment - II

Science

Class - VIII

Time : 2 : 30 Hrs.]

[M. M. 60

General Instructions :

1. Questions **1–9** carry **1** mark each.
 2. Questions **10–15** carry **2** marks each.
 3. Questions **16–18** carry **3** marks each.
 4. Questions **19–20** carry **5** marks each.
 5. There will be no overall choice. However, there will be an internal choice in every question carrying 5 marks and one internal choice in question carrying 3 marks.
-

1. What is accommodation ?
2. What purpose does the tail serve in a sperm cell ?
3. How fluid friction can be minimized ?
4. What is Richter scale ?
5. What determines the pitch of the sound ?
6. Name any two artificial satellites of our country.
7. Draw a well labeled diagram of a human sperm.
8. Why the diet for an adolescent has to be carefully planned ? What type of diet they should have ?
9. Explain the process of an electric discharge ?
10. Define pitch. State which has a low pitch voice : A woman or a man, a lion or a bird.
11. What is the Braille system ? Who developed it ?
12. With the help of diagram, show the relative positions of prominent stars in
(a) Ursa Major and (b) Orion
13. Explain what is spring balance.
14. Explain how we can hear sound through our ears.

Or

Draw a labeled sketch of the human eye.

15. Explain the process of lightning.
16. Write any three harmful effects of polluted water ?

Or

Fill in the blanks :

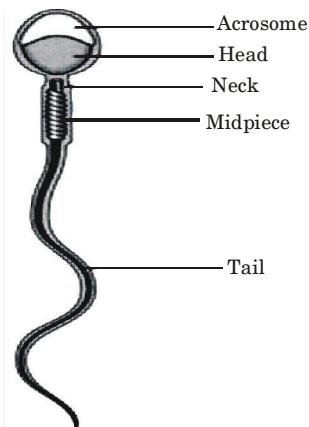
- (a) The nearest planet to the Sun is
- (b) The planet, which appears reddish in colour, is
- (c) A group of stars that appear to form a figure or picture
17. What vibrates to produce sound in the following musical instruments :

(a) A violin	(b) A piano
(c) A flying mosquito	(d) A singing lady
(e) A table	
18. How sex determination takes place in human beings ?

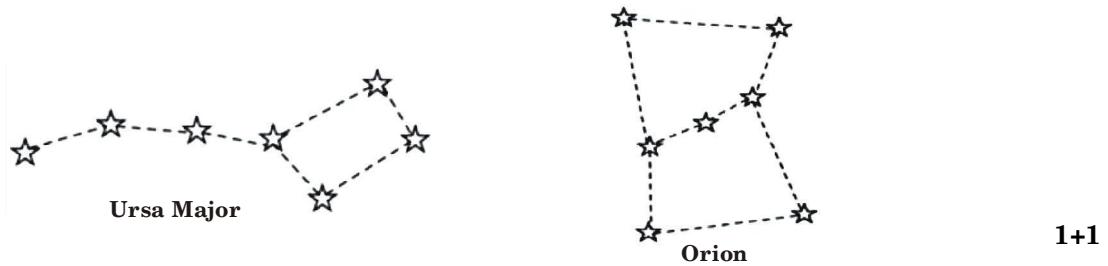
- (a) Differentiate between sexual and asexual reproduction.
 (b) List two secondary sexual changes that take place in boys.

SOLUTIONS

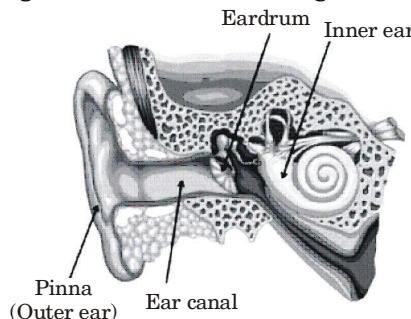
1. The process by which the focal length of the lens of the eye is changed to ensure the formation of sharp images of objects at different distances is called accommodation. 1
2. Tail helps in swimming sperm towards the egg through the vagina. 1
3. Fluid friction can be minimized by streamlining. 1
4. Richter scale is used to measure the intensity of earthquake. 1
5. Frequency. 1
6. Two artificial satellites of our country are
 (1) INSAT 3E
 EDUSAT. (2)
 $\frac{1}{2} + \frac{1}{2}$
7. Human sperm.

**Fig.****2**

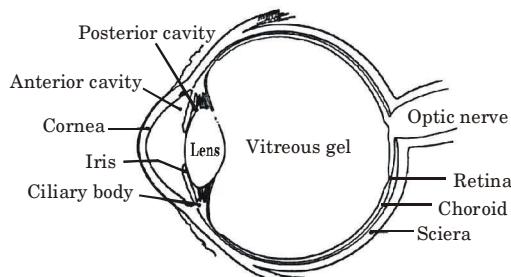
8. It is necessary to eat right kind of food during the growing years to provide proper and adequate nourishment to the body for growth and development. An adolescent should have balanced diet. 1 + 1
9. During the development of thunderstorm, air currents move in the upward direction and the water droplets move in the downward direction. These movements cause the separation of charges. Usually, the negative charges accumulate at the lower part of the clouds and the positive charges are accumulated at its upper part. The positive charges are also accumulated at the ground also. When the accumulation of charges becomes large, a high potential difference is set up between lower part of clouds and earth, which is sufficient to break the insulation of air. As a result, negative and positive charges meet, producing streaks of bright light and sound. This process is called an electric discharge. 2
10. The sensation of a frequency is commonly referred to as the pitch of a sound. A high pitch sound corresponds to a high frequency sound wave and a low pitch sound corresponds to a low frequency sound wave.
 A woman and a bird have high pitch voice. 1 + 1
11. The Braille system was developed by Louis Braille. This system was published in 1821. Braille code was developed for common languages, mathematics and scientific symbols. 1 + 1
12. (a) Prominent stars in Ursa major (b) Prominent stars in Orion

**Fig.****1+1**

13. (1) Spring balance is a device used for measuring the force acting on an object.
 (2) It consists of a coiled spring which gets stretched when a force is applied to it.
 (3) Stretching of the spring is measured by a pointer moving on a graduated scale. The reading on the scale gives the magnitude of the force.
- 1 × 3**
14. The shape of the ear's outer part is like that of a funnel. As sound goes inside the outer part of the ear, it propagates in a canal. At the end of the canal, there is a thin membrane which is stretched tightly. It is called eardrum. The eardrum is like a stretched rubber sheet. The eardrum vibrates due to the sound vibrations. Then these vibrations are sent by the eardrum to the inner ear. The signal from the inner ear goes to the brain. In this way, we hear sound.



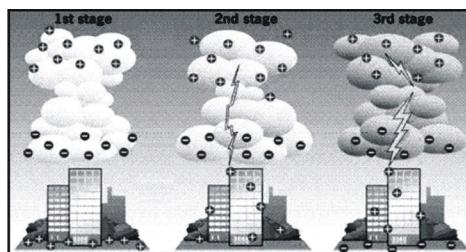
3

Fig.**Or****Diagram of Human Eye**

3

Fig.

15. During the development of thunderstorm, air currents move in the upward direction and the water droplets move in the downward direction. These movements cause the separation of charges. Usually, the negative charges accumulate at the lower part of the clouds and the positive charges are accumulated at its upper part. The positive charges are also accumulated at the ground also. When the accumulation of charges becomes large, a high potential difference is set up between lower part of clouds and earth, which is sufficient to break the insulation of air. As a result, negative and positive charges meet, producing streaks of bright light and sound. This streak of bright light is called lightning.



3

Fig.

16. Three harmful effects of polluted water are :
 (1) Polluted water causes many diseases in humans (e.g., Typhoid) and animals due to the presence of disease causing micro-organisms
 (2) The polluted water containing chemicals like lead, arsenic toxic to plants and animals

- (3) Impure water causes change in pH of soil.

1 + 1 + 1

Or

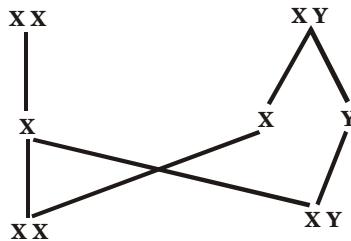
- (a) Mercury
 (b) Mars
 (c) Constellation

1 × 3

17. (a) A violin ---- The strings vibrate when played with a bow
 (b) A piano ---- Its strings are struck by hammers
 (c) A flying mosquito ---- Its wings vibrate as it flies
 (d) A singing lady ---- Her vocal cords vibrates
 (e) A table ---- The stretched skin on the top vibrates when it is struck.

1 × 5

18. The unfertilized egg always has one X-chromosome. But sperms are of two kinds. One kind has an X chromosome, and the other kind has a Y chromosome. When a sperm containing X chromosome fertilizes the egg, the zygote would have two X Chromosomes, which would develop into a female child. If the sperm contributes a Y chromosome to the egg the zygote would develop into a male child.



5

Fig.
Or

- | | |
|--|--|
| (a) Asexual reproduction <ul style="list-style-type: none"> (1) Only one individual is needed to give rise to a new individual. (2) Fertilization does not take place. (3) Occurs in amoeba, hydra, etc. | Sexual reproduction <ul style="list-style-type: none"> Two organisms one male and other female are needed to give rise to a new individual. Fertilization of gametes take place. Occurs in humans, birds, etc. |
| (b) Two secondary sexual characters of boys are :
(1) Growth of hair under arms and on face.
(2) Shoulders get broadened. | |

3 + 2

● ●

CROP PRODUCTION AND MANAGEMENT

Quick Review

- To provide food for a large population, regular production, proper management and distribution of food is necessary.
- When nomadic people settled and cultivated lands, produced rice, wheat and other crops, then agriculture was born.
- **Crop :** When plants of same kind are grown and cultivated at one place on a large scale, it is called crop.
- In India, two cropping patterns are found :
 - **Kharif crops :** Grown from June to September (Rainy Season) e.g., paddy, maize, soyabean, etc.
 - **Rabi crops :** Grown from October to March (Winter Season) e.g., gram, pea, mustard, linseed etc.
- **Agricultural implements :** Tools used for the purpose of various agricultural activities.
- Main agricultural implements are :
 - Plough
 - Hoe
 - Cultivator
 - Tools used for sowing seeds :
 - (a) **Traditional tool :** It is shaped like a funnel passed down through pipes having sharp ends, which pierce into the soil and place seeds there.
 - (b) **Seed drill :** Seed drill tools sow seeds uniformly at proper distance and depth.
- **Agricultural practices :**

General activities undertaken by the farmers over a period of time to cultivate crops are called agricultural practices. They are as follow :

 1. **Preparation of soils :**
 - It is the first step before growing a crop. Soil has to be loosened (The process of loosening and turning of the soil is called tilling or ploughing).
 - This also helps in growth of earthworms and microbes that add humus to it.
 - The ploughed field have big pieces of soil called crumbs.
 2. **Sowing :** Before sowing, good quality seeds are selected. Farmers are advised to use good, healthy and high yielding seeds.

- 3. Adding manures and fertilizers :** The substances that are added to the soil in the form of nutrients for the healthy growth of plants are called manures and fertilizers.

Manure : Is an organic substance obtained from the decomposition of plant or animal wastes.

Fertilizers : Are chemical substances which are rich in a particular nutrient. e.g., urea, ammonium sulphate, super phosphate, Potash, NPK.

4. Irrigation : The supply of water to crops at different intervals is called irrigation. Sources of irrigation are—wells, tubewells, ponds, lakes, rivers, dams and canals.

 - **Methods of irrigation.**

(A) **Traditional methods :** Water available in wells, lakes and canal is lifted up by different methods.

 - (i) Moat (Pulley system)
 - (ii) Chain pump
 - (iii) Dhekli and
 - (iv) Rahat (Lever system)

(B) **Modern methods :**

 - (i) **Sprinkler system :** Rotating nozzles sprinkle water as if it is raining. (Useful for sandy soil)
 - (ii) **Drip irrigation :** Water falls drop by drop. (Best for fruits and vegetables).

5. Protection from weeds :

 - (i) Undesirable plants that naturally grow with plants are called **weeds**.
 - (ii) Removal of weeds is called **weeding**. It can be done by different methods as follows :
 - (a) Manually (Uprooting or cutting them close to ground).
 - (b) Using weedicide, e.g., 2, 4 – D.

6. Harvesting : The cutting of crop after its maturity is called **harvesting**.
In the harvested crop, the grain seeds are separated from the chaff. This process is called **threshing** : (It is done by machine called **Combine**).

7. Storage : Before storing, grains are properly dried in the Sun to reduce the moisture in them. This prevents the attack by pests, bacteria and fungi.

 - (i) Farmers store grains in jute bags or metallic bins.
 - (ii) Large scale storage of grain is **silos** and **granaries**.

Animal husbandry : Animals, reared at home or in farms, have to be provided with proper food, shelter and care. When it is done on large scale, it is called animal husbandry.

Summative Assessment

Objective Type Questions (1 mark)

(A) Multiple Choice Questions

1. Which is not a Kharif crop ?
(a) Paddy (b) Gram
(c) Maize (d) Soya bean
 2. Sometimes, manure is added to the soil before filling because :
(a) less manure is used.
(b) it helps in proper mixing of manure with soil.
(c) save labour and time.
(d) none of above.

3. Process of separating grain seeds from the chaff is called :

(a) threshing (b) harvesting
(c) weeding (d) sowing.

4. Which of the following is not a traditional method of irrigation ?

(a) Moat (b) Chain pump
(c) Drip system (d) Rahat.

5. An agricultural implement used since ancient times for tilling the soil, adding fertilizers, removing weeds etc. is :

(a) hoe (b) combine
(c) plough (d) seed drill.

6. The use of manure (which is not correct) :
 - (a) Enhances the water-holding capacity of the soil.
 - (b) Improves soil texture.
 - (c) Increases the number of friendly microbes
 - (d) Also becomes a source of water pollution.

Ans. 1. (b) Gram.

2. (b) it helps in proper mixing of manure with soil.
3. (a) threshing.
4. (c) drip system.
5. (c) plough.
6. (d) also becomes the source of water pollution.

(B) Fill in the blanks :

1. and are the examples of Rabi crops.
2. The ploughed field may have big pieces of soil called
3. The main part of the plough is a long log of wood, which is called a
4. Now-a-days ploughing is done by
5. Seed drill sows the seeds uniformly at proper and
6. The decomposed matter is used as

7. are the chemical substances that are rich in a particular nutrient.
8. is a weedicide.
9. and are storage of grains in large scale.
10. Food is also obtained from reared animals, called

Ans. 1. Wheat, gram.

2. crumbs.
3. plough shaft.
4. tractor driver cultivator.
5. distance, depth.
6. organic manure.
7. fertilizers.
8. 2, 4-D.
9. Silos, granaries.
10. animal husbandry.

(C) Match the Columns :

1. Granaries	A. NPK
2. Kharif crop	B. 2, 4-D
3. Weedicide	C. Dhekli
4. Traditional method of Irrigation	D. Silos
5. Fertilizers.	E. Ground nut.

Ans. 1. → (D), 2. → (E), 3. → (B), 4. → (C),
5. → (A).

Very Short Answer Type Questions [1 mark]

Q. 1. Write full form of NPK.

Ans. Nitrogen, Phosphorus, Potassium.

Q. 2. What is winnowing ?

Ans. Winnowing is a process by which small farmers do the separation of grains by chaff.

Q. 3. When was agriculture born ?

Ans. When nomadic people cultivated land and produced rice, wheat and other food crops, agriculture was born.

Q. 4. What are the crops grown generally from June to September called ?

Ans. Crops grown generally from June to September are called Kharif crops. e.g., maize, groundnut, soyabean.

Q. 5. What is the first step before growing a crop ?

Ans. The first step before growing a crop is the preparation of soil.

Q. 6. What are the main tools used for agriculture practices ?

Ans. The main tools are plough, hoe and cultivator.

Q. 7. What will happen if freshly harvested grains are stored without drying ?

Ans. Grains should be properly dried to reduce the moisture and this prevents the attack by insects

pests, bacteria and fungi.

Q. 8. Where is the sprinkler water system useful ?

Ans. Sprinkle water system is useful on the uneven land and at the land where water is not available. It is good for sandy soil.

Q. 9. Why traditional irrigation methods are cheaper ?

Ans. Cattle or human labour is used in these methods so they are cheaper.

Q. 10. Name two harvest festivals celebrated in India.

Ans. Pongal, Baisakhi.

Q. 11. What is the process of loosening and turning of the soil called ?

Ans. Tilling or ploughing.

Q. 12. What is a strong triangular iron strip of plough called ?

Ans. Plough share.

Q. 13. Who increases the number of friendly microbes ?

Ans. The loosened soil.

Q. 14. The irrigation system that sprinkles water on the crops as if it is raining ?

Ans. Sprinkle water system.

Short Answer Type Questions-I [2 marks]

Q. 1. Why is the process of loosening and turning of the soil an important task in agriculture?

Ans. This allows the roots to penetrate deep into soil. The loose soil allows the roots to breathe easily deep into the soil and also helps in the growth of earthworms and microbes present in soil as they add humus to it.

Q. 2. Why is levelling of soil essential?

Ans. The field is levelled for sowing and for irrigation purposes.

Q. 3. What are the advantages of using seed drill?

Ans. Seed drill sows the seeds uniformly at proper distance and depth.

Q. 4. Why fields have to be watered regularly?

Ans. Water is essential because germination of seeds does not take place under dry

conditions.

Q. 5. How can a farmer increase the fertility of the soil?

Ans. Farmers can increase the fertility of the soil by :

- adding manure and fertilizers.

- crop rotation.

- leaving the field uncultivated in between two crops.

Q. 6. Why is weeding necessary?

Ans. Weeding is necessary since weeds compete with the crops plants for water, nutrients, space and light. They affect growth of the crop. Some weeds may be poisonous for animals and human beings.

Short Answer Type Questions-II [3 marks]

Q. 1. Differentiate between fertilizer and manure.

Ans. Differences between fertilizer and manure.

S. No.	Fertilizer	Manure
1.	A fertilizer is an inorganic salt.	Manure is a natural substance obtained by the decomposition of cattle dung, human waste and plant residues.
2.	A fertilizer is prepared in factories.	Manure can be prepared in the fields.
3.	A fertilizer does not provide any humus to the soil.	Manure provides a lot of humus to the soil.
4.	Fertilizers are very rich in plant nutrients such as nitrogen, phosphorus and potassium.	Manure is relatively less rich in plant nutrients.

Q. 2. List all the activities practiced during cultivation of crops.

Ans. The activities practiced during cultivation of crops are :

- (1) preparation of soil, (2) sowing,
- (3) adding manure and fertilizers,
- (4) Irrigation, (5) protecting from weeds,
- (6) harvesting (7) storage.

Q. 3. Explain the structure of plough.

Ans. Plough is a tool used since ancient times for tilling soil, adding manure etc. This implement is made of wood. It contains a strong triangular iron strip called ploughshare.

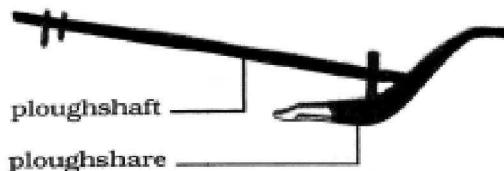


Fig. Plough

The main part of the plough is a long wood called ploughshaft. There is a handle at one end. Other end is attached to beam, placed on the bullock's neck.

Q. 4. What are the advantages of manure?

Ans. Advantages of manure :

- (i) It enhances the waterholding capacity of the soil.
- (ii) It makes the soil porous due to which exchange of gases becomes easy.
- (iii) It increases the number of friendly microbes.
- (iv) It improves the texture of the soil.

Q. 5. What are the disadvantages of fertilizers?

(Any three) $1 \times 1 = 1$

Ans. Disadvantages of using fertilizers :

- (i) They become source of water pollution.
- (ii) They make soil less fertile.
- (iii) They do not provide any humus to the soil.

Long Answer Type Questions [5 marks]

Q. 1. Discuss various systems of irrigation.

Ans. The supply of water to crops at different intervals is called irrigation.

Various systems of irrigation are :

(i) **Traditional methods** : The water available in wells, lakes and canals is lifted up by :

- (a) Moat (Pulley system);
- (b) Chain pump
- (c) Dhekli and;
- (d) Rahat (Lever system)

Pumps are commonly used for lifting water.

(ii) **Modern methods** :

(a) **Sprinkler system** : This system is more useful on uneven land. The perpendicular pipes, having rotating nozzles on top, are jointed to the main pipeline at regular intervals. When water flows through main pipes, it gets

sprinkled on the crop as if it is raining.

(2½+2½)

(b) **Drip system** : In this system water falls drop by drop just at the position of the roots. It is the best technique for watering fruit plants, garden and trees.

Q. 2. Explain the main tools used to prepare soil.

Ans. Main tools used to prepare soil are as follows :

(a) **Plough** : This implement is made of wood and is drawn by a pair of bulls or other animals. It is used for tilling the soil, adding manure, removing the weeds, scraping of soil etc.

(b) **Hoe** : It is a simple tool that is used for removing weeds and for loosening the soil.

(c) **Cultivator** : Ploughing is done by tractor-driver cultivator. It uses same labour and time.

Value Based Questions [3 marks]

Q. 1. What is the importance of using manure and fertilizers as an agricultural practice ?

Ans. Using manure and fertilizers as an agriculture practice is important as continuous growth of crops makes the soil poorer in certain nutrients. These both are added to the soil in

the form of nutrients for the healthy growth of plants. Manure replenishes the soil with nutrients and also improves water retaining capacity whereas fertilizers make soil rich in a particular nutrient. They also help farmers to get better yield of crops.

Formative Assessment

(A) Oral Questions : (Give answer in one word)

Q. 1. Plants of the same kind that are grown and cultivated at one place on a large scale.

Ans. Crops.

Q. 2. A simple tool that is used for removing weeds.

Ans. Hoe.

Q. 3. The tool that sows the seeds uniformly at proper distance and depths.

Ans. Seed drill.

Q. 4. An organic substance obtained from the decomposition of plants or animal wastes.

Ans. Manure.

Q. 5. Bacteria present in the root nodules of leguminous plants.

Ans. Rhizobium.

Q. 6. Supply of water to crops at different intervals.

Ans. Irrigation.

Q. 7. Small farmers do the separation of grain and chaff by this method.

Ans. Winnowing.

(B) Define or answer in one line (Oral).

Q. 1. What is drip system ?

Ans. Water falls drop by drop just at the position of the roots. So it is called drip system.

Q. 2. What are fertilizers ?

Ans. Fertilizers are the chemical substances that are rich in a particular nutrient.

Q. 3. What is the use of seed drill ?

Ans. Seed drill is a tool that sows the seeds uniformly at proper distances and depth.

Q. 4. What is a combine ?

Ans. Combine is a modern machine used for harvesting and threshing.

Q. 5. What is a plough ?

Ans. Plough is a tool used for tilling the soil, adding fertilizers, removing weeds, scraping soil etc.

(C) True / False

- Q. 1.** Manure are the chemical substances used to increase the fertility of the soil.
Q. 2. Water is essential because germination of seeds does not take place under dry conditions.
Q. 3. A good method for separating good, healthy seeds from the damaged ones is soaking them in water.
Q. 4. Continuous growing of crops makes the soil poorer in certain nutrients.
Q. 5. Manure reduces the water holding capacity of the soil.
Q. 6. Crops can be classified on the basis of the season in which they grow.
Q. 7. Only a few centimetres of the top layer of soil supports plant growth.
Q. 8. The ploughed field may not have any crumbs.
Q. 9. The use of cultivator does not save labour and time.
Q. 10. Fallow is to leave the field uncultivated in between two crops.

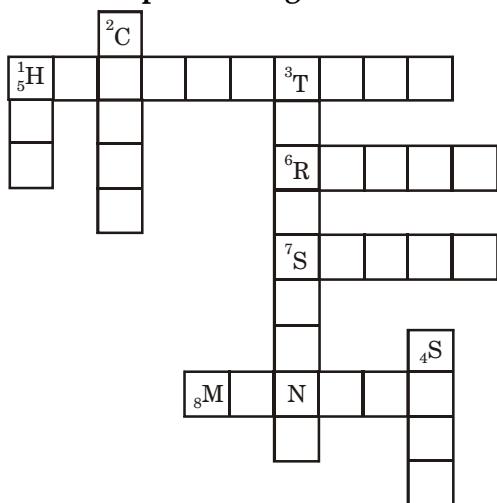
Ans. 1. False, 2. True, 3. True, 4. True, 5. False, 6. True, 7. True, 8. False, 9. False, 10. True.

(D) Quiz**Name quickly for the following :**

- Q. 1.** Two broad cropping patterns of India.
Q. 2. Two activities from agricultural practices.
Q. 3. Two important agricultural implements.
Q. 4. Two substances added to the soil in the form of nutrients.
Q. 5. Two traditional methods of irrigation.

Ans. 1. Kharif crops, Rabi crops.

2. Sowing, irrigation.
3. Plough, hoe.
4. Manure, fertilizer.
5. Moat, Rahat.

(E) Complete the crossword puzzle with the help of clues given below.**Down :**

1. A tool used for removing weeds and for loosening the soil.
2. Same kind of plants grown at one place on a large scale.
3. Grain seeds separated from the chaff.
4. Need to grow crops.

Across :

5. The cutting of crop after it is mature.
6. Traditional method of irrigation (lever system).
7. Large scale of storage of grains.
8. An organic substance used to increase fertility of soil.

Ans. Down :

1. Hoe, 2. Crops, 3. Threshing, 4. Seed.

Across :

5. Harvesting, 6. Rahat, 7. Silos, 8. Manure.

Extending learning : Activities and Projects.**Activities :**

1. Collect the pictures of new agricultural implement and paste them in a file with their names and uses.
2. Collect different types of seeds under the heading of Kharif crops and Rabi crops.

Project Work :

Visit a nearby farm or a garden nearby. Collect all the information with pictures under the following headings :

1. How soil is prepared ?
2. Method of Sowing.
3. Manure or fertilizer used.
4. Mode of irrigation.
5. Weeding.
6. Harvesting.
7. Storage.



MICRO-ORGANISMS : FRIEND AND FOE

Quick Review

- Living organisms that cannot be seen with naked eyes are called **micro-organisms**. As they can be seen with the help of **microscope**, they are also called microscopic organisms.
 - Micro-organisms are classified into four major groups. These are **Bacteria**, **Fungi**, **Protozoa** and some **Algae**.
 - Viruses are also microscopic. They reproduce only inside the cells of host organism.
 - Micro-organism may be single-celled (bacteria, some algae and protozoa) or multicellular (algae and fungi). They can survive under all types of environment.
 - **Friendly microorganisms :**
 - They are used in preparation of curd, bread and cake.
 - In cleaning up of the environment.
 - Production of alcohol.
 - Increase soil fertility (Nitrogen, fixing bacteria).
 - Bacterium "*Lactobacillus*" forms curd from milk.
 - The process of conversion of sugar into alcohol (by yeast) is known as **fermentation**.
 - **Louis Pasteur** discovered fermentation in 1857.
 - **Medicinal use of micro-organism** : These days a number of **antibiotics** are being produced from bacteria and fungi. e.g., streptomycin, tetracycline and erythromycin.
 - In 1929, **Alexander Fleming** formed **Penicillin**.
 - **Edward Jenner** discovered the vaccine for small pox in 1798.
 - Several diseases such as cholera, tuberculosis, small pox and hepatitis can be prevented by vaccination.
- Harmful micro organism :**
- Disease causing micro-organisms are called **pathogens**.
 - Microbial diseases that can spread from an infected person to a healthy person through air, water, food and physical contact are called **communicable diseases**. e.g., cholera, common cold and chicken pox.
 - There are some insects and animals that act as **carriers** of disease causing microbes. For example, female **Anopheles** mosquito that carries the parasite of **malaria**. Female **Aedes** mosquito acts as a carrier of **dengue virus**.
 - Some common human diseases caused by microbes :
 - Virus—Measles, Chicken pox, Polio, Hepatitis and Dengue.
 - Bacteria—Tuberculosis, Cholera and Typhoid.
 - Protozoa—Malaria and Dysentery.

- Micro-organisms also causes diseases in plants :
Bacteria—Citrus canker.
Fungi—Rust of Wheat.
Virus—Yellow vein mosaic of Bhindi (Okra).
 - Micro-organisms that grow on our food, may produce toxic substances causing **food poisoning**.
 - **Food Preservation**—Some chemicals such as sodium benzoate, sodium metabisulphite are used as preservatives in jams, squashes, or in pickles.
 - Common salt, oil, vinegar and sugar are also used as preservatives for meat, fish, jams, jellies, fruits, pickles etc.
 - **Heat and cold treatment**—Milk is heated at 70°C for 15–30 sec and suddenly chilled and stored. This process was discovered by **Louis Pasteur** and is called **pasteurization**.
Nitrogen Cycle—Our atmosphere has 78% Nitrogen gas. It is a part of proteins, chlorophyll, nucleic acids and vitamins.
 - The atmospheric nitrogen is taken only by certain bacteria and blue-green algae in the soil.
 - They convert it into nitrogen compounds (Proteins).
 - Animals feeding on plants get these proteins.
 - When plants and animals die, bacteria and fungi present in the soil convert the nitrogenous wastes into nitrogenous compounds to be used by plants again.
 - Certain bacteria convert some part of nitrogenous waste into N_2 gas, which goes back into the atmosphere.
 - Microbes also cause diseases in animals, such as anthrax in cattle by bacterium **bacillus anthracis** and in plants such as citrus canker in citrus fruits by a bacteria. Foot and mouth disease is caused in cattles by a virus.
 - Rust of wheat is a fungal disease in plants.
 - Yellow vein mosaic of bhindi (okra) is a viral disease in plants.
 - The carriers of disease causing microbes are called **Vectors**. For example, female Anopheles mosquito is carrier of malarial parasite (Plasmodium) and female Aedes mosquito acts as carrier of dengue virus.
 - **Vaccine** : If dead or weakened microbes for a particular disease are introduced in a healthy body, the body produces suitable antibodies. These antibodies remain in the body for a long time and protect us from disease-causing microbes. The substance that is injected in the body to trigger it to produce its own defence mechanism is called vaccine.
 - The medicines that kill or stop the growth of micro-organisms in our body are called antibiotics.
 - The unnecessary administration of antibiotics should be avoided as they may be harmful for various body organs and become less effective in future.

Summative Assessment

Objective Type Questions

(A) Multiple Choice Questions

1. Which is not classified as major group of the micro-organisms ?
(a) Bacteria (b) Fungi
(c) Protozoa (d) Plants
 2. Viruses only reproduce inside the cells of :
(a) host organism (b) only surface.
(c) plants (d) animals.
 3. Typhoid is a disease.
(a) protozoan (b) viral
(c) bacterial (d) fungi.

4. This bacterium promotes the formation of milk into curd :
(a) rhizobium (b) *lactobacillus*
(c) aedes (d) all.

5. This micro-organism used for the large scale production of alcohol, wine and acetic acid :
(a) amoeba (b) paramecium
(c) chlamydomonas (d) yeast.

6. Edward Jenner had discovered :
(a) fermentation (b) antibiotics
(c) vaccine (d) none of these.

7. The process of conversion of sugar into alcohol in the absence of oxygen is called :
 - (a) pasteurization
 - (b) vaccination
 - (c) fermentation
 - (d) decomposition
8. Nitrogen fixation is brought about by :
 - (a) blue-green algae
 - (b) bacteria
 - (c) both (a) and (b)
 - (d) none of these
9. Which is not a communicable disease ?
 - (a) Diabetes
 - (b) Chicken pox
 - (c) Tuberculosis
 - (d) Cholera
10. Which is the plant disease caused by micro-organisms ?
 - (a) Measles
 - (b) Small pox
 - (c) Citrus
 - (d) Polio.

- Ans.**
1. (d) Plants
 2. (a) host organism
 3. (c) bacterial
 4. (b) *lactobacillus*
 5. (d) yeast
 6. (c) vaccine
 7. (c) fermentation
 8. (c) both (a) and (b)
 9. (a) Diabetes
 10. (c) Citrus.

(B) True / False

1. Micro-organisms are too small and are not visible to the naked eye.
2. Viruses can reproduce anywhere.
3. Bacteria are an essential part of nitrogen cycle.
4. Nitrogen is used for the synthesis of plant proteins and other compounds.
5. Edward Jenner had discovered pasteurization.
6. Microorganisms that grow on our food sometimes produce toxic substances.
7. The carrier of dengue virus is female Anopheles.
8. The disease causing micro-organisms are called pathogens.
9. Polio drops given to children are actually a vaccine.
10. Antibiotics are only useful for human beings.

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

(C) Match the Column :

- | | |
|-------------------------|-----------------------------|
| 1. Louis Pasteur | A. Pasteurization |
| 2. <i>Lactobacillus</i> | B. Increases soil fertility |

- | | |
|-------------------------------|---------------------|
| 3. Penicillin | C. Aedes |
| 4. Alexander Fleming | D. Mould |
| 5. Biological nitrogen fixers | E. Virus fixers |
| 6. Malaria | F. Vaccine |
| 7. Edward Jenner | G. Fungi (Plants) |
| 8. Dengue | H. Fermentation |
| 9. Hepatitis A | I. Curd |
| 10. Rust of wheat | J. Penicillin |
| 11. Hot and cold treatment | K. Female Anopheles |
- Ans.** 1. → (H), 2. → (I), 3. → (D), 4. → (J), 5. → (B), 6. → (K), 7. → (F), 8. → (C), 9. → (E), 10. → (G), 11. → (A).

(D) Fill in the blanks :

1. Some and present in the soil to fix nitrogen from the atmosphere.
2. Protozoans cause serious diseases such as and
3. Milk can be pasteurized by the treatment.
4. and are the common chemical preservatives.
5. Bread left unused under moist conditions is attacked by
6. is a dangerous human and cattle disease caused by a bacterium.
7. By keeping the surroundings clean and dry, we can prevent from breeding.
8. Disease that can spread from an infected person to a healthy person is called disease.
9. A world wide campaign against has finally led to its eradication from most parts of the world.
10. Medicines that kill or stop the growth of disease causing micro-organisms are called

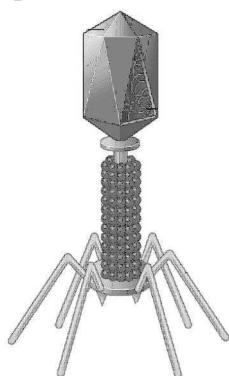
- Ans.**
1. bacteria, blue-green algae.
 2. typhoid and Tuberculosis.
 3. hot and cold.
 4. salts and edible oils.
 5. fungus.
 6. anthrax.
 7. mosquitoes.
 8. communicable.
 9. small pox.
 10. antibiotics.

Very Short Answer Type Questions [1 mark]

Q. 1. What is fermentation ?

Ans. The process of conversion of sugar into alcohol is known as fermentation.

Q. 2. Identify the organism given below. Where does it reproduce ?



Ans. Virus. It reproduces in the host cell.

Q. 3. Name two commonly known antibiotics.

Ans. Streptomycin, tetracycline.

Q. 4. Which microorganisms are able to fix nitrogen from the atmosphere ?

Ans. Some bacteria and blue-green algae are able to fix nitrogen from the atmosphere.

Q. 5. What are pathogens ?

Ans. Disease-causing micro-organisms are called pathogens.

Q. 6. Name the carrier insect that carries the parasite of malaria.

Ans. Female Anopheles mosquito carries the parasite of malaria.

Q. 7. How we can prevent mosquitoes from breeding ?

Ans. All mosquitoes breed in water. Hence, one should not let water collect anywhere, in coolers, tyres, flowerpots etc. By keeping the surroundings clean and dry we can prevent mosquitoes from breeding.

Q. 8. How sugar preserves the food substance ?

Ans. Sugar reduces the moisture content in food which inhibits the growth of bacteria to spoil food.

Q. 9. Why are dry fruits and vegetables sold in sealed air packets these days ?

Ans. These days dry fruits and even vegetables are sold in sealed air tight packets to prevent the attack of microbes.

Q. 10. How animals get proteins and other nitrogen compounds ?

Ans. Animals feeding on plants get proteins and other nitrogen compounds.

Short Answer Type Questions-I [2 marks]

Q. 1. How do some micro-organisms clean up the environment ?

Ans. Some micro-organisms decompose the organic waste and dead plants and animals into simple substance and clean up the environment.

Q. 2. What is the basis of the use of yeast in the baking industry ?

Ans. Yeast reproduces rapidly and produces carbon dioxide during respiration. Bubbles of gas fill the dough and increase its volume. This is the basis of the use of yeast in baking industry.

Q. 3. What are communicable diseases ?

Ans. Microbial diseases that can spread from an infected person to a healthy person through air, water food or physical contact, are called communicable diseases. e.g. cholera, common cold etc.

Q. 4. What are general preventive measures to protect ourselves from cholera ?

Ans. To prevent ourselves from cholera we should maintain personal hygiene and good sanitary habits.

Q. 5. How are micro-organisms useful for commercial productions ?

Ans. Micro-organisms are commercially used for the large scale production of alcohol, wine and acetic acid. Yeast is commonly used for commercial production of wine and alcohol.

Q. 6. Who discovered the first antibiotic ? Name any two antibiotics.

Ans. Alexander Fleming discovered first antibiotic penicillin. Two other common antibiotics are streptomycin and tetracycline.

Q. 7. Why are vaccines so important for children ?

Ans. By introducing vaccine in body, the body fights and kills the bacteria by producing suitable antibodies. The antibodies remain in the body and the child is protected from the disease causing microbes.

Q. 8. How common cold spreads from infected person to a healthy person ?

Ans. When a person suffering from common cold sneezes, fine droplets of moisture carrying thousands of viruses are spread in the air. The virus may enter the body of a healthy person while breathing.

Q. 9. Name one viral and one fungal disease in plants.

Ans. **Viral disease :** Yellow vein mosaic of Bhindi

(Okra).

Fungal disease : Rust of wheat.

Short Answer Type Questions-II [3 marks]

Q. 1. How housefly makes us sick ?

Ans. Housefly is a carrier of disease-causing microbes. The flies sit on the garbage and animal excreta. Pathogens stick to their bodies. When these flies sit on uncovered food they may transfer these pathogens. Whoever eats this contaminated food is likely to get sick. 3

Q. 2. Who discovered the bacterium *Bacillus anthracis* ? Which disease can be caused by it ? Is it harmful ?

Ans. Robert Koch (1876) discovered the bacterium *Bacillus anthracis*, which causes anthrax disease. It is dangerous for human and cattle both. (1+1+1=3)

Q. 3. Why are salt and edible oils also called preservatives ? Name two chemicals that are used as common preservatives.

Ans. Salt and edible oils are the common chemicals generally used to check the growth of micro-organism. Sodium benzoate and metadisulphite are common preservatives. (2+1=3)

Q. 4. Draw structure of virus and amoeba.

Ans. Virus :

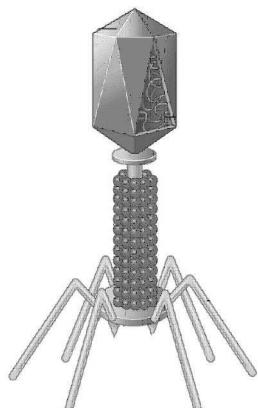


Fig. Virus

Amoeba—

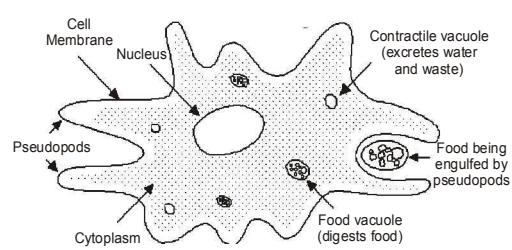


Fig. Amoeba

(1½+1½=3)

Q. 5. We often see large amount of dead organic matter in the form of decaying matter. Where do they disappear after sometime ?

Ans. The dead organic matter disappears after sometime because the micro-organisms decompose dead organic waste of plants and animals into simple substances. They are again used by other plants and animals.

Q. 6. Give preventive measures for Tuberculosis.

Ans. Tuberculosis is a bacterial disease for prevention from this diseases we should :
(i) keep the patient in complete isolation.
(ii) keep the personal belongings of the patient away from those of the other. (iii) Vaccination should be given at suitable age. (1x3=3)

Q. 7. Explain the various shapes of bacteria.

Ans. The bacteria are classified into three types on the basis of their shape :

(a) Rod shaped (Bacillus) :

Example : *Lactobacillus*

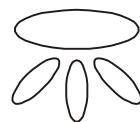


Fig. Rod shaped (Bacillus)

(b) Round shaped (Coccus) :

Example : *Streptococcus*

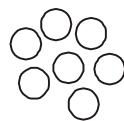


Fig. Round shaped (Coccus)

(c) Spiral shaped

Example : *Treponema*



Fig. Spiral shaped

(1x3=3)

Long Answer Type Questions [5 marks]

Q. 1. Explain and draw nitrogen cycle.

Ans. Nitrogen cycle.

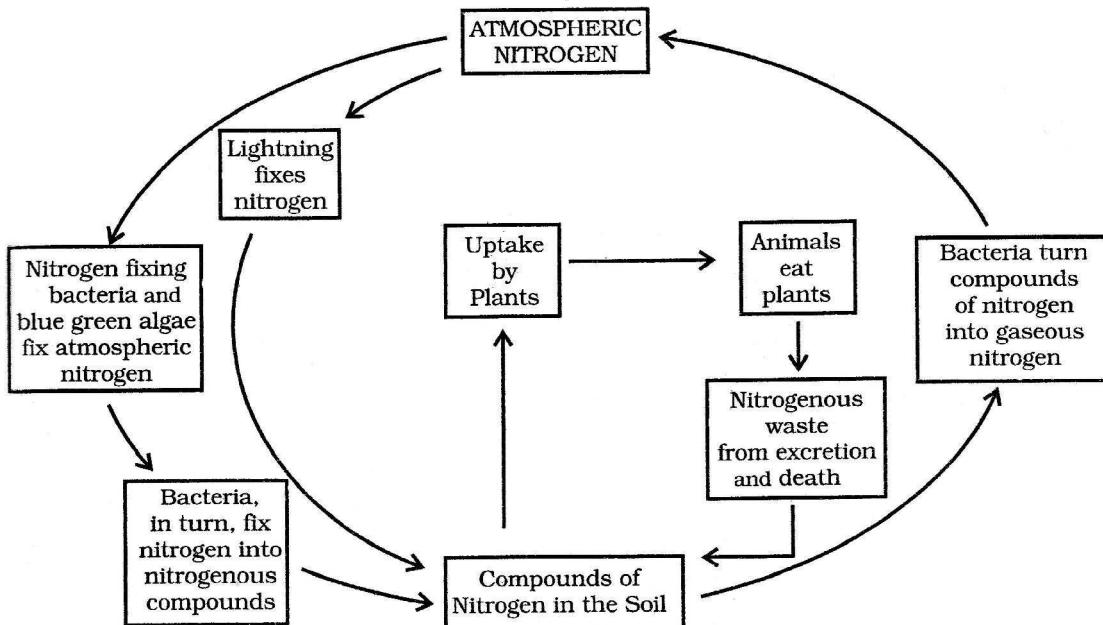


Fig. Nitrogen Cycle

- (i) Our atmosphere has 78% of nitrogen gas. Certain bacteria and blue-green algae are present in soil that fix nitrogen.
(ii) They convert it into compound of Nitrogen.
(iii) These compounds can be used by plants through soil.
(iv) Plants synthesize proteins and other compounds.
(v) Animals, feeding on plants get these.
(vi) When plants and animals die, bacteria and fungi present in the soil decompose them and again convert into nitrogenous compound.
(vii) Certain bacteria convert it into nitrogen gas, which goes back to the atmosphere.
- Q. 2. What do you understand by food preservation? Explain any four methods of food preservation.

Ans. Micro-organisms spoil our food. The process of keeping our food safe from micro-organism is called food preservation. Various methods of food preservation are :

- (i) **Drying** : It reduces the moisture of food material which prevents growth of micro-organisms.
(ii) **By common salt and sugar** : Meat and fish are covered with dry salt to check the growth of bacteria. Sugar reduces the moisture content, which inhibits the

- growth of bacteria that spoils food.
(iii) **By oil and vinegar** : Use of oil and vinegar prevents spoilage of pickles because bacteria cannot live in such an environment.
(iv) **Refrigeration and freezing** : Low temperature retards this growth. Thus, it is safe for food.
(v) **By chemicals** : Chemicals such as sodium benzoate and potassium metabisulphite are used in jams, squash and ketchup.
- (Any four) (1+4=5)

Q. 3. Write a short note on useful micro-organisms.
Or

Harmful micro-organisms.

Ans. Useful micro-organisms :

- (i) **Friendly micro-organism**—They are used for various purposes. They are used in making curd (*Lactobacillus* bacteria) and bread. They are ingredients of Idli, Dhoklas and Bhaturas.
(ii) **Commercial use**—Micro-organism are used for the large scale production of alcohol and wine. Yeast is grown on natural sugars present in grains such as barley, wheat, rice, fruit juices for this purpose.
(iii) **Medicinal use**—A very useful medicine 'antibiotics' is prepared from micro-organisms commonly-used antibiotics

- are formed by fungi and bacteria. Vaccine also protects it from microbes.
- (iv) **Increasing soil fertility**—Some bacteria and blue-green algae are able to fix nitrogen from atmosphere and form nitrogen compounds which increase the soil fertility.
- (v) **Decomposers**—They decompose the dead organic substances into their constituents and clean the environment.

(1x5=5)

*Or***Harmful micro organism**

- (i) **Pathogens**—Disease causing micro-organism is called pathogens. Diseases such as dysentery and malaria are caused by protozoa. Typhoid and tuberculosis are bacterial diseases. Virus shows common ailments such as cold, influenza and most coughs.
- (ii) **Food spoilage**—Some micro-organisms spoil food, clothing and leather. Fungus

developed in moisture on leather and some food articles and spoil them.

- Q. 4. What are antibiotics ? What precautions must be taken while taking antibiotics ?**

Ans. Antibiotics are medicines preferred during illness. The source of these medicines are micro-organisms.

Precautions while taking antibiotics are :

- They should be taken only on the advice of a qualified doctor.
- One must complete the course prescribed by the doctor.
- They should only be taken in right doses.
- Do not take these medicines when not needed or in wrong doses. It may make the drug less effective when you might need it in future.
- Antibiotics taken unnecessarily may kill the beneficial bacteria in the body.

Any four (1+4=5)

Value Based Questions [3 marks]

- Q. 1. What is the importance of immunization in eradicating diseases from a country ?**

Ans. Immunization is the development of resistance against a pathogen. It is carried out through vaccination. Regular vaccination will

eradicate diseases from a country. Such as PPIP (Pulse Polio Immunization Programme). It is the largest public health project. It was conducted for the first time in December 1995 in an attempt to eradicate polio from our country.

5

Formative Assessment**(A) Oral Questions : (Give answer in one word)**

- Q. 1.** Name the organisms that cannot be seen with naked eyes.
- Q. 2.** Name some diseases caused by protozoa.
- Q. 3.** Name two groups of micro-organisms.
- Q. 4.** Name the bacteria that converts milk into curd.
- Q. 5.** Name the process of conversion of sugar into alcohol.

Ans.

- Micro-organisms
- Dysentery
- Bacteria, fungi
- Lactobacillus*
- Fermentation

(B) Define or answer in one line (Oral).

- Q. 1.** Who discovered the vaccine ?
- Q. 2.** What are disease causing micro-organism called ?
- Q. 3.** Where are the micro-organisms found ?
- Q. 4.** Name the instruments used to see the micro-organisms.

- Q. 5.** What is the carrier of malaria causing protozoan ?

Ans. 1. Edward Jenner.
2. Pathogens.
3. Micro-organisms are found everywhere in water, soil, air, where living organism can survive.
4. Microscope is an instrument to see the microbes.
5. Female Anopheles mosquito.

(C) True / False

- Q. 1.** All living organisms are able to take the atmospheric nitrogen.
- Q. 2.** Heat and cold treatment is also called pasteurization.
- Q. 3.** Maintaining personal hygiene and good sanitary habits help us in staying away from cholera and typhoid.
- 4.** Micro-organisms such as amoeba live in colonies, while fungi and bacteria may live alone.
- 5.** Micro-organisms do not harm plants.

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

(D) Quiz :**Answer the following :**

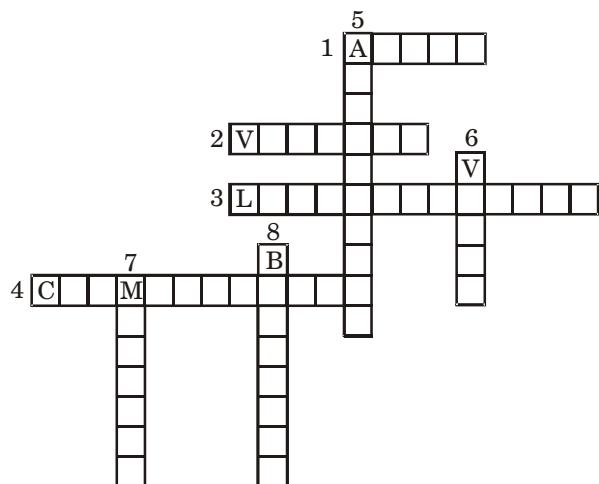
1. Two food items that can be preserved by sugar.
2. A bacteria that can absorb the atmospheric nitrogen.
3. Two diseases caused by virus.
4. A plant disease caused by fungi.
5. Who discovered fermentation ?

Ans. 1. Jams, jellies

2. Rhizobium.
3. Polio and chicken pox.
4. Rust of wheat.
5. Louis Pasteur.

(E) Complete the crossword puzzle with the help of clues given below :**Across :**

1. A group of micro-organisms.



2. Edward Jenner discovered it.

Q. 3. The bacterium that multiplies in milk and converts it into curd.

Q. 4. Microbial disease spreads from an infected person to a healthy person.

Down :

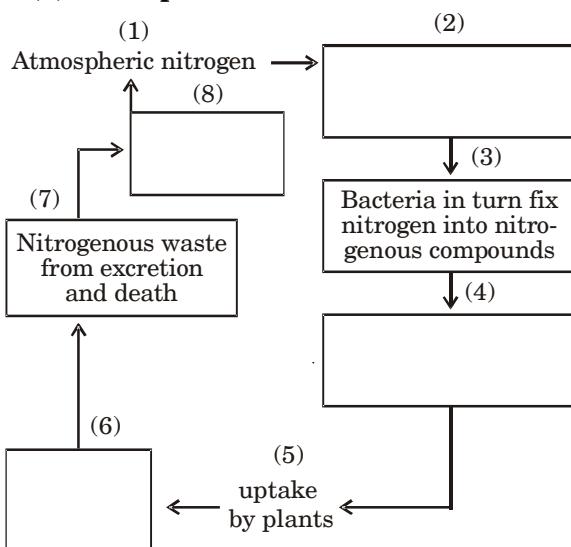
5. When a disease-carrying microbe enters into our body, the body produces it.
6. A microscopic organism that reproduces only inside the cells of the host.
7. A viral disease.
8. Citrus canker disease is caused in plants, by it.

Ans. Across :

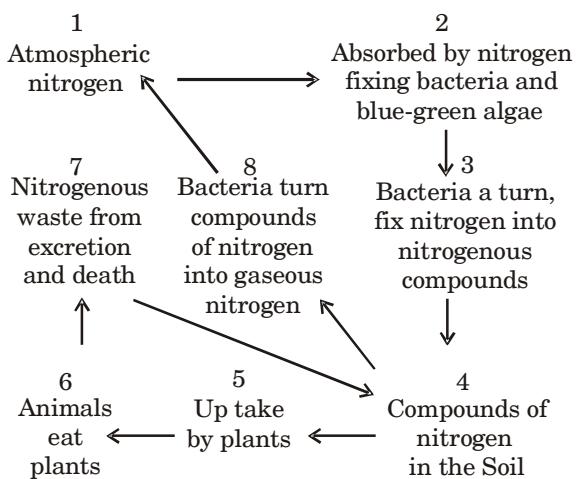
1. Algae, 2. Vaccine, 3. *Lacto-bacillus*, 4. Communicable.

Down :

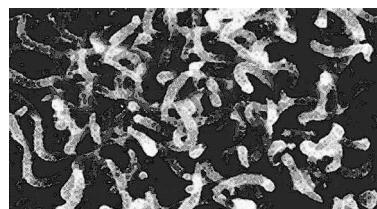
5. Antibodies, 6. Virus, 7. Measles, 8. Bacteria.

(F) Complete the flowchart :

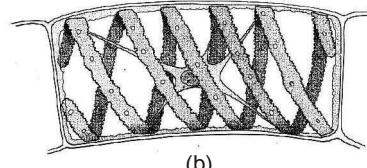
Ans.

**(G) Identify the diagrams :**

(Write the name and type of microorganism group)



(a)



(b)

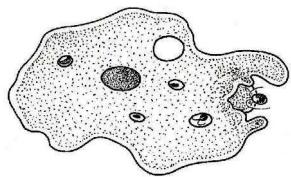


Fig. (c)

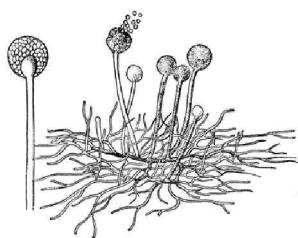


Fig. (d)

Ans. Bacteria : Spiral bacteria

Algae : Spirogyra

Protozoa : Amoeba

Fungi : Bread mould

Extending learning : Activities and Project.

Activities :

1. Collect pictures of micro-organisms from each group. Arrange and paste them on a scrap file.
2. Visit a big grocery store and enlist the different food items preserved by different preservatives.

Projects :

1. Prepare a report file on nitrogen cycle on following points :
 - Visit to a field (having crops with leguminous roots)
 - Study the soil before sowing seeds.
 - Study the soil after harvesting.
2. Prepare a report file on vaccination. (Visit to a doctor child specialist and ask for the vaccination chart).



SYNTHETIC FIBRES AND PLASTICS

Quick Review

- Fabrics are made from fibres obtained from natural or artificial sources.
- **Natural fibres**—Cotton, wool, silk etc.
Synthetic fibres—Nylon, polyester, artificial silk etc.
- A synthetic fibre is a chain of small units joined together. Each small unit is a chemical substance. Many such small units combine to form a large single unit called a **Polymer**.
- **Cellulose** is a polymer made up of large number of glucose units.
- A fibre having properties similar to silk obtained by chemical treatment of wood pulp is called **Rayon or Artificial silk**.
- **Nylon** is man-made fibre which was made without using any natural raw material and was prepared from coal, water and air. (First fully synthetic fibre).
- **Nylon** is used to make socks, ropes, tents, toothbrushes, car seat belts, sleeping bags, curtains, parachutes, etc. It is stronger than a steel wire.
- **Polyester** is another synthetic fibre made of ester units. It is wrinkle free, remains crisp and is easy to wash. Terylene and dacron are common examples.
- **PET** is a very familiar form of polyester. It is used to make bottles, utensils, films, wires and many other useful products.
- **Polyester** is actually made up of the repeating units of a chemical called an ester.
Polycot is a mixture of polyester and cotton. **Polywool** is a mixture of polyester and wool.
- **Acrylic** is a synthetic fibre used as wool. It is more durable and affordable.
- Disadvantage of synthetic fibre is that it catches fire easily, melts on heating and sticks to the body of the person wearing it.
- **Plastic** is also a polymer.
- Thermoplastics are such plastics that get deformed easily on heating, e.g., Polythene and PVC.
- Thermosetting plastics are some plastics which, when moulded once, cannot be softened by heating. e.g., Bakelite and melamine.
- Plastics are not environment friendly. They take several years to decompose, do not burn easily and release lots of poisonous fumes in the environment.
- As responsible citizens, remember the **4R principle** : Reduce, Reuse, Recycle and Recover.

Summative Assessment

Objective Type Questions

(A) Multiple Choice Questions

1. Rayon was obtained by :
 - (a) petroleum products
 - (b) fully Synthetic method
 - (c) chemical treatment of wood pulp
 - (d) all methods.
2. Which is not made from nylon ?

(a) Socks	(b) Rope
(c) Bottles	(d) Tents.
3. The strongest fibre is called :

(a) rayon	(b) nylon
(c) acrylic	(d) none of these.
4. The polyester is made up of :

(a) nylon	(b) rayon
(c) esters	(d) cotton.
5. The raw materials used in making nylon are :

(a) wood pulp	(b) cellulose
(c) coal, water, air	(d) all of these.
6. Which is an example of plastic ?

(a) Wood pulp	(b) Polythene
(c) Cotton	(d) None of these
7. Which is not a property of plastic ?

(a) Biodegradable	(b) Light
(c) Strong	(d) Durable.
8. Fireproof plastic used in the uniform of fireman is :

(a) teflon	(b) melamine
(c) bakelite	(d) all of these

- Ans.** 1. (c) Chemical treatment of wood pulp.
 2. (c) Bottles.
 3. (b) nylon.
 4. (c) esters.
 5. (c) coal, water & air.
 6. (b) Polyethene.
 7. (a) Biodegradable.
 8. (b) melamine.

(B) Fill in the blanks :

1. Cellulose is made up of a large number of
2. A fibre obtained by chemical treatment of wood pulp is called or
3. was prepared from coal, water and air.
4. Nylon thread is stronger than a

5. Rayon is mixed with cotton to make or mixed with wool to make
6. The fibers that are made by human beings, they are called or fibres.
7. is quite suitable for making dress material.
8. and are some of the examples of thermoplastics.
9. Plastic does not react with and
10. Plastic is a substance since it takes several years to decompose.

- Ans.** 1. glucose units.
 2. rayon or artificial silk.
 3. Nylon.
 4. steel wire.
 5. bedsheets / carpets.
 6. synthetic, man made.
 7. Terylene.
 8. Polythene, PVC.
 9. moisture, air.
 10. non-biodegradable.

(C) Match the Column :

- | | |
|-------------------|-----------------------------------|
| 1. Polymer | A. First fully synthetic fibre |
| 2. Rayon | B. Woolen synthetic fibre |
| 3. Nylon | C. Gets deformed easily |
| 4. Polyester | D. Non bio-degradable |
| 5. Terylene | E. Cannot be softened by heating |
| 6. Acrylic | F. Artificial silk |
| 7. Petrochemicals | G. Large single chemical unit |
| 8. Polywool | H. Fibre do not wrinkle easily |
| 9. Thermoplastic | I. Petroleum origin |
| 10. Thermosetting | J. Can be drawn into fine fibre |
| 11. Plastic bags | K. Mixture of polyester and wool. |

- Ans.** 1. → (G), 2. → (F), 3. → (A), 4. → (H),
 5. → (J), 6. → (B), 7. → (I), 8. → (K),
 9. → (C), 10. → (E), 11. → (D).

Very Short Answer Type Questions [1 mark]

Q. 1. Which is biodegradable ? Paper bag or polythene bag ?

Ans. Paper bag.

Q. 2. Define cellulose.

Ans. Cellulose is made up of a large number of glucose units.

Q. 3. What are natural fibres ?

Ans. The fibres obtained by nature are called natural fibres. e.g., cotton.

Q. 4. What are artificial fibres ?

Ans. The fibres made by human being are called artificial fibres. e.g., polyester.

Q. 5. How rayon is formed ?

Ans. Rayon is obtained by chemical treatment of wood pulp.

Q. 6. Name any two thermoplastic and thermosetting plastics.

Ans. Thermoplastic – Polyethene, PVC

Thermosetting – Melamine, Bakelite.

Q. 7. Name the material that is used to make ropes for rock climbing.

Ans. Nylon.

Q. 8. Why terylene is a popular polyester ?

Ans. Because it can be drawn into very fine fibre that can be woven like any other yarn.

Q. 9. Name the articles made from PET.

Ans. Bottles, utensils, films, wires etc.

Q. 10. What is the versatility about melamine ?

Ans. It resists fire and can tolerate heat better than plastic.

Short Answer Type Questions-I [2 marks]

Q. 1. Why is nylon fibre becoming very popular for making clothes ?

Ans. Nylon fibre is strong, elastic, light and water resistant. It is lustrous and easy to wash. Thus it is becoming very popular for making clothes.

Q. 2. Name five articles made from nylon.

Ans. Articles made from nylon are socks, ropes, tents, toothbrushes, car seat belts, sleeping bags etc.

Q. 3. Why is nylon used for making parachutes and ropes for rock climbing ?

Ans. Nylon thread is stronger than a steel wire.

Q. 4. What is polyester ?

Ans. Polyester is actually made up of the repeating units of a chemical called ester.

Q. 5. Why is acrylic more popular than natural woolen fibres ?

Ans. Polywool is available in a variety of colours, more durable and affordable which make them more popular than natural woolen fibres.

Q. 6. What are petrochemicals ?

Ans. All synthetic fibres are prepared by a number of processes using raw materials of petroleum origin, called petrochemicals.

Q. 7. Which are the unique characteristics are possessed by synthetic fibres ?

Ans. Synthetic fibres are more durable and affordable, available in a variety of colours, making them unique.

Q. 8. What is plastic ?

Ans. Plastic is a polymer like the synthetic fibre.

Q. 9. Why does plastic find such variety of uses ?

Ans. Plastic is easily mouldable, i.e., can be shaped in any form. Plastic can be recycled, reused, coloured, melted, rolled into sheets or made into wires. That is why it finds such variety of uses.

Q. 10. When we add hot water in a plastic bottle, it gets deformed. What kind of plastic is it ? Give two more examples.

Ans. It is thermoplastic. Two examples are polythene, PVC.

Short Answer Type Questions-II [3 marks]

Q. 1. What are the disadvantages of synthetic fibres ?

Ans. Disadvantages of synthetic fibres :

- It melts on heating.
- Its clothes catch fire easily.
- It melts and sticks to the body of the person wearing it, when it is heated.

Q. 2. Take two cloth pieces of the same size, one from natural fibre and another from synthetic fibre. Soak them in different mugs containing same amount of water. After five minutes spread them in the Sun. Observe and answer the following :

- How much water is soaked by both fibres ?

(b) Which fibre soaks more water ?

(c) Which fibre dries quickly ?

- Ans.** (a) Synthetic fibre will soak less water, whereas cotton cloth soaks more water.
 (b) Natural fibre
 (c) Synthetic fibre.

Q. 3. What are thermosetting plastics ? Write two examples with their characteristics ?

- Ans.** There are some plastics which when moulded once, cannot be softened by heating. These are called thermosetting plastics. e.g., bakelite and melamine.

Bakelite : It is a poor conductor of heat and light.

Melamine : It is fire resistant.

Q. 4. Why do plastic containers seem most convenient ?

- Ans.** Plastic containers seem most convenient because of their light weight, lower price, good strength and easy handling.

Q. 5. How can we say that plastic is non-reactive ?

- Ans.** When plastic is left exposed to moisture and air it is not corroded easily. So they are non-reactive.

Q. 6. Write any three positive characters of plastic.

- Ans.** Plastic is very strong, light and durable. It can be moulded into different shapes and sizes. It is used for various purposes. Plastics are

generally cheaper than metals. They are widely used in industry and for household articles.

Q. 7. What are the uses of plastic in health care industry ?

- Ans.** Plastics find extensive use in the healthcare industry. Some examples of their uses are the packaging of tablets, threads used for stitching wounds, syringes, doctor's gloves and a number of medical instruments.

Q. 8. What is teflon ?

- Ans.** Teflon is a special plastic on which oil and water do not stick. It is used for nonstick coating on cookwares.

Q. 9. Arrange the following wastes as biodegradable and non-biodegradable.

Peel of vegetables and fruits, leftover food stuff, paper, cotton cloth, wood, woollen clothes, Tin, aluminium, plastic bags.

- Ans.** **Biodegradable :** Peel of vegetables and fruits, leftover food stuff, paper, cotton cloth, wood and woollen cloth.

Non-biodegradable : Tin, aluminium, plastic bags etc.

Q. 10. What is 4R principle ?

- Ans.** The 4R principle means Reduce, Reuse, Recycle and Recover. One should develop these habits, which are environment friendly.

Long Answer Type Questions [5 marks]

Q. 1. Plastic is not environment friendly. Explain.

- Ans.** Plastic is a non-biodegradable substance, so it cannot be decomposed. It is creating a great problem for environment. While burning it gives lots of poisonous gases and takes a long time to degrade. This pollution is a major threat to our environment.

(i) Polyethene bags are also a big threat to our environment. They are non-biodegradable substances. When people throw peels of vegetables and left over food items in plastic bags they are eaten by animals such as cows. The plastic material chokes the respiratory system of these animals or forms a lining in their stomach and can be the cause of their death.

(ii) The polybags carelessly thrown here and there are responsible for clogging the drains. Carelessly the wrappers of chips, biscuits etc.

are thrown here and there on picnic spots and roads which all create pollution in our environment.

(iii) Plastic waste when dumped in water, causes water pollution. Aquatic animals consume these plastics and die.

Hence, the plastic is not environment friendly.

Q. 2. 'Plastic as material of choice'. Explain with suitable examples.

- Ans.** Plastic is a material of choice. It is also a polymer like the synthetic fibre. It can be used easily as follows.

(i) Plastic is easily moulded, i.e., can be shaped in any form. It can be recycled, reused, coloured, melted, rolled into sheets or made into wires.

(ii) Plastics are strong, light weight and durable. Plastic containers seem to be the most convenient. They are easy to carry.

- (iii) Plastics are non-reactive. These are not affected by chemicals, they do not corrode but melt upon heating.
- (iv) Plastics are poor conductors of heat and electricity. Hence they are widely used in electric wire coating, plastic covering, handles of screw drivers, handles of frying pans and also to form non-sticking cookwares.
- (v) Fire-proof plastics are also used in the uniform of firemen. They have coating of melamine plastic to make them flame resistant. (1x5=5)

Value Based Questions [5 marks]

Q. 1. Human actions are leading to environment problems. But, we need not feel powerless or helpless as there are many things we can do to make a difference. Keeping in view the above statement, answer the following questions :

- What are the 4R by which we can make a difference in our environment ?
- How can you contribute at your own level to save the environment ?

Ans. (a) As a responsible citizen we must remember the 4R principle. Reduce, Reuse, Recycle and Recover. Development of these habits is environment friendly. Reduce the use of

plastic as it is a non-biodegradable substance. Reuse such plastic which get deformed easily on heating and can be reshaped in any form. Recycling also reduces the cost of articles and saves resources. 2½

- (b) I can contribute at my own level to save the environment as follows :
- I will not throw plastic bags in the water bodies or on the road.
 - I will take a cotton bag or a jute bag while going for shopping.
 - I will try to minimize the use of plastic materials e.g., use a steel lunch box instead of a plastic one. 2½

Formative Assessment

(A) Oral Question : (Give answer in one word)

- What is a large single unit formed from small chemical substance called ?
- Another name of artificial silk.
- Name first fully synthetic fibre.
- Name a polyester used for making bottles, utensils, films, wires and many other useful products.
- Polywool is a mixture of what ?

Ans. 1. Polymer 2. Rayon
3. Nylon 4. PET
5. Polyester and wool.

(B) Define or answer in one line (Oral)

- What are fabrics made from ?
- How is rayon obtained ?
- Name the articles made from nylon.
- What is PET ?

Ans. 1. Fabrics are made from synthetic fibres or natural fibres.
2. Rayon is obtained by chemical treatment of wood pulp.
3. Socks, ropes, tents, toothbrushes, curtains, belts, sleeping bags, curtains etc.

4. PET is a familiar form of polyester, used for making bottles, utensils, films etc.

(C) True / False

- A synthetic fibre is a chemical substance of single unit.
- Rayon is the fully synthetic fibre.
- We should not wear synthetic clothes while cooking in the kitchen or in a laboratory.
- Synthetic fabrics soak more water than the natural fabrics.
- Plastic is easily mouldable and can be shaped in any form.
- Thermoplastics gets deformed easily on heating and can be bent easily.
- Thermosetting plastics are some plastics, which when moulded once, cannot be softened by heating.
- Plastics can be corroded easily.
- Since plastic takes several years to decompose, it is not environment friendly.
- A material that is easily decomposed by natural process is termed as biodegradable.

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

(D) Quiz**Answer the following :**

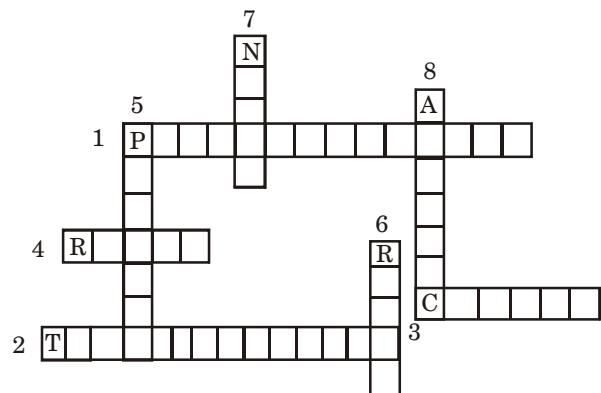
1. What material gets decomposed through natural processes ?
 2. Name the special plastic on which oil and water do not stick.
 3. Name two non-biodegradable type of wastes.
 4. Name the coating of plastic on the uniform of fireman.
 5. Name two thermoplastics used for manufacturing toys, combs and various types of containers.
- Ans.** 1. Biodegradable.
2. Teflon.
3. Plastic, teflon, tin.
4. Melamine.
5. Polythene and PVC.

(E) Complete the crossword puzzle with the help of clues given below.**Across :**

1. Synthetic fibres prepared by using raw materials of petroleum origin.
2. Plastic which can be deformed easily on heating.
3. A natural fibre Rayon/Nylon/Linkage in Synthetic fibres/Questions related.
4. Fibre obtained by chemical treatment of wood pulp.

Down :

5. Many small chemical substance units combine to form a large unit.



6. A 'R' from 4R principle .
7. The first fully synthetic fibre.
8. Wool prepared from another type of synthetic fibre.

Ans. Across Down

- | | |
|-------------------|------------|
| 1. Petrochemicals | 5. Polymer |
| 2. Thermoplastics | 6. Reuse |
| 3. Cotton | 7. Nylon |
| 4. Rayon | 8. Acrylic |

(F) Complete the following table :

Polyester = +

Polycot = +

Polywool = +

Ans. Polyester = Poly + ester.

Polycot = Polyester + cotton.

Polywool = Polyester + wool

Extending learning : Activities and Projects**Activities :**

1. Collect different types of materials and enlist them as natural fibres, synthetic fibres and subheading as acrylic, rayon, nylon, polyester.

Project :

1. Make a project report to prove that plastic is not environment friendly by following steps :
 - Take two biodegradable and two non-biodegradable (Plastic and Polythene) articles.
 - Burry them under soil.
 - Dig them again after a month.
 - What happens to them, prepare a report about their appearance, colours, shapes, etc.



MATERIALS : METALS AND Non-METALS

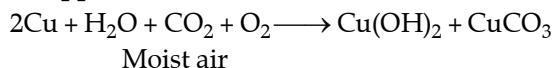
Quick Review

- There are about 110 different elements. They can be broadly grouped into metals and Non-metals.
- **Physical properties of metals :**
 - Malleability :** The property of metals by which they can be beaten into thin sheets.
 - Ductility :** The property of metal by which it can be drawn into wires is called ductility.
 - Lustre :** Metal in the pure state generally shines, the shine on the metal is called the metallic lustre.
 - Sonorous :** Metals produce ringing sounds. They are said to be sonorous.
 - Conductivity :** Metals are good conductors of heat and electricity.
 - Solid :** All metals are solid except mercury.
- **Physical properties of non-metals :**
 - Solid non-metals are soft and dull.
 - Non-metals are not sonorous, non malleable, non-ductile, non-soluble and bad conductors of heat and electricity.
- **Exceptional properties of metals :**
 - Metals such as Sodium (Na) and Potassium (K) are soft and can be cut with a knife.
 - Mercury is liquid at room temperature.
 - Lithium is the lightest metal.
 - Bromine is a non-metal.
- **Exceptional properties of non-metals :**
 - Graphite is a good conductor of electricity.
 - Iodine and diamond have good shining surfaces.
- **Chemical properties of metals :**
 - **Reaction with oxygen :** Metals except gold and silver react with oxygen to form basic oxides, e.g.,

$$2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$$
 (Magnesium) (Oxygen) (Magnesium oxide)
 - **Rusting of iron :**

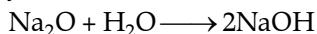
$$\text{Fe} + \text{O}_2 + \text{H}_2\text{O} \longrightarrow \text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$$
 (Iron) (Oxygen) (Water) (Iron oxide rust)

- **Dull Green Coating on Copper Vessel.**



- **Metal Oxides are basic in nature.**

Oxide of sodium formed sodium hydroxide.



- This NaOH turns red litmus paper to blue.
(As bases turn red litmus paper to blue).

- **Reaction with Water:** According to reactivity of metals, they react with water

— Sodium, potassium, calcium react with water at room temperature.

— Iron reacts with water slowly.

- **Reaction with Acids:** Acids react with metals to liberate hydrogen and salt of metal.



- **Reaction with Bases:** Metal reacts with base to produce hydrogen.

- **Displacement Reactions:** Some metals are capable of displacing other metals from their solutions.



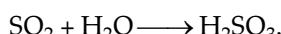
(Zinc replace copper from copper sulphate)

➤ Chemical Properties of Non-metals

- **Reaction with Oxygen:** Non-metals react with O₂ to form oxides.



Non-metallic oxides are acidic in nature.



This H₂SO₃ (Sulphurous acid) turns blue litmus paper in to red. i.e., it is acidic.

- **Reaction with Water:**

Non-metals generally do not react with water.

➤ Use of Metals.

- Metals are used in making machinery, automobiles, aeroplanes, trains, satellites, industrial gadgets, cooking utensils; water boilers and alloys etc.

➤ Uses of Non-metals :

- They are essential for life. (O₂ and CO₂)
- Used in fertilizers. (N, P)
- Used in water purification process. (Bleaching powder)
- Used as an antiseptic (Iodine solution).
- Used in Crackers.

Summative Assessment

Objective Type Questions [1 mark]

(A) Multiple Choice Questions :

1. Which is not a property of non-metal ?
 - Ductility
 - Solid state
 - Can be conductors
 - All.
2. Metals can be cut with a knife :
 - Sodium and iron

(b) Potassium and copper

(c) Copper and iron

(d) Sodium and potassium

3. Sulphurous acid turns blue litmus paper into :

(a) Blue

(b) Red

(c) Neutral

(d) No reaction

4. Sodium metal is stored in:
 - (a) Oil
 - (b) Petrol
 - (c) Kerosene
 - (d) Diesel.
 5. Some metals react with bases to produce gas :
 - (a) Oxygen
 - (b) Nitrogen
 - (c) Hydrogen
 - (d) Sulphur.
 6. Which statement is not correct for non-metals ?
 - (a) Non-metals do not react with acids
 - (b) Non-metals are not ductile
 - (c) Non-metals are not sonorous
 - (d) Non-metals can be drawn into wires.
 7. Metals are not used in making :
 - (a) Machinery
 - (b) An antiseptic
 - (c) Satellite
 - (d) Utensils.
- Ans.** 1. (a) Ductility.
2. (d) Sodium and potassium.
3. (b) Red.
4. (c) Kerosene.
5. (c) Hydrogen.
6. (d) Non-metals can be drawn into wires.
7. (b) An antiseptic.

(B) Fill in the blanks :

1. Generally metals are good conductors of and
2. Solutions of non-metallic oxides turn blue litmus paper into
3. Metals react with sodium hydroxide to produce gas.
4. Non-metal is used in
5. Non-metals are used in the purple coloured solutions that are applied on as an

6. A more reactive can replace a metal.
 7. are lustrous whereas have no lustre.
 8. On burning, metals react with oxygen to produce that are in nature.
 9. catches fire if exposed to air.
 10. are used to wrap food items.
- Ans.** 1. Heat, electricity.
2. Red.
3. Hydrogen.
4. Crackers.
5. Wounds, antiseptic
6. Metal, less reactive.
7. Metals, non-metals.
8. Metallic oxides, basic.
9. Phosphorus.
10. Aluminium foils.

(C) Match the Columns :

Column A	Column B
1. Iron	(A) non-metal
2. Sodium	(B) Metallic hydroxide
3. Phosphorus	(C) Metal
4. Calcium hydroxide	(D) Rust
5. Lustre	(E) Kerosene
6. Mercury	(F) Thermometers.

Ans. 1. → (D), 2. → (E), 3. → (A), 4. → (B),
5. → (C), 6. → (F).

Very Short Answer Type Questions [1 mark]

Q. 1. Name the property of metal by which it can be drawn into wires ?

Ans. Ductility

Q. 2. Name the materials that are not sonorous and are poor conductors of heat and electricity.

Ans. Non-metals.

Q. 3. Name the metal that is found in liquid state at room temperature.

Ans. Mercury.

Q. 4. How are metal oxides formed ?

Ans. Metals oxides are formed when metal reacts with oxygen.

Q. 5. Write two physical properties of metal.

Ans. Ductility, sonorous.

Q. 6. Why is immersion rod used for heating liquids is made of metallic substances ?
(NCERT)

Ans. It is because metallic substances are good conductors of electricity.

Q. 7. Why are sodium and potassium are stored in Kerosene ?
(NCERT)

Ans. It is because they react vigorously with oxygen and water.

Q. 8. Why copper cannot displace zinc from its salt solution ?
(NCERT)

Ans. It is because zinc is more reactive than copper.

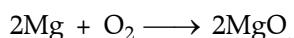
Short Answer Type Questions-I [2 marks]

Q.1. Write the chemical reaction that shows rusting of iron.

Ans. Iron (Fe) + Oxygen (O₂) + Water (H₂O)
 \longrightarrow Fe₂O₃.xH₂O
Hydrated Iron oxide
(Rust)

Q.2. What happens when magnesium ribbon is burnt in air? How will you test for its acidic / basic nature?

Ans. A white coloured ash of magnesium oxide is obtained on burning magnesium ribbon. When white ash (Magnesium oxide) is dissolved on testing, it turns red litmus paper to blue. Hence, it is basic in nature.



Q.3. Complete the following chemical reactions.

Sulphur dioxide (SO₂)

+ Water (H₂O) \longrightarrow ? Is it a acid/base?

Ans. SO₂ + H₂O \rightarrow H₂SO₃. Sulphurous acid.

It is an acid. 1+1=2

Q.4. Why is sodium stored in kerosene?

Ans. Sodium metal is very reactive. It reacts vigorously with oxygen and water. A lot of heat is generated in the reaction. It is, therefore, stored in kerosene.

Q.5. Why is phosphorus stored in water?

Ans. Phosphorus is a very reactive non-metal. It catches fire if exposed to air. To prevent contact of phosphorus with atmospheric oxygen, it is stored in water.

Q.6. Drop a piece of aluminium in freshly prepared solution of sodium hydroxide. Bring a matchstick near the mouth of test-tube. A pop sound appears.

- (i) What does this pop-up sound indicate?
- (ii) What do you conclude from this reaction?

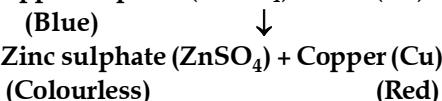
Ans. (i) This 'pop' sound indicates the presence of hydrogen gas.

(ii) We conclude that metal reacts with sodium hydroxide to produce hydrogen gas.

Q.7. Write the different uses of metals.

Ans. Metals are used in making machinery, automobiles, aeroplane, trains, satellites, industrial gadgets, cooking utensils, water boilers etc.

Q.8. Copper sulphate (CuSO₄) + Zinc (Zn)



- What is this reaction is called?
- Is it a reversible chemical reaction why? Why not?

Ans. This reaction is called displacement reaction. It is not a reversible reaction because copper is less reactive metal than zinc. It is unable to replace zinc from zinc sulphate salt.

Q.9. Why aluminium foils are used to wrap food items? (NCERT)

Ans. Aluminium can be converted into thin sheets that can be folded into any shape. Further, it is available at affordable cost.

Q.10. Write characteristics of metals.

OR

Write characteristics of non-metals.

Ans. Characteristics of Metals :

- (1) Metals can be hammered into sheets (Malleable).
- (2) Metals can be drawn into wires (ductile).
- (3) Metals give ringing sound (Sonorous).
- (4) Metals are good conductors of heat and electricity.

Or

Characteristics of non-metal :

- (1) Non-metals are brittle.
- (2) They can be broken into pieces on heating. (non-malleable, non- ductile).
- (3) Non-metals are poor conductors of heat and electricity.
- (4) They are non-soundous. (any two)

(1+1=2)

Short Answer Type Questions-II [3 marks]

Q.1. What happens when a copper vessel is exposed to moist air for long? (Write chemical reaction also.)

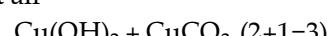
Ans. When a copper vessel is exposed to moist air for long, it acquires a dull green coating. The green material is a mixture of copper hydroxide

(Cu(OH)₂) and copper carbonate (CuCO₃).

Following is the reaction :



Moist air



Green colour

Q. 2. Write an activity to test whether sulphur solution is acidic or basic in nature.

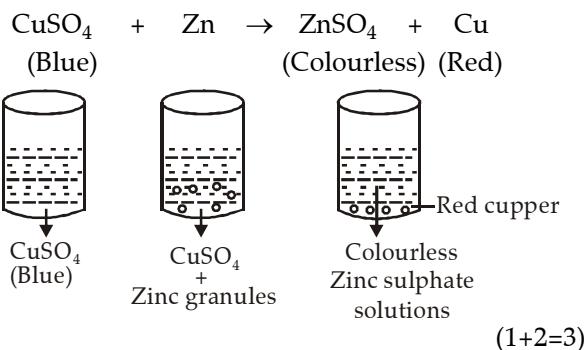
Ans. Activity to test that sulphur solution is acidic or basic in nature :

- (i) Take a small amount of powdered sulphur in a deflagrating spoon and heat it.
 - (ii) As sulphur starts burning introduce it into a gas jar.
 - (iii) Cover the gas jar so that gas produced does not escape.
 - (iv) Remove spoon after sometime, add a small quantity of water.
 - (v) Shake it well. Sulphur solution is ready.
 - (vi) Test it with red and blue litmus papers.
 - (vii) It turns blue litmus paper red. Hence it is acidic in nature.

Q. 3. What do you understand by displacement reactions ? What happens when copper sulphate reacts with zinc ? Explain this reaction also.

Ans. When a more reactive element replaces a less reactive element or molecule from its salt, such reactions are called displacement reactions.

These reactions can be well explained in metals. When in copper sulphate solution zinc granules are added, the blue colour of copper sulphate disappears and a powdery red mass of copper is deposited at the bottom of the beaker. The reaction can be represented as follows :



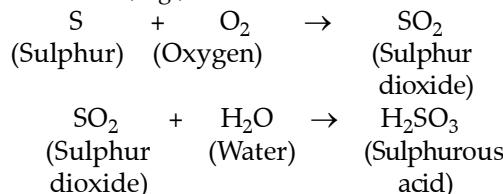
Q. 4. Write three important uses of non-metals.

Ans. Important uses of non-metals.

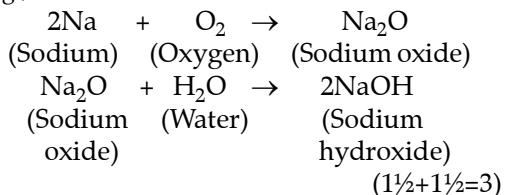
- (i) Non-metals are essential for our life as all living beings inhale Oxygen and breathe out carbon dioxide during breathing.
 - (ii) They are used in fertilizers to enhance the growth of plants.
 - (iii) Non-metal is used in the purple coloured solution that is applied on wounds as an antiseptic.
 - (iv) Non-metals are used in crackers. (2+1=3)

Q. 5. How are acids and bases formed ?

Ans. Acids—Acids are formed when non-metals react with oxygen and form non-metallic oxides. These oxides when dissolved in water, form acids, e.g.,



Bases—Bases are formed when metals react with oxygen and form metallic oxides. These oxides when dissolved in water, form bases, e.g.,



Q. 6. Discuss all the physical properties of metals.

Ans. Physical Properties of Metals :

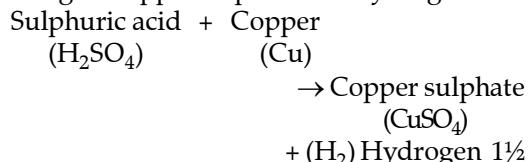
- (1) Metals are good conductors of heat and electricity.
 - (2) Metals are malleable and ductile.
 - (3) They are lustrous and can be polished.
 - (4) Generally they are solid at room temperature except mercury.
 - (5) Metals generally have high melting and boiling points. [Any Three (1x3=3)]

Q.7. What happens when : (NCERT)

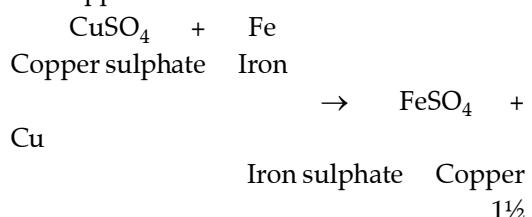
- (a) Dilute sulphuric acid is poured on a copper plate?
 - (b) Iron nails are placed in copper sulphate solution?

Write word equation of the reaction involved.

Ans. (a) When dilute sulphuric acid is poured on a copper plate, copper reacts with acid to give copper sulphate and hydrogen.



(b) When iron nails are placed in copper sulphate solution, displacement reaction takes place in which iron displaces copper.



Q. 8. Take a piece of burning charcoal and collect the gas evolved in a test-tube. (NCERT)

(a) Find the nature of gas.

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

Ans. (a) Charcoal produces carbon dioxide on burning. This gas turns lime water milky and its solution turns blue litmus to red. Hence, it is acidic.

(b) Carbon + Oxygen → Carbon dioxide.



Carbon dioxide lime water Milky solution.

Q. 9. What happens when gold jewellery is washed in acidic solution ? (NCERT)

Ans. Gold jewelleries washed in acidic solution. In this process certain amount of gold is lost in the acidic solution as some gold is

dissolved in acid to form oxide. This causes the loss of gold in the form of gold oxide.

Q. 10. (a) Why does an aluminium vessel lose its shining soon after use ?

(b) Can we store lemon pickle in an aluminium utensil ? Explain.

Ans. (a) Aluminium is a reactive metal. As it comes in contact with air, it forms a dull layer of aluminium oxide on its surface and hence loses its shine.

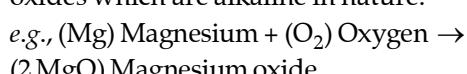
(b) No, we cannot store the lemon pickle in aluminium utensils because aluminium is a metal and lemon is acid. The acid reacts with metals to give hydrogen which would spoil the food and make it unfit to use.

Long Answer Type Questions [5 marks]

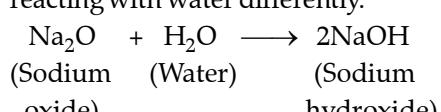
Q. 1. Discuss all the chemical properties of (a) metal and (b) non-metals.

Ans.. (a) Chemical Properties of Metals :

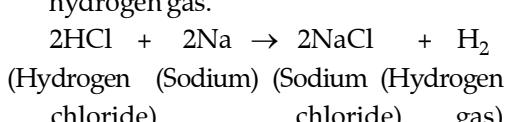
(i) Metals react with oxygen to produce oxides which are alkaline in nature.



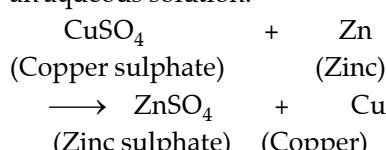
(ii) Metallic oxides produce bases by reacting with water differently.



(iii) Metals react with acid to produce hydrogen gas.

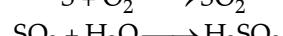
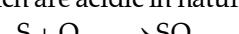


(iv) More reactive metals displace the less reactive metals from their compounds in an aqueous solution.



(b) Chemical Properties of Non-metals

(i) Non-metals react with oxygen to produce oxides which are acidic in nature.



(ii) Non-metals do not react with water.

(iii) Non-metals do not show displacement reactions.

Value Based Questions [3 marks]

Q. 1. Corrosion is a serious problem. Every year an enormous amount of money is spent to replace damaged iron. What steps can be taken to prevent this damage ?

Ans. The wasting of iron objects due to rusting causes a big loss to the country's economy, so it must be prevented by following methods :

(i) By painting : Paint is applied to the surface of an iron object, then air and moisture cannot come in contact of iron and hence no rusting or oil to prevent their rusting.

(ii) By applying grease or oil : Tools and machine parts made of iron and steel are smeared with grease or oil to prevent their rusting.

(iii) By galvanisation : Galvanisation is done by dipping an iron object in molten zinc metal. This thin layer of zinc metal on the surface of iron objects protects them from rusting.

(iv) By tin plating and chromium-plating : When a thin layer of tin metal is deposited on iron and steel objects by electroplating, then

the iron and steel objects are protected from rusting.

(v) By alloying it to make-stainless steel :
When iron is alloyed with chromium and nickel, stainless steel is obtained, which does not rust at all.

Q. 2. Mercury is the only metal found in liquid state. It is largely used in thermometers to measure the temperature. But mercury is a very dangerous metal as its density is very

high. What two precautions you would take while handling the equipments containing mercury ?

Ans. Precautions while handling the equipments containing mercury are as follows :

(i) Mercury, a liquid metal with high density, can corrode the skin if it drops over it. Hence, the vessel should be closed or tightly packed.

(ii) It should not be heated directly.

Formative Assessment

(A) Oral Questions : (Give answer in one word)

1. Name the property of metals by which they can be beaten into sheets.
2. Since metals produce ringing sounds. What are they said to be ?
3. What are the materials called which are not sonorous, non-ductile and poor conductors of heat and electricity ?
4. Name a non-metal which breaks into a powdery mass on tapping with a hammer.
5. What happens to copper when it is tapped with a hammer ?
6. Name the metals that can be cut with a knife.
7. Name the metal which is found in liquid state at room temperature.
8. What is the nature of metals with litmus paper ?
9. Name a very reactive metal.
10. Name a non-metal that conducts electricity.

Ans. 1. Malleability.

2. Sonorous.
3. Non-metals.
4. Coal.
5. Drawn into wires.
6. Sodium and potassium.
7. Mercury.
8. It turns red litmus to blue.
9. Sodium.
10. Graphite.

(B) True / False

1. When metals react with acid, they form oxygen gas.
2. Metals show displacement reaction whereas Non-metal do not show any displacement reaction.

3. Metals react with sodium hydroxide to produce hydrogen gas.

4. The Non-metallic oxides turns red litmus into blue.

5. Mercury is the only metal which is found liquid at room temperature.

6. Sulphite of iron is rust.

7. Non-metals are essential for our life.

8. Metals are not essential for our life.

9. A more reactive metal can replace a less reactive metal.

10. Reaction of non-metal with bases are complex.

Ans. (1) False, (2) True, (3) True, (4) False, (5) True, (6) False, (7) True, (8) False, (9) True, (10) True.

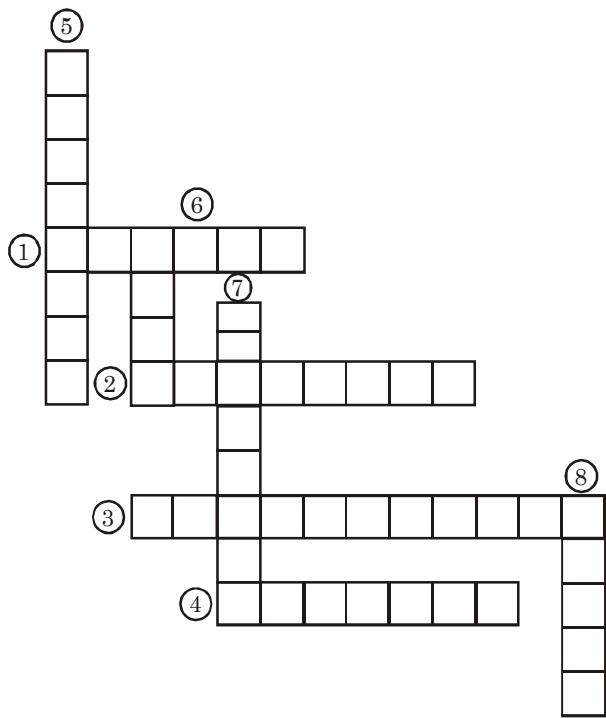
(C) Quiz

1. Name one property of metal.
2. Name the metal whose oxide forms rust.
3. Metal stored in kerosene.
4. Non-metals stored in water.
5. A structural form of coal which is a good conductor of electricity.
6. Name a metal that is more reactive than copper.
7. Metals are used to decorate sweets.
8. Name a shining Non-metal.
9. I am used for wrapping food.
10. Generally used to make electric wires.

Ans. 1. Sonorous.

2. Iron.
3. Sodium.
4. Phosphorus.
5. Graphite.
6. Zinc.
7. Silver.
8. Graphite, Iodine.
9. Aluminium.
10. Copper.

(D) Puzzle (Complete the crossword puzzle with the help of clues given below)



Across :

1. A very reactive metal.
2. They turn blue litmus paper to red.
3. A very reactive Non-metal.
4. An example of Non-metal.

Down :

5. Sodium is kept in it.
6. This metal shows rusting.
7. Property of metal, which produces ringing sounds.
8. Metals are generally found in this state.

Ans. Across :

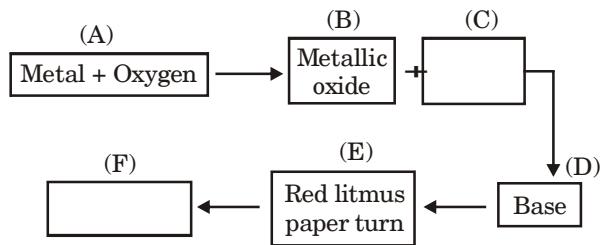
1. Sodium, 2. Non-metal, 3. Phosphorous, 4. Sulphur.

Down:

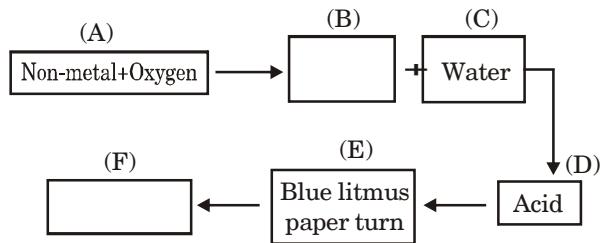
5. Kerosene, 6. Iron, 7. Sonorous, 8. Solid

(E) Complete the flowcharts :

(1)



(2)



Ans. (1) (C) Water, (F) Blue.

(2) (B) Non-metallic oxide, (F) Red.

Extending learning : Activities and projects

Activities—Take two solutions in different test-tubes. One with rust suspension and another with solution of sulphur dioxide in water. Check their nature whether they are basic / acidic with the help of litmus paper.

Projects—Make a project file on metals and non-metals according to following :

- Metals and non-metals found in India.
- Their location. (City, District, State)
- Uses.
- Mark locations on map of India.



COAL AND PETROLEUM

Quick Review

- **Natural Resources :** The various resources that are obtained from the nature are called natural resources. e.g., air, water, soil etc..
- **Inexhaustible Natural Resources :** These resources are present in unlimited quantity in nature and are not likely to be exhausted by human activity.
Example : Sunlight, Air.
- **Exhaustible Natural Resources :** The amount of these resources in nature is limited. They can be exhausted by human activities.
Example : Coal, petroleum, natural gas.
- **Fossil Fuel :** The fuel formed by the remains of dead plants and animals is called fossil fuel.
- **Coal :** It is a fossil fuel formed by the remains of forest that got buried deeply under the soil at high pressure and temperature.
- **Carbonisation :** As coal mainly contains mainly carbon, the slow process of conversion of dead vegetation into coal is called carbonisation.
- **Coke :** It is a tough, porous and black substance. It is an almost pure form of carbon.
- **Coal-tar :** It is a black and thick liquid with an unpleasant smell. It is used for manufacturing various substances such as synthetic dyes, drugs, explosives, perfumes, plastics, paints and photographic materials etc. (These days—Bitumen, a petroleum product, is used in place of coal-tar for metalling the roads.)
- **Coal Gas :** It is obtained during the processing of coal to get coke.
- **Petroleum :** It is a dark oily liquid from which many valuable substances such as petrol and diesel etc. are obtained.
- **Refining of Petroleum :** The process of separating various constituents of petroleum is known as refining. It is carried out in petroleum refinery.
- **Natural Gas :** It is a fossil fuel stored under high pressure as compressed natural gas (CNG).
- **PCRA :** The Petroleum Conservation Research Association which advises people how to save fuel while driving.

Summative Assessment

Objective Type Questions (1 mark)

(A) Multiple Choice Questions

- When coal burns in the air,
 - Carbon dioxide is formed
 - Sulphur dioxide is formed
 - Carbon monoxide is formed
 - Hydrogen gas is formed.
 - PCRA stands for :
 - Public Conservation Research Association
 - Petroleum Conservation Research Association
 - Public Council of Research Association
 - Partial Counting of Remaining Amendment.
 - Which is not an exhaustible natural resource ?
 - Sunlight
 - Petroleum
 - Natural gas
 - Wildlife.
 - A black, tough and porous substance is :
 - Coal Tar
 - Coal Gas
 - Coke
 - Diesel.
 - Which is not a constituent of petroleum ?
 - Petrol
 - Diesel
 - Sunlight
 - Bitumen.
 - The world's first oil well was drilled in :
 - USSR
 - USA
 - India
 - UK.
 - It was used for street lightning for the first time in London :
 - Coke
 - Coal-tar
 - Coal gas
 - Petrol.
 - Coal-tar contains about substances :
 - 400
 - 300
 - 100
 - 200.

Ans.

1. (a) Carbon dioxide is formed.
2. (b) Petroleum Conservation Research Association.
3. (a) Sunlight
4. (c) Coke

5. (c) Sunlight
 6. (b) USA
 7. (c) Coal gas
 8. (d) 200.

(B) Fill in the blanks :

1. Fossil fuels were formed from the remains of living organism.
 2. Fossil fuels are resources.
 3. and resources are limited.
 4. Least polluting fuel for vehicle is
 5. is a petroleum gas in liquid form.
 6. is fuel for stoves, lamps and for jet aircrafts.
 7. Ointments, candles and vaseline are
 8. Petroleum is also called
 9. Refining of petroleum is carried out in a
 10. and are obtained from a natural resource called petroleum.

Ans.

- 1. Dead
- 2. Exhaustible resource
- 3. Petrol, Diesel.
- 4. CNG
- 5. LPG
- 6. Kerosene
- 7. Paraffin wax
- 8. Black gold
- 9. Petroleum refinery
- 10. Petrol, diesel.

(C) Match the Column :

Column 'A'	Column 'B'
1. Metalling the road	(A) Natural gas
2. Candles	(B) Sunlight
3. Black gold	(C) Coal tar
4. Black, thick liquid	(D) Petroleum
5. Inexhaustible	(E) Bitumen
6. Exhaustible	(F) Paraffin wax.

Very Short Answer Type Questions (1 mark)

O. 1. What are inexhaustible natural resources ?

Ans. These resources are present in unlimited quantity in nature and are not likely to be exhausted by human activity, e.g., sunlight, air, water, etc.

O. 2. What are exhaustible natural resources ?

Ans. The amount of these resources in nature are limited. They can be exhausted by human activities. e.g., coal, petroleum, natural gas.

Q. 3. What are fossil fuels ?

Ans. Some exhaustible natural resources are formed from the dead remains of living organisms. Hence, these are all known as fossil fuels.

Q. 4. What happens when coal is heated in air ?

Ans. When coal gets heated in air, it burns and produces mainly carbon dioxide gas.

Q. 5. Name some useful products obtained from coal when it is processed in industry.

Ans. Coal is processed in industry to get some useful products such as coke, coal-tar and coal gas.

Q. 6. Write one use of coal.

Ans. Coal is also used in thermal power plants to produce electricity.

Q. 7. When was coal gas first used for street lightning in London ?

Ans. Coal gas was used for street lighting for the first time in London in 1810 and in New York around 1820.

Q. 8. Where is oil found in India ?

Ans. Oil is found in India at Assam, Gujarat, Mumbai High and in the river basins of Godavari and Krishna.

Q. 9. Why petroleum is also called black gold ?

Ans. Due to its great commercial importance, petroleum is also called 'Black Gold'.

Q. 10. What are the uses of diesel ?

Ans. Diesel is used as fuel for heavy motor vehicles, electric generators etc.

Short Answer Type Questions-I [2 marks]**Q. 1. What is carbonisation ?**

Ans. As coal contains mainly carbon, the slow process of conversion of dead vegetation into coal is called carbonization. 2

Q. 2. What is the full form of CNG and LPG ?

Ans. CNG : Compressed Natural Gas.
LPG : Liquified Petroleum Gas. (1+1=2)

Q. 3. Write different uses of coal-tar.

Ans. Coal-tar is used as starting material for manufacturing various substances used in everyday life and in industry, like synthetic dyes, drugs, explosives, perfumes, plastics, paints, photographic materials etc. 2

Q. 4. How petroleum was formed? (NCERT)

Ans. Petroleum was formed from organisms living in the sea. As these organisms die, their bodies get settled at the bottom of the sea and get covered with layers of sand and clay. Over millions of years, absence of air, high temperature and high pressure transformed the dead organisms into petroleum and natural gas. 2

Q. 5. Describe the characteristics and uses of coke. (NCERT)

Ans. Coke is a tough, porous and black substance. It is pure form of carbon, used in manufacture of steel and in the extraction of many metals. (1+1=2)

Short Answer Type Questions-II [3 marks]**Q. 1. List various constituents of petroleum and their uses.**

Ans. Various constituents of petroleum and their uses.

- (a) **LPG :** Fuel for home and industry.
- (b) **Petrol :** Motor fuel, aviation fuel, solvent for dry cleaning.
- (c) **Kerosene :** Fuel for stoves, lamps and for jet aircraft.
- (d) **Diesel :** Fuel for heavy motor vehicles and electric generators.
- (e) **Lubricating oil :** Lubrication.
- (f) **Paraffin wax :** Ointments, candles, Vaseline etc.
- (g) **Bitumen :** Paints and road surfacing.

Q. 2. What is refining of petroleum ? Give different constituents of petroleum.

Ans. Refining of Petroleum : Petroleum is a dark oily liquid. It has an unpleasant odour. It is a

mixture of various constituents such as petroleum gas, petrol, diesel, lubricating oil, paraffin wax etc. The process of separating the various constituents of petroleum is known as refining. Different constituents of petroleum are LPG, petrol, kerosene, diesel, lubricating oil, paraffin wax, bitumen etc.

Q. 3. What is natural gas ? What are the advantages of using CNG ?

Ans. Natural gas is a very important fossil fuel. It is stored under high pressure as compressed natural gas (CNG).

Advantages of CNG :

1. It is easy to transport.
2. It does not produce any pollution.
3. It burns directly for burning.
4. No residue is left after burning of CNG.
5. It burns completely in the air.

Long Answer Type Questions [5 marks]

Q. 1. What do you understand by the statement that “the known reserves of these will last only few hundred years”.

Ans. The known reserves of these will last only a few hundred years is true, as we know that coal and petroleum are fossil fuels. It requires the dead organisms millions of years to get converted into these fuels. Excessive and unjudicious uses of these fuels leads to shortage of these fuels and their use is also linked to global warming. It is therefore necessary that we use these fuels only when absolutely necessary.

Q. 2. What is PCRA. What are their tips ?

Ans. PCRA is the Petroleum Conservation Research Association. They advise people how to save petrol/diesel while driving. Their tips are :

- (i) Drive at a constant and moderate speed.
- (ii) Switch off the engines at traffic lights, or at places where you have to wait.
- (iii) Ensure correct type of pressure.
- (iv) Ensure regular maintenance of the vehicle.

(1+4=5)

Value Based Questions [3 marks]

Q. 1. In a village people burn wood and cow dung as a fuel for basic necessity. In other nearby village; they have a big biogas plant in which bio waste is used to prepare biogas. If we compare the situation of both villages, which practice you will prefer as the best and why ?

Ans. In a village people burn wood and cowdung as a fuel for basic necessity. In other near by village, they have a big biogas plant in which bio waste is used to prepare biogas. If we compare the situation of both villages, I will prefer the best practice to have biogas plant as it cleans the surroundings of bio waste. It is environment friendly, no pollutions, produce electricity and cooking gas and at last waste can be used as manure.

Q. 2. Conserving energy has become the need of the society and nature, be it in the transport, house-hold or industries. Energy

conservation has been recognized as a national issue for long time. As a responsible citizen of India, what steps would you take to conserve energy ?

Ans. Conserving energy has become need of the society and nature. As a responsible citizen of India I should follow the following steps regarding conservation of energy :

- (i) Use energy wisely.
- (ii) Practise three R's : Reduce, Recycle and Reuse
- (iii) Follow all, the instructions including Do's and Don'ts, e.g., switch off the light when is not in use. Use cycle for short distances. Avoid excess use of plastic or non bio-degradable substances etc.

Formative Assessment

(A) Oral Questions : (Give answer in one word)

1. Name two inexhaustible natural resources.
2. Name two exhaustible natural resources.
3. Fossil fuel used to cook food.
4. A tough, porous and black substance, used in manufacture of steel.
5. A substance used for metalling the road.
6. Where is natural gas found in India ?
7. Name the least polluting fuel for vehicles.
8. What is black gold ?

Ans.

1. Sunlight, air.	7. CNG.
2. Petroleum, Wildlife.	8. Petroleum.
3. Coal.	(B) True / False
4. Coke.	1. Natural gas is an inexhaustible natural resource.
5. Bitumen.	2. Coal is one of the fuels used to cook food.
6. Tripura, Rajasthan.	3. Coal is not a fossil fuel.

7. CNG.
8. Petroleum.

(B) True / False

1. Natural gas is an inexhaustible natural resource.
2. Coal is one of the fuels used to cook food.
3. Coal is not a fossil fuel.
4. Coal gas is obtained during the processing of coal to get coke.
5. Petroleum is dark oily liquid.
6. Kerosene is not a fossil fuel.
7. Coke is harder and denser than charcoal.
8. A good fuel leaves ash after burning.

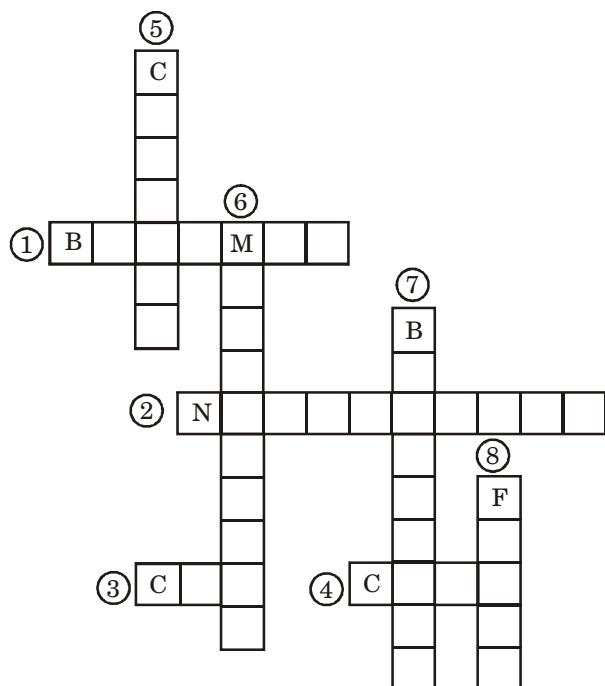
Ans.

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

(C) Quiz

1. These days, I am used in place of coal-tar for metalling the roads.
2. It is dark oily liquid.
3. From where petrol and diesel are obtained.
4. Natural gas stored under high pressure is called.
5. Fuel used for stoves, lamps and for jet air-crafts are :

Ans. 1. Bitumen
2. Black gold
3. Petroleum
4. CNG
5. Kerosene.

(D) Puzzle (Complete the crossword puzzle with the help of clues given below)**Across :**

1. A petroleum product used for metalling the roads.
2. A very important gaseous fuel.
3. Natural gas under high pressure.
4. A tough, porous and black substance.

Down :

5. A black thick liquid with an unpleasant smell.
6. In India oil is found.
7. Petroleum is also called.
8. Generally petroleum products are used as this.

Ans. Across :

1. Bitumen
2. Natural gas
3. CNG
4. Coke.

Down

5. Coal-tar
6. Mumbai high
7. Black gold
8. Fuels.

Extended Learning : Activities and Projects.

1. Make a project file by locating the places in the map of India separately where coal, petroleum and natural gas and thermal power plant are found. Also mark the places where petroleum refineries are situated. Stick their pictures also.



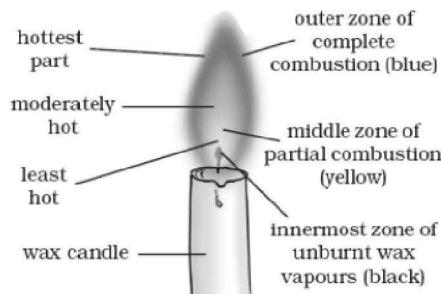
CHAPTER

6

COMBUSTION AND FLAME

Quick Review

- **Combustion :** A chemical process in which a substance reacts with oxygen to give off heat is called combustion.
- **Fuel :** The substance that undergoes combustion is said to be **Combustible**. It is also called fuel.
Fuel may be solid : Wood, Coal, Cowdung Coke etc.
Liquid : Kerosene, Petrol, Diesel.
Gas : CNG, LPG.
- **Ignition temperature :** The lowest temperature at which a substance catches fire is called its ignition temperature.
- **Inflammable substances :** The substances that have very low ignition temperature and can easily catch fire with a flame are called inflammable substances. e.g., LPG, petrol, alcohol.
- **Fire extinguishers :** A substance that disrupts the contact between the air and the fire is called fire extinguisher.
 - Fire brigade pours water on the fire. Water cools the combustible material so that its temperature is brought below its ignition temperature. This prevents the fire from spreading.
 - For fire involving electrical equipments and inflammable materials like petrol, carbon dioxide is the best extinguisher. CO₂ being heavier than oxygen, covers the fire like a blanket, and the fire is controlled.
- **Type of Combustion :**
 - (a) **Rapid Combustion :** When combustion occurs rapidly, it is called rapid combustion.
 - (b) **Spontaneous Combustion :** The type of combustion in which material suddenly bursts into flames, without the application of any apparent cause is called spontaneous combustion, e.g., Burning of Phosphorus.
 - (c) **Explosion :** When a sudden reaction takes place with the release of heat and light, and evolution of large amount of gas takes place, it is called explosion. e.g., fire crackers.
- **Flame :** A flame is a region where combustion of gaseous substance or vapour takes place.
- **Zones of Flame :**
 - (i) **Black Zone :** Inner most zone of unburnt vapours.



Different zones of Candle flame

- (ii) **Bright and Luminous Zone :** It is the middle zone, Brightness of this zone is due to the glow of unburnt carbon particles.
- (iii) **Blue Zone :** It is the outer zone of complete combustion. It is the hottest and non-luminous zone.
- **Ideal or Good Fuel :**
- Readily available
 - Cheap
 - It burns easily in air at a moderate rate.
 - It produces large amount of heat.
 - It does not leave behind any undesirable substances.
- **Calorific Value :** The amount of heat energy produced on complete combustion of 1 kg of fuel is called its calorific value. Its unit is kilojoule per kg (kJ/kg).
- **Burning of fuels leads to harmful products :**
- Carbon fuel such as like wood, coal and petroleum releases unburnt carbon particles. These fine particles are dangerous pollutants causing respiratory diseases such as asthma.
 - Incomplete combustion of these fuels give 'CO' i.e., carbon monoxide gas. It is a very poisonous gas.
 - Combustion of most fuels releases carbon dioxide in the environment, Increased concentration of carbon dioxide in the air is believed to cause **global warming**.
 - Burning of coal and diesel releases sulphur dioxide gas. These oxides dissolve in rain water and form acids. Such rain in called acid rain.

Summative Assessment

Objective Type Questions [1 mark]

(A) Multiple Choice Questions

- Which fuel is pollution free ?
 - Cow dung
 - Coal
 - LPG
 - All.
- Combustion occurs in the presence of :
 - Oxygen
 - Nitrogen
 - Carbon
 - Air.
- The substance that gives heat and light after combustion is called :
 - Flame
 - Combustion
 - Fuel
 - None of these.
- The calorific value of a fuel is expressed in a unit called :
 - Kilo joule per kg
 - Kilo joule per gram
 - Both are correct
 - Both are incorrect.
- The fine particles of unburnt carbon cause :
 - Diabetes
 - Asthma
 - Brain haemorrhage
 - All.
- Coal burns with :
 - Flame
 - Glow
 - Flame and glow
 - None of these.

- CNG and LPG are examples of :
 - Liquid fuels
 - Solid fuels
 - Gaseous fuels
 - They are not fuels.
- The Sun produces heat and light through :
 - Nuclear reaction
 - Combustion reactions
 - Oxidation reaction
 - Explosive reactions.
- This part of the flame is the hottest part of the flame :
 - Outer zone
 - Middle zone
 - Inner zone
 - All zones.
- When a wax candles burns, flame gives :
 - Wick
 - Wax vapours
 - Liquid wax
 - Solid wax.

- Ans.**
- (c) LPG.
 - (a) Oxygen.
 - (c) Fuel.
 - (a) Kilo joule per kg.
 - (b) Asthma.
 - (b) Glow.
 - (c) Gaseous fuel.
 - (a) Nuclear reactions.
 - (a) Outer zone.
 - (b) Wax vapour.

(B) Fill in the blanks :

1. Burning of wood and coal causes of air.
(NCERT)
2. A liquid fuel, used in home is
(NCERT)
3. Fuel must be heated to its before it starts burning.
(NCERT)
4. The substances which burn in air is called
.....
5. in air is essential for combustion.
6. substances have very low ignition temperature.
7. is commonly used to control fire.
8. Fuels differ in their and
9. Incomplete combustion of a fuel gives poisonous gas.
10. is the rise in temperature of the atmosphere of the earth.

Ans. 1. Pollution.
2. LPG.
3. Ignition temperature.
4. Fuel.

5. Oxygen.
6. Inflammable.
7. Water.
8. Efficiency, cost.
9. Carbon monoxide.
10. Global warming.

(C) Match the Column :

1. Acid rain	(A) Supporter of combustion
2. Deforestation	(B) Fuels
3. Explosion	(C) Match sticks
4. Rapid combustion	(D) Fire crackers
5. LPG and CNG	(E) Cutting of trees
6. Antimony trisulphide + Potassium Chlorate	(F) Oxides of sulphur and nitrogen dissolved in water
7. Oxygen	(G) Gas burns rapidly

Ans. 1. → (F), 2. → (E), 3. → (D), 4. → (G),
5. → (B), 6. → (C), 7. → (A).

Very Short Answer Type Questions [1 mark]**Q. 1. What is combustion ?**

Ans. A chemical process in which a substance burns in the presence of oxygen to release heat is called combustion.

Q. 2. Name two combustible substances.

Ans. Wood, petrol.

Q. 3. What happens when charcoal burns in the air ?

Ans. Charcoal burns in air producing carbon dioxide, heat and light.

Q. 4. Define ignition temperature.

Ans. The lowest temperature at which a substance catches fire is called its ignition temperature.

Q. 5. Name different zones of a flame.

Ans. Three zones of a flame are :

- (i) Non-luminous zone
- (ii) Luminous zone
- (iii) Dark zone.

Q. 6. What is the composition of a match-stick ?

Ans. A mixture of antimony trisulphide, potassium chlorate and white phosphorus with some glue and starch applied on the head of the match stick.

Q. 7. Define inflammable substances.

Ans. The substance that has very low ignition temperature and can easily catch fire with a flame is called inflammable substance.

Q. 8. Who helps us when a building or an area catches fire ?

Ans. Fire brigade helps to extinguish the fire in an area or a buildings.

Q. 9. Name the types of combustion.**Ans. Types of combustion :**

- (1) Rapid combustion.
- (2) Spontaneous combustion.
- (3) Explosion.

Q. 10. What is global warming ?

Ans. The rise in temperature of the atmosphere of the Earth due to increased concentration of carbon dioxide in the air is called global warming.

Q. 11. What is calorific value ?

Ans. The amount of heat energy produced on complete combustion of 1 kg of a fuel is called its calorific value.

Q. 12. How is carbon monoxide gas formed ?

Ans. Incomplete combustion of any fuel is responsible for the formation of carbon monoxide gas.

Short Answer Type Questions—I [2 marks]**Q. 1. What are the characteristics of an ideal fuel ?**

Characteristics of an ideal fuel :

- (a) It is readily available.
- (b) It is cheap.

- (c) It burns easily at moderate temperature.
- (d) It has high calorific value.
- (e) It does not leave behind any undesirable substances.
- (f) It can be easily transported.

Q. 2. Which zone of a flame does a goldsmith use for melting gold and silver and why?

(NCERT)

Ans. Goldsmiths blow the outer most zone of a flame with a metallic blow-pipe for melting gold and silver, because it is the hottest part of the flame.

Q. 3. Make a labelled diagram of a candle flame.

Ans.

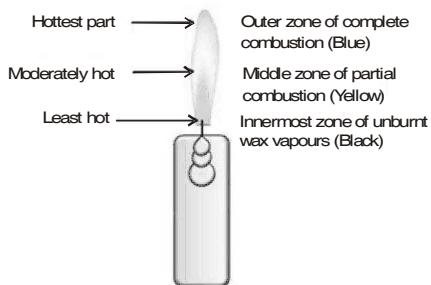


Fig. Candle Flame

Q. 4. Compare LPG and woods as fuels. (NCERT)

Ans. Distinguish between LPG and wood.

	LPG	Wood
(a)	It is a gaseous fuel.	It is a solid fuel.
(b)	It does not produce smoke.	It produces smoke.
(c)	No residue after burning.	Leaves a lot of ash on burning.
(d)	Can be transported through pipe-lines, and cylinder.	Cannot be transported easily like LPG.

($\frac{1}{2} \times 4 = 2$)

Q. 5. When the clothes of a person catch fire the person is covered with a blanket to extinguish fire. Why?

Ans. When the clothes of a person catch fire the person is covered with a blanket to extinguish fire because blanket cuts off the supply of air, that is the supporter of fire.

Q. 6. Why is it very difficult to control forest fire ?

Ans. During extreme heat in the hot summer days, at some places dry grass catches fire. It is because the heat is sufficient to attain ignition temperature of grass. From grass, it spreads to trees and very soon the whole forest is on fire. It is called forest fire. It is very difficult to control forest fire. As fire spreads at a very high speed and in a very large area, it is very difficult to control it. 2

Q. 7. When kerosene oil is heated a little, it will catch fire. But when wood is heated a little, it does not catch fire. Why?

Ans. If kerosene oil is heated a little, it catches fire. But if wood is heated a little, it does not catch fire because ignition temperature of kerosene oil is lower than that of wood. 2

Q. 8. Two paper cups, one with water in it and one empty, are heated carefully on candle flame.

- (a) What will happen to both the cups ?
- (b) Why ?

Ans. (a) The cup containing water will not burn whereas the empty paper cup will burn rapidly.

(b) Because the heat supplied to the paper cup is transferred to water by conduction. So, in the presence of water, the ignition temperature of paper is not reached. Hence, it does not burn. On the other hand the empty paper's ignition temperature is low and it burns rapidly.

1+1=2

Q. 9. Why is water used by fire brigade to extinguish fire ?

Ans. Water is used by fire brigade to extinguish fire as water cools the combustible material so that its temperature is brought below its ignition temperature. This prevents the fire from spreading.

Q. 10. Name two substances that burn with flame and without flame ?

Ans. Substances that burn with flame are candle, oil lamp.
Substances that burn without flame are coal, charcoal.

Short Answer Type Questions-II [3 marks]

Q. 1. Write an experiment to show that air is necessary for burning of a candle.

1. Air is necessary for burning a candle.

Experiment :

- (i) Fix a lighted candle on a table.
- (ii) Put a glass chimney over the candle in such a

way that air can enter the chimney. We find that candle burns freely.

- (iii) Now, fix a glass chimney in a way that no air enters in the glass.
- (iv) The flame flickers and produces smoke.
- (v) The flame finally goes off because the air is not available. It is already used by the candle

to burn. So, this concludes that air is necessary for burning a candle.

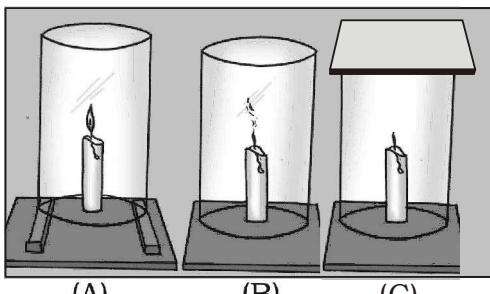


Fig. Experiment to show that air is essential for burning

Q. 2. Explain how CO_2 is able to control fire ? (NCERT)

Ans. For fires, involving electrical equipments and inflammable materials like petrol, carbon dioxide is the best extinguishers. CO_2 being heavier than oxygen, covers the fire like a blanket. Since, the contact between the fuel and oxygen is cutoff, the fire is controlled.

Q. 3. It is difficult to burn a heap of green leaves but dry leaves catch fire easily. Explain. (NCERT)

Ans. It is difficult to burn heap of green leaves because they have moisture in them, which increases their ignition temperature. On the other hand, dry leaves have low ignition temperature and thus burn easily. 2

Q. 4. 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. (NCERT)

Ans. Heat produced by burning 4.5 kg fuel = 180,000 kJ.

Heat produced by burning 1 kg fuel

$$\begin{aligned} &= \frac{180,000}{4.5} \text{ kJ} \\ &= \frac{180,000 \times 10}{45} \text{ kJ} \\ &= 40,000 \text{ kJ}. \end{aligned}$$

∴ Calorific value of fuel = 40,000 kJ/kg. 2

Q. 5. Can the process of rusting be called Combustion ? Discuss. (NCERT)

Ans. Process of rusting cannot be called combustion

because during the process of rusting no heat and light is evolved, and moreover iron is not an inflammable substance.

Q. 6. What is acid rain ? Describe.

Ans. Burning of coal and diesel releases sulphur dioxide gas. It is an extremely suffocating and corrosive gas. Moreover, petrol engine gives off gaseous oxides of nitrogen. Oxides of sulphur and nitrogen dissolve in rain water and form acids. Such rain is called acid rain.

Q. 7. In many rural parts of India, people still use wood as a fuel. Why ? What are its disadvantages ?

Ans.. In many rural parts of our country, people still use wood as a fuel because of its easy availability and low cost. Its disadvantages are :

- (i) It gives a lot of smoke, that is harmful for living beings.
- (ii) It causes respiratory problems.
- (iii) Trees provide us with useful substances, which are lost when wood is used as fuel.

Q. 8. Explain briefly different types of combustion.

Ans.. Types of combustion—It is of three types :

- (a) **Rapid combustion**—When gases burn rapidly to produce heat and light, it is called rapid combustion.
- (b) **Spontaneous combustion**—When material suddenly bursts into flames, without the application of any apparent cause, it is called spontaneous combustion.
- (c) **Explosion**—When combustion takes place with sudden release of heat, sound, light and gas with a bang it is called explosion. $1 \times 3 = 3$

Q. 9. How a match stick burns. Explain its process.

Ans. These days the head of the match sticks contains only antimony trisulphide and potassium chlorate. The rubbing surface has powdered glass and a little red phosphorus. When the matchstick is struck against the rubbing surface i.e., some red phosphorus, this immediately reacts with potassium chlorate on the match stick head to produce enough heat to ignite antimony trisulphide and start combustion.

3

Long Answer Type Questions [5 marks]

Q. 1. Give reasons :

- (a) Water is not used to control fires involving electrical equipments.
- (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.

(NCERT)

- Ans.** (a) Water is not used to control the fire involving electric equipment because it is a good conductor of electricity and harms those trying to control the fire.
- (b) LPG is a better domestic fuel than wood because it neither produces gases nor residues that pollute the environment.
- (c) The paper by itself catches fire easily because its ignition temperature is low, while a piece of paper wrapped around an aluminium pipe does not catch fire, because its ignition temperature rises as some heat is absorbed by the aluminium foil.

Q. 2. Describe the various zones of a candle flame.

Ans. A candle flame has three zones :

- (a) **The inner-most zone**—It is also called black zone. It indicates the deposition of unburnt carbon particles in this zone. It is the least hot region.
- For diagram refer Ans. 3. SA-I*
- (b) **The middle zone**—Here partial combustion takes place and wax vapours start burning with yellow flame. This part is moderately hot. It is also called luminous zone. Carbon particles formed burn with yellow flame.
- (c) **The outer zone**—It is the outer zone of

complete combustion. It is the hottest and non-luminous zone. The wax burns here completely and produces carbon dioxide.

Q. 3. Explain the harmful effects of burning fuels.

Ans. The harmful effects of burning fuels :

- (a) Fuels like wood, coal, petroleum etc. which are carbon fuels, produce unburnt carbon particles, which cause respiratory diseases (asthma) and skin diseases.
- (b) Generally CO_2 is released during burning of fuels. It causes the rise in the temperature of the atmosphere of Earth, which is called global warming.
- (c) Incomplete combustion of fuel releases many poisonous gases such as carbon monoxide. It can kill people sleeping in a room containing carbon monoxide.
- (d) Combustion of coal and diesel generates sulphur dioxide. It is a corrosive gas and it causes suffocation.
- (e) Burning of fuels releases oxides of nitrogen and sulphur. They dissolve in rain water and form acid. Such rain is called acid rain. It is harmful to crops, buildings and soil.

Value Based Questions [3 marks]

Q. 1. Uneducated and careless people are not aware of saving fossil fuels, such as, coal and petroleum. Discuss some points how you can make them aware regarding this ?

Ans. All fossil fuels are in limited quantity. Thus we need a very judicious use of these fuels. For this, we must find out some alternative

sources of energy as solar energy, water energy, geothermal energy etc. We must ask them to reduce unnecessary use of vehicles i.e., If four people are going from one place to single destination, they should use only one vehicle rather than more than one.

Formative Assessment

(A) Oral Questions : (Give answer in one word)

1. Name the process in which some substances burn in the presence of oxygen.
2. What are fuels ?
3. Name two fuels that are used in our homes.
4. Do all fuels burn with a flame ?
5. Name four combustible substances.
6. Name four non-combustible substances.

7. What is the lowest temperature called at which a substance catches fire called ?
8. What was used in Egypt as matches ?
9. Which chemical is used on the rubbing surface of match box ?
10. Whose ignition temperature is low ? Wood or kerosene.
11. Which zone of a flame has the highest temperature ?

12. Which chemicals give rise to acid rains ?
13. Which pollutant in air causes respiratory problem ?
14. Which zone of candle flame is used by the goldsmith ?
15. Which gas is used as fire extinguisher ?

Ans. 1. Combustion.

2. Fuel is a substance that burns to produce heat and light energy.
3. LPG and wood.
4. No.
5. Wood, paper, diesel, kerosene.
6. Soil, sand, iron, steel.
7. Ignition temperature.
8. Pine wood dipped in sulphur.
9. The rubbing surface has powdered glass and red phosphorus in it.
10. Kerosene.
11. Outermost zone.
12. Oxides of sulphur and nitrogen.
13. Carbon monoxide, sulphur dioxide.
14. Outermost zone.
15. Carbon dioxide.

(B) Oral Questions (Give answer in one or two lines)

1. How are heat and light produced in the Sun ?
2. What are conditions essential for combustion ?
3. What is the difference between burning of candle and burning of coal ?
4. Define ignition temperature ?
5. Name the substances that are used on the head of matchsticks these days ?

Ans. 1. In the Sun, heat and light are produced by nuclear reactions.

2. Presence of combustible substance, presence of air, attainment of ignition temperature.
3. Candle burns with flame whereas coal does not burn with flame instead it glows.
4. The lowest temperature at which a combustible substance catches fire.
5. Antimony trisulphide and potassium chlorate.

(C) True / False

1. Magnesium burns to form magnesium oxide and produces heat and light.
2. Coal burns in air producing carbon dioxide, heat and light.
3. The fuel is found only in solid form.

4. Light is only given during combustion as a flame.
5. When a person catches fire, he is covered with a blanket to extinguish fire.
6. The highest temperature at which a substance catches fire is called its ignition temperature.
7. Examples of inflammable substance are petrol, alcohol, LPG etc.
8. The heat supplied to the paper cup is transferred to water by convection.

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

(D) Quiz (Give answer in one word or one line)

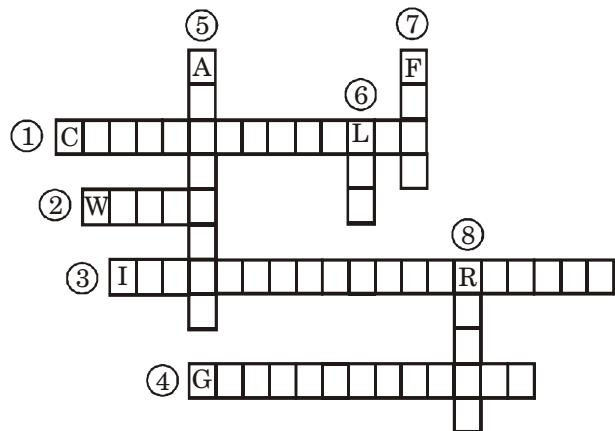
1. Fuel used in Indian rural areas.
2. A gas essential for burning.
3. In cities this agency extinguishes the fire.
4. A gas is used to extinguish the fire.
5. Fire crackers are the examples of which type of combustion.
6. A circular blackish ring is formed on the glass plate. What does it indicate ?
7. Which part of the flame is used by goldsmiths ?
8. Unit to calculate fuel efficiency.
9. What is global warming ?
10. Cutting of trees leads to what ?

- | |
|---|
| Ans. 1. Cowdung |
| 2. Oxygen |
| 3. Fire brigade |
| 4. Carbon dioxide |
| 5. Explosion |
| 6. Deposition of unburnt carbon particle |
| 7. Outermost |
| 8. Kilo joule per kg. |
| 9. Rise in the temperature of atmosphere. |
| 10. Deforestation. |

(E) Puzzles (Complete the Crossword puzzle with the help of clues given below)

Across :

1. Fuel efficiency is called its
2. Fire brigade use it to extinguish fire.
3. The lowest temperature at which a substance catches fire.
4. Rise in the temperature of the atmosphere.

**Down:**

5. Oxides of sulphur and nitrogen dissolve in rain water and form this.
6. A clean gaseous fuel.
7. Substances that are source of heat and energy.
8. A type of combustion, when fuel burns rapidly and produces heat and light, is called combustion.

Ans. Across :

1. Calorific value
2. Water
3. Ignition temperature
4. Global warming.

Down:

- | | |
|---------------|-----------|
| 5. Acid rain. | 6. LPG |
| 7. Fuel | 8. rapid. |



CONSERVATION OF PLANTS AND ANIMALS

Quick Review

- A great variety of plants and animals exist on the earth. They are essential for the well-being and survival of mankind.
- A major threat to survival of these organism is deforestation.
Trees in the forest are cut for some of the purposes mentioned below :
 - Producing land for cultivation.
 - Building houses and factories.
 - Making furniture or using wood as fuel.
 - Natural calamities, causing, forest fires and sever droughts.
- The increase in temperature on the earth disturbs the water cycle and may reduce rainfall, causing droughts.
- Eroded soil has less humus and is less fertile. Gradually the fertile land gets converted into deserts. It is called desertification.
- Biosphere is that part of the earth in which living organism exist or which supports life.
- Biological diversity refers to the variety of organisms existing on the earth, their inter- relationships with the environment.
- To protect our flora and fauna and their habitats, protected areas are called sancturies, national park and biosphere reserves are formed.
- **Sanctuaries :** Areas where animals are protected from any disturbances to them and their habitats.
- **National Park :** The areas reserved for wildlife where they can freely use the habitats and natural resources.
- **Biosphere reserve :** Large areas of protected land for conservation of wild life animals, plants and traditional life of the tribals living in the area.
- The plant and animals found in a particular area are termed as flora and fauna of that area.
- Endemic species are those species of plants and animals which are found exclusively in a particular area.
- Species are a group of population that are capable of interbreeding.
- Wildlife sanctuaries provide protection and suitable living conditions to wild animals, where killing (Poaching) or capturing of animals is strictly prohibited.
- National parks are large area to protect whole set of ecosystems. They protect flora, fauna, land space and historical object of that area. Satpura National Park is the first reserve forest of India. The finest teak is found in this forest.
- Project tiger was launched by the government to protect tigers in the country.

- Animals whose numbers are diminishing to a level that they might face extinction are known as the endangered animals.
 - An ecosystem is made up of all the plants, animals and micro-organisms in an area along with non-living components such as climate, soil, river deltas etc.
 - Red Data Book is the source book that keeps a record of all the endangered species of animals and plants.
 - Migratory birds fly to far away areas every year during a particular time because of climatic changes. Birds who cover long distances to reach another land are known as migratory birds.
 - **Recycling of Paper:** Seventeen fully grown trees make one tonne of paper. We should save, reuse used paper and recycle it.
 - **Reforestation:** It is restocking of the destroyed forest by planting new trees. We should plant atleast as many trees as we cut. It can takes place naturally also.

Summative Assessment

Objective Type Questions

(A) Multiple Choice Questions

1. Which of the following do not cause deforestation?
 - (a) Procuring land for cultivation
 - (b) Building houses and factories
 - (c) Using wood as fuel and for furniture
 - (d) Growing more plants.
 2. Natural causes of deforestation are :
 - (a) Forest fires
 - (b) Making roads
 - (c) Buildings
 - (d) Urbanisation.
 3. Term is used for a species which is restricted to :
 - (a) Fauna
 - (b) Extinct species
 - (c) Endemic species
 - (d) Endangered species.
 4. Gradually the conversion of fertile land gets converted into deserts is called :
 - (a) Droughts
 - (b) Desertification
 - (c) Wasteland
 - (d) All.
 5. Flora includes :
 - (a) Only plants
 - (b) Only animals
 - (c) Both animals and plants
 - (d) Extinct animals.
 6. The first reserve forest in India is :
 - (a) Jim Corbett National Park
 - (b) Kanha wildlife sanctuary
 - (c) Satpura National Park
 - (d) None of these.
 7. A book that keeps records of all the endangered animals and plants is caused :
 - (a) Yellow Book
 - (b) Red Data Book
 - (c) Black Data Book
 - (d) Green Data Book.
 8. Recycling of paper is also a step towards :
 - (a) Deforestation
 - (b) Reforestation
 - (c) Both of above
 - (d) None of these.

9. The part of the earth where living organism exist is called :
(a) Ecosystem (b) Biodiversity
(c) Flora (d) Biosphere.

10. Which one of the following is not a threatened wild animal ?
(a) Elephant (b) Golden Cat
(c) Python (d) Zebra.

Ans. 1. (d) Growing more plants.
2. (a) Forest fires.
3. (c) Endemic species.
4. (b) Desertification.
5. (a) Only plants.
6. (c) Satpura National Park
7. (b) Red Data Book.
8. (b) Reforestation.
9. (d) Biosphere.
10. (d) Zebra.

(B) Fill in the blanks :

1. refers to the variety of living organism in a specific area.
 2. Plants and animals of a particular area are known as the and of the area.
 3. species are found only in a particular area.
 4. species are those which are facing the dangers of extinction.
 5. We should save, and paper to save trees, energy and water.
 6. is the restocking of destroyed forest by planting new trees.
 7. A place where animals are protected in their natural habitats is called (**NCERT**)
 8. Species found only in a particular area is known as (**NCERT**)

9. Migratory birds fly to far away places because of changes. (NCERT)
10. contains a record of endangered species.
- Ans.** 1. Biodiversity.
2. Flora, fauna.
3. Endemic.
4. Endangered.
5. Reuse, recycle.
6. Reforestation.
7. Sanctuary.

8. Endemic.
9. Climatic.
10. Red Data Book.
- (C) Match the Column :**
- | | |
|------------------|---------------------------------------|
| 1. Black Buck | (A) Less rainfull |
| 2. Rock Shelters | (B) Extinct a long time ago |
| 3. Project Tiger | (C) Threatened wild animal. |
| 4. Dinosaurs | (D) Safeguarding the tiger population |
| 5. Droughts | (E) Satpura National Park. |
- Ans.** 1. → (C), 2. → (E), 3. → (D), 4. → (B), 5. → (A).

Very Short Answer Type Questions [1 mark]

Q. 1. Name the major threat to survival of great variety of plants and animals on earth.

Ans. Deforestation.

Q. 2. What are the factors that increases deforestation ?

Ans. Agricultural expansion and wood harvest for domestic fuel.

Q. 3. Less rainfall causes what ?

Ans. Drought.

Q. 4. What is infiltration rate ?

Ans. The movement of water from the soil surface into the ground is called infiltration rate ?

Q. 5. In which part of the earth living organism exists and supports life ?

Ans. Biosphere.

Q. 6. Name the biosphere reserve where the plants and animals are found similar to the upper Himalayan peaks.

Ans. Pachmarhi Biosphere Reserve.

Q. 7. Name the areas reserved for wildlife and can be used freely for habitats and natural resources.

Ans. National Park.

Q. 8. Name any two wildlife sanctuaries in Pachmarhi Biosphere Reserve.

Ans. Bori, Pachmarhi.

Q. 9. Name the endemic flora of the Pachmarhi Biosphere Reserve.

Ans. Sal and wild mango.

Q. 10. Name the group of population that are capable of Inter-breeding.

Ans. Species.

Short Answer Type Questions-I [2 marks]

Q. 1. Protected forests are not completely safe for wild animals. Why ? (NCERT)

Ans. Because people living in neighbourhood of such forests encroach upon them and destroy them. 2

Q. 2. Some tribals depend on jungle. How ? (NCERT)

Ans. Tribals depend on forest for their livelihood as they get wild fruits, firewood, fibre, construction material, industrial products and product of medicinal importance from it. 2

Q. 3. What is Red Data book ? (NCERT)

Ans. Red Data Book is the source book which keeps a record of all endangered animals and plants. 2

Q. 4. What do you understand by the term migration ? (NCERT)

Ans. The phenomenon of movement of a species from its own habitat to some other for a particular time period every year for a specific purpose like breeding, climatic conditions etc. is called migration. 2

Q. 5. What is desertification ?

Ans. Deforestation results in more soil erosion. Removal of top layer of soil exposes the lower, hard and rocky layers. This soil has less humus and is less fertile. Gradually the fertile land gets converted into deserts. It is called desertification. 2

Q. 6. Write any two consequences of deforestation.

Ans. Consequences of Deforestation :

(i) Deforestation increases the temperature and pollution level on the earth. It increases the level of carbon dioxide in the atmosphere. 1

(ii) It also disturbs the balance in nature and increase chances of natural calamities such as floods and droughts. $1 \times 2 = 2$

Q. 7. What do you understand by biological diversity?

Ans. Biological diversity, refers to the variety of organism existing on the earth, their inter relationships and their relationship with the environment. 2

Q. 8. What do you understand by Endemic species? Name two endemic flora and fauna.

Ans. Endemic species are those species of plants and animals that are found exclusively in a particular area.

A particular type of animal or plant may be endemic to a zone, a state or a country. e.g., Sal and wild mango are endemic flora, Bison and the Indian giant squirrel are endemic fauna of the Pachmarhi Biosphere Reserve.

$1 \times 2 = 2$

Q. 9. Write briefly about Rock paintings.

Ans. Rock paintings are found inside the Satpura

National Park. There are evidences of Prehistoric human life in these jungles, figures of animals and men hunting, dancing and playing musical instruments are depicted in these paintings. 2

Q. 10. Which animals are known as endangered animals?

Ans. Animals whose numbers are diminishing to a level that they might face extinction are known as the endangered animals. e.g., Dinosaurs become extinct a long time ago. 2

Q. 11. Why small animals are much more in danger of becoming extinct than the bigger animals?

Ans. At times, we kill snakes, frogs, lizards, bats and owls ruthlessly without releasing their importance in the ecosystem. By killing them we are harming ourselves. They might be small in size but they play a significant role in the formation of food chains and food webs. 2

Q. 12. What is Ecosystem?

Ans. An ecosystem constitutes the plants, animals and micro-organisms in an area along with non-living components such as climate, soil, river deltas etc. 2

Short Answer Type Questions-II [3 marks]

Q. 1. Write in brief about wildlife sanctuary.

Ans. (i) Wildlife sanctuaries provide protection and suitable living conditions to wild animals.
(ii) Sanctuaries are places where killing (Poaching) or capturing of animals is strictly prohibited.
(iii) Indian sanctuaries have unique landscapes—broad level forests, mountain forests and bush land forests, in deltas of big rivers.
(iv) Some of the threatened wild animals such as black buck, white eyed buck, elephant, golden cat and pink headed duck are protected and preserved in our wildlife sanctuaries.

(any three) $(1 \times 3 = 3)$

Q. 2. Explain how deforestation leads to reduction rainfall. (NCERT)

Ans. Plants need carbon dioxide for photosynthesis. Fewer trees mean that less carbon dioxide is used up resulting in its increased amount in the atmosphere. This leads to global warming as carbon dioxide traps heat rays reflected by the earth. The increase in temperature on the earth disturbs the water cycle and may reduce rainfall.

Q. 3. Identify some major national parks of your country. (NCERT)

Ans. India has 92 national parks based on 2004 database. Some of these are:

- (i) Jim Corbett National Park : Uttarakhand.
- (ii) Dudhwa National Park : Uttar Pradesh.
- (iii) Kanha National Park : Madhya Pradesh.
- (iv) Satpura National Park : Madhya Pradesh.

Q. 4. Differentiate between the following :

- (a) Endangered species and extinct species.
- (b) Flora and fauna. (NCERT)

Ans. Differentiate between the following :

(a)	Endangered Species	Extinct Species
	Animals whose numbers are diminishing to a level that they might get extinct are known as the endangered animals.	Animals that do not exist any more. Found anywhere are called extinct animals. Example is Dinosaurs.

(b)	Flora	Fauna
	The plants found in a particular area are termed as flora of that area.	The animals found in a particular area are termed as fauna of that area.

Q. 5. Why should paper be saved ? Prepare a list of ways by which you can save paper.

Ans. Papers are manufactured from trees. Seventeen full grown trees are needed to make one tonne of paper. Hence, protect the trees, we should save papers.

Ways to save papers :

- (1) Write on both sides of the paper.

- (2) Avoid wastage of paper.
- (3) Recycle paper for reuse.
- (4) Obtain bill on e-mail to reduce paper use. $(1+2=3)$

Q. 6. What are the advantages of reforestation ?

Ans. Reforestation is restocking of the destroyed forests by planting new trees.

- (i) It retains our green wealth for future generations.
- (ii) It also aims at preservation and conservation of natural forests and meeting the basic needs of the people living in or near the forests. $(1+2=3)$

Long Answer Type Questions [5 marks]

Q. 1. What do you mean by protected area ? Explain it with examples.

Ans. Protected area is the area where our flora and fauna and their habitats are protected. They are called sanctuaries, national parks and biosphere reserves. Plantation, cultivation, grazing, felling trees hunting and poaching are prohibited there.

Sanctuary : Areas where animals are protected from any disturbance to them and their habitat.

National Parks : Areas reserved for wildlife where they can freely use the habitats and natural resources.

Biosphere Reserves : Large areas for protected land for conservation of wild-life, plant and animal resources and traditional life of the tribals living in the area. $2+3=5$

Q. 2. List the various causes for loss of biodiversity (No details required).

Ans. Various causes of loss of biodiversity :

- 1. Increase in population.
- 2. Deforestation.
- 3. Over grazing.
- 4. Pollution of air, water and soil
- 5. Habitat destruction
- 6. Hunting and killing of animals. 5

Q. 3. Why should biodiversity should be conserved ? Discuss in detail. (NCERT)

Ans. Biodiversity should be conserved because many countless direct economic benefits can be derived from it such as food, fire wood, fibre construction material, industrial products, and products of medicinal importance. It is our moral duty to take care for their well being and pass on our biological legacy in good order to our future generations. 5

Value Based Questions [3 marks]

Q. 1. Number of vultures is decreasing remarkably, now-a-days which is a matter of concern. Vultures belong to which category of animal ? What is their role in nature to maintain ecological balance ?

Ans. Number of vultures is decreasing remarkably now a days because of mainly deforestation which disturbs the wildlife. Vultures play an important role in the food chain. They feed on dead organisms and act to clean the environment. Hence, they act as decomposers in the ecological balance.

Q. 2. Radha is a student of class X of a Govt. School and she is a member of 'Eco club' of her school. What suggestions would you like to give to Radha to improve the environment in her school ?

Ans. Now-a-days in schools also environment education is provided to students. They form 'Eco clubs' to create awareness about the environment. As Radha is a member of the 'Eco club' she will be suggested to make beautiful dustbins (as use me) to collect garbage, can make small discussions and entertainment programmes regarding 'save environment'.

Formative Assessment

(A) Give one word :

1. The process that means clearing of forest and using that land for other purposes.
2. The increase in temperature on the Earth disturbs the water cycle and may reduce rainfall which causes ?
3. When fertile land gets converted into deserts, what is it called ?
4. The movement of water from the soil surface into the ground.
5. Name the reserve where the plants and animals found were similar to those of the upper Himalayan peak.
6. What is the protected area of flora and fauna called ?
7. Name the national park and a wildlife sanctuary found in Pachmarhi Biosphere Reserve.
8. Name an endemic flora of the Pachmarhi Biosphere Reserve.
9. A project launched by the government to protect the tiger in the country.
10. Name a book that keeps records of all the endangered species.
11. How many trees are used to make a tonne of paper ?

Ans. 1. Deforestation.

2. Drought.
3. Desertification.
4. Infiltration rate.
5. Pachmarhi Biosphere Reserve.
6. Sanctuaries, National Parks, Biosphere Reserves.
7. Satpura National Park.
8. Sal and wild mango.
9. Project Tiger.
10. Red Data Book.
11. Seventeen trees.

(B) Oral Questions : (Answer in one line)

1. Define Desertification.
2. What is the Pachmarhi Biosphere Reserve consists of ?
3. What is flora and fauna ?
4. Which flora and fauna is endangered in Pachmarhi Biosphere Reserve ?
5. Name few animals that are protected and preserved in our wildlife sanctuaries.
6. What is project tiger ?
7. Name the first reserve forest of India.

Ans. 1. Due to soil erosion gradually the fertile land gets converted into deserts. It is called desertification.

2. Pachmarhi Biosphere Reserve consists of one national park named Satpura and two wildlife sanctuaries named Bori and Panchmarhi.
3. The plants and animals found in a particular area are termed as flora and fauna of that area.
4. Sal and wild mango are two examples of the endemic flora; Bison and Indian giant squirrel are two examples of the endemic fauna of the Pachmarhi Biosphere Reserve.
5. Some animals such as black buck, white eyed buck, elephant, golden cat, pink headed duck, ghariyal, marsh crocodile, python, rhinoceros etc. are protected and preserved in the wildlife sanctuary.
6. Project Tiger was launched by the government to protect the tigers in the country. The objective of this project was to ensure the survival and maintenance of the tiger population in the country. e.g., Satpura Tiger Project, Satpura National Park.
7. Satpura National Park.

(C) True/False

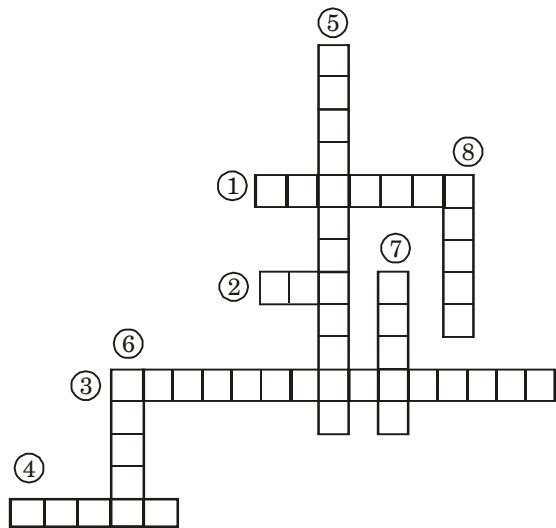
1. Building houses and factories also causes deforestation.
 2. Biosphere reserve protects only flora and fauna of that area.
 3. The biosphere reserve helps to maintain the biodiversity and culture of that area.
 4. Twenty full grown trees are required for making one tonne of paper.
 5. Species are a group of population that are capable of interbreeding.
 6. Jim Corbett park is the first reserve forest of India.
 7. Rock shelters are also found inside the Satpura National Park.
 8. A total of 100 rock shelters have been identified in Pachmarhi Biosphere Reserve.
 9. Once upon a time, animals such as lions, elephants, wild buffaloes and barasingha were also found in the Satpura National Park.
 10. Red Book Data keeps a record of all the flora and fauna found in India.
- Ans.** (1) True, (2) False, (3) True, (4) False, (5) True, (6) False, (7) True, (8) False, (9) True, (10) False.

(D) Quiz (Give answer in One word or one line)

1. Name one biodiversity of India.
2. Name a book that keeps record of endangered species of animals and plants.
3. Name few small sized animals who are the part of our ecosystem.
4. An animal that became extinct a long time ago.
5. Name the project launched by the government to protect tigers.

Ans. 1. Pachmarhi Biosphere Reserve.

2. Red Data Book.
3. Snakes, frogs.
4. Dinosaurs.
5. Project Tigers.

**(E) Puzzle (Complete the Crossword
Puzzle with the help of clues given
below)****Across :**

1. Reduce rainfall cause.
2. Endemic flora of the Pachmarhi.
3. The area meant for conservation of biodiversity.
4. Animal Kingdom.

Down :

5. Area reserved for wildlife with their natural habitat.
6. An endemic fauna of the Pachmarhi Biosphere.
7. Plant Kingdom.
8. An animal protected by project tiger.

Ans. Across :

- | | |
|-----------------------|-----------|
| 1. Drought. | 2. Sal. |
| 3. Biosphere reserve. | 4. Fauna. |

Down :

- | | |
|-------------------|-----------|
| 5. National park. | 6. Bison. |
| 7. Flora. | 8. Tiger. |

Extending Learning : Activities and Projects.

Activities : Plant at least five different plants in your locality during this academic year and ensure their maintenance till they grow.

(NCERT)

Project : Prepare a projects file on the topic of conservation of plants and animals in India. Under following headings.

- Mark all the sanctuaries, national parks and biosphere reserves on the map of India.
- Categorise them statewise and write about them in brief (which plants and animals protected, about endangered species etc.) Paste their beautiful picture also.
- Records from Red Data Book.
- Projects of the governments to protect them.
- Your role in conservation of Biodiversity.



CELL-STRUCTURE AND FUNCTIONS

Quick Review

- Cell is the basic structural and functional unit of living organisms.
- Robert Hooke in 1665 observed slices of cork under a simple magnifying device. He observed cells in the cork.
- The egg of a hen represents a single cell, and can be seen by naked eye.
- Cell can be seen by Microscope.
- Organisms made of more than one cell are called multicellular organisms.
- A single celled organism is called unicellular. e.g., Amoeba, Protozoa.
- A single celled organism performs all the functions such as digest food, respire, excretes, grow and reproduction within the cell.
- Group of cells performing same function is called tissue.
- Shape and size of the cell depends on the function performed by it.
- Generally, cells are round, spherical, or elongated. Some cells are long and pointed at both the ends. They are spindle shaped. Some are long and branched like nerve cells.
- Components of the cell are enclosed in a membrane. It provides shape to the cells of plants and animals.
- Plant cells have additional covering called cell wall.

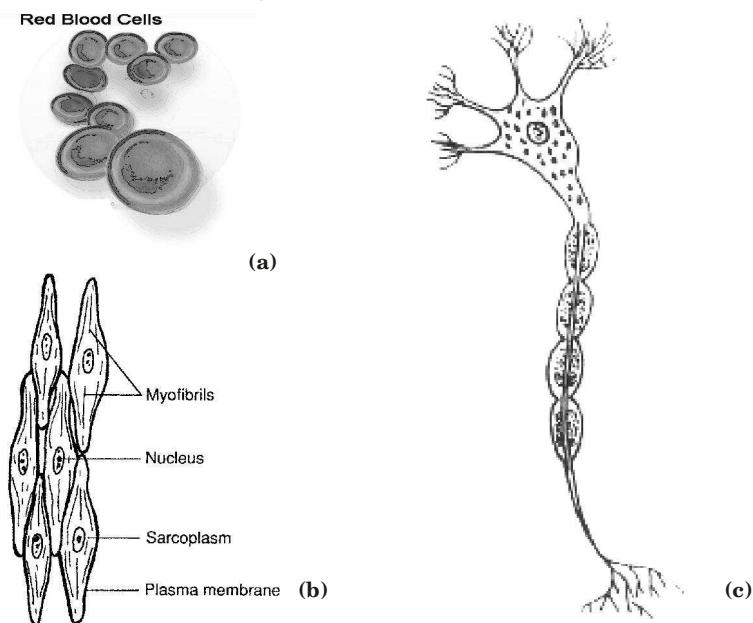


Fig. (a) Spherical Red Blood cells of humans, (b) Spindle Shaped muscle cells, (c) Long branched nerve cells.

- The smallest cell is 0.1 to 0.5 micrometre in bacteria. The largest cell measuring 170 mm × 130 mm is the egg of an ostrich.
- A tissue is a group of similar cells performing a specific function.
- Tissue makes organ and organs make organ system organ system performs different functions such as digestion, assimilation and absorption.
- **Parts of the Cell**
 - (a) **Cell membrane** : The cytoplasm and nucleus are enclosed within the membrane. It is also called the plasma membrane. It is porous and allows the movement of substance or material both inward and outward.
 - (b) **Cytoplasm** : The jelly like substance between the nucleus and the membrane is called cytoplasm.
 - (c) **Cell wall** : An outer thick layer in cells of plants is called cell wall.
 - (d) **Organelles** : Various other components of cells are present in the cytoplasm. These are mitochondria, golgi bodies, ribosomes etc called cell organelles.
 - (e) **Nucleus** : The central dense round body in the centre is called the nucleus. Nucleus is separated from the cytoplasm by a membrane called the nuclear membrane. It is also porous. It has a smaller spherical body called **nucleolus**. Nucleus contains thread like structures called **chromosomes**. These carry genes and helps in inheritance or transfer of characters from the parents to the offsprings.
- Cells are divided into :
 - (i) **Prokaryotic cells** : The cells having nuclear material without the nuclear membrane.
 - (ii) **Eukaryotic cells** : The cells having well organized nucleus with nuclear membrane.
 - (f) **Vacuole** : Plant cells have large vacuole whereas animal cells have small vacuoles.
 - (g) **Plastids** : Plastids are found in plant cells. They are of different colours. Some of them contain green pigment called **chlorophyll**. Green coloured plastids are called **chloroplasts**.
- **Comparison of Plant cell and Animal cell.**

Table : Comparison of Plant Cell and Animal Cell

S.No.	Part	Plant Cell	Animal Cell
1.	Cell membrane	Present	Present
2.	Cell wall	Present	Absent
3.	Nucleus	Present	Present
4.	Nuclear membrane	Present	Present
5.	Cytoplasm	Present	Present
6.	Plastids	Present	Absent
7.	Vacuole	Present (large)	Present (small)

Summative Assessment

Objective Type Questions [1 mark]

(A) Multiple Choice Questions

1. Robert Hooke observed slice of cork under the microscope in the year :
 - (a) 1665
 - (b) 1666
 - (c) 1690
 - (d) 1687.
2. The egg of a hen represents a :
 - (a) Multicellular organism
 - (b) Single cell
 - (c) Organ
 - (d) None of these.
3. A human cell which can change its shape is :
 - (a) Red Blood Cells
 - (b) WBC
4. A tissue is :
 - (a) A group of different cells.
 - (b) A group of similar cells performing different functions.
 - (c) A group of similar cells performing a specific function.
 - (d) All of above.
5. This is not a part of animal cell :
 - (a) Cell wall
 - (b) Cell membrane
 - (c) Mitochondria
 - (d) Nucleolus.

6. The cell having nuclear material without nuclear membrane is termed as :
 (a) Eukaryotes (b) Single cell
 (c) Well developed (d) Prokaryotes.

7. A unit of inheritance in living organism is :
 (a) Nucleolus (b) Chromosomes
 (c) Gene (d) All.

- Ans.** 1. (a) 1665
 2. (b) Single cell
 3. (b) WBC
 4. (c) A group of similar cells performing specific function
 5. (a) Cell wall.
 6. (d) Prokaryotes.
 7. (c) Gene.

(B) Fill in the blanks :

1. All organisms are made of small parts called
 2. Cell was first observed in cork by..... in
 3. Cells exhibit variety of and
 4. is separated from cytoplasm by a nuclear membrane.
 5. Plant cells have an additional layer around the cell membrane called

6. Green plastids containing chlorophyll are called
 7. Plant cell has a big central unlike a number of small vacuoles in cells.

- Ans.** 1. Organs
 2. Robert Hooke, 1665
 3. Shapes, sizes
 4. Nucleus
 5. Cell wall
 6. Chloroplast
 7. Vacuole, animal.

(C) Match the Column :

- | | |
|----------------|--|
| 1. Cell wall | (A) A jelly like substance |
| 2. Chloroplast | (B) Cell having well defined nucleus |
| 3. Gene | (C) Group of similar cells |
| 4. Cytoplasm | (D) White Blood Cell |
| 5. Eukaryotes | (E) Plant cell |
| 6. Nucleolus | (F) Dense round body in centre of nucleus. |
| 7. Tissue | (G) Green coloured plastid |
| 8. WBC | (H) A unit of inheritance. |

- Ans.** 1. → (E), 2. → (G), 3. → (H), 4. → (A),
 5. → (B), 6. → (F), 7 → (C), 8. → (D).

Very Short Answer Type Questions [1 mark]

Q. 1. A single celled animal.

Ans. Amoeba

Q. 2. A human cell that can change shape.

Ans. White Blood Cell.

Q. 3. A cell in the human body that receives and transfers messages.

Ans. Nerve cell.

Q. 4. A group of similar cells performing a specific function.

Ans. Tissue.

Q. 5. What are the basic components of a cell ?

Ans. The basic components of cell are :

- The cell membrane
- Cytoplasm
- Nucleus.

Q. 6. A solution added to make onion peel slide.

Ans. Methylene blue.

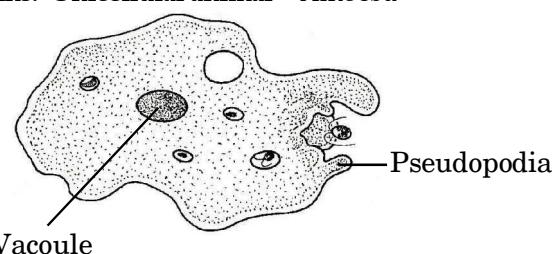
Q. 7. Various components present in cytoplasm. Name them.

Ans. They are mitochondria, golgi bodies, ribosomes, vacuoles etc.

Short Answer Type Questions-I [2 marks]

Q. 1. Draw a labelled diagram of unicellular organism.

Ans. Unicellular animal—Amoeba



Q. 2. How does an organism begins its life ?

Ans. An organism with billions of cells begins life as a single cell which is the fertilized egg. This fertilized egg cell multiplies and the number of cells increases as development proceeds.

Q. 3. How does amoeba capture the food ?

Ans. Amoeba captures the food by producing the projections of varying lengths. These are called pseudopodia (false feet).

Q. 4. What are the shapes of cells ?

Ans. Generally, cells are round, spherical or elongated. Some cells are long and pointed at both the ends. They exhibit a spindle shape. Sometimes they are quite long and branched like nerve cell.

Q. 5. Write the size of the smallest and largest cell.

Ans. The smallest cell is 0.1 to 0.5 micrometre in bacteria. The largest cell measuring 170 mm × 130 mm, is the egg of an Ostrich.

Q. 6. Define tissue.

Ans. A tissue is a group of similar cells performing a specific function. Tissues together make an organ.

Q. 7. Describe the structure of hen's egg.

Ans. In hen's egg a white material surrounds the yellow part. White material is albumin and yellow part is yolk. They are part of a single cell.

Q. 8. What is plasma membrane ? What are its characteristics ?

Ans. The cytoplasm and nucleus are enclosed within the cell membrane, also called plasma membrane. The membrane separates cells from one another and also cells from the surrounding medium.

It is porous and allows the movement of substances or materials both inwards and outwards.

Q. 9. Why plant cell needs cell wall ?

Ans. There is an outer thick layer in cells of plants called cell wall. It is required by plant for protection. Plants cells need protection against variations in temperature, high wind speed, atmospheric moisture etc.

Q. 10. What is cytoplasm ?

Ans. Cytoplasm is a jelly like substance present between the cell membrane and the nucleus. Various components, or organelles are present in the cytoplasm. These are mitochondria, golgi bodies, ribosomes etc.

Short Answer Type Questions-II [3 marks]

Q. 1. Draw Red blood cell and nerve cell.

Ans.

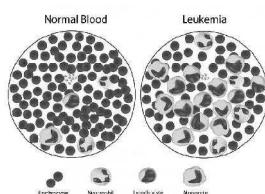


Fig. Red Blood Cells

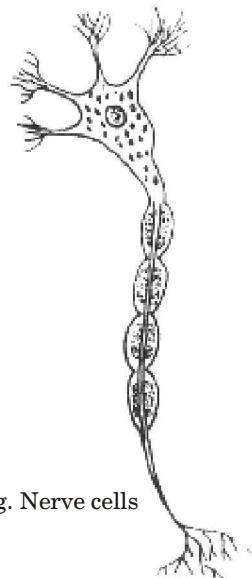


Fig. Nerve cells

Q. 2. What is nucleus ? Describe it.

Ans. Nucleus is an important component of the living cell. It is generally spherical and located in the centre of the cell. It is separated from the cytoplasm by a membrane called nuclear membrane. It is also porous and allows the

movement of material between the cytoplasm and nucleus. It has a small spherical body inside it called nucleolus. It contains small thread like structures called chromosomes. They carry genes and help in transferring of characters from parents to offsprings.

Q. 3. Differentiate between :

- (a) Prokaryotic and eukaryotic
- (b) Animal cell and plant cell.

Ans. Differentiate Between

(a)	Prokaryotic Cell	Eukaryotic Cell
	The cells having nuclear material without nuclear membrane. Organisms termed Prokaryotes e.g., Blue, green algae.	The cells having well-organised nucleus with nuclear membrane. Organism termed Eukaryotes e.g., Onion cell, cheek cells.

(b)

Animal Cell	Plant Cell
(i) Cell wall absent.	Cell wall present.
(ii) Vacuoles are small in size.	A large vacuole present in the centre of cell.

Long Answer Type Questions [5 marks]

Q. 1. What is a Gene ? What are its functions.

Ans. Gene is a unit of inheritance in living

organisms. It controls the transfer of hereditary characteristics from parents to offsprings.

This means that your parents pass some of their characteristics to you. If your father has brown eyes, you may have brown eyes. However, the different combination of genes from parents results in different characteristics.

Q. 2. Describe the various parts of a cell.

Ans. Parts of the Cell : The basic components of a cell are :

- (i) Cell membrane
- (ii) Cytoplasm
- (iii) Nucleus.

(i) Cell membrane : The cytoplasm and nucleus are enclosed within the cell membrane. It is also called plasma membrane. It separates cell from another cell and from the surrounding medium. It is porous in nature and allows

movement of substance or material both inward and outward.

(ii) Cytoplasm : It is the jelly like substance present in between the cell membrane and the nucleus. Various other components, or organelles of cells are present in the cytoplasm. These are mitochondria, golgi bodies, ribosomes etc.

(iii) Nucleus : It is an important component of the cell. It is generally spherical and located in the centre of the cell. It is surrounded by nuclear membrane. It is porous in nature. It has a smaller spherical body called nucleolus. The nucleus contains thread like structures called chromosomes. They carry genes and help in transferring the characteristics from parents to offsprings.

Value Based Questions [3 marks]

Q. 1. To study the cell and its structure, microscope is needed. Explain the students brief history of microscope and how it works ?

Ans. Discovery of microscope brings many advantages in study of science. Such as regarding microscopic animals and internal structure of various animals and plants. Microscope is an instrument which make

an object look many times bigger than its original size. It has one eye piece, draw tube, baby tube, objective lens, stage and mirror as main parts. Tiny structures are kept on stage under objective lens. Light is adjusted by mirror. Then structure is watched through eye piece. Much bigger structure is visible. So students can be easily & clearly understand the micro scopic structures.

Formative Assessment

(A) Oral Questions : (Answer in one word)

1. Name the basic structural and functional unit of body.
2. Who named the term cell and when ?
3. Name the biggest cell and its size.
4. Organisms made of more than one cell are called.
5. Name two examples of single celled organism.
6. Amoeba has protruding projections of various lengths called.
7. A cell in human body that can change its shape.
8. A long and branched cell in human body.
9. Outer thick layer in plant cell.
10. Name two cell organelles.
11. A unit of inheritance in living organism.
12. Green coloured plastids.

Ans. 1. Cell

2. Robert Hooke, 1665
3. Egg of an Ostrich, 170 mm × 130 mm.
4. Multicellular.

5. Amoeba, Paramecium.

6. Pseudopodia.

7. WBC

8. Nerve cell

9. Cell wall

10. Mitochondria, Plastids.

11. Gene.

12. Chloroplast.

(B) Oral Questions : (Answer in one line)

1. What is a cell ?
2. Where do different body functions occur in a single celled organisms ?
3. What is pseudopodia ?
4. What is tissue ?
5. What is nucleolus ?
6. What is the function of genes ?
7. What are plastids ?

Ans.

1. Cell is a basic structural and functional unit of living organism.

2. Within cell.
3. Pseudopodia are the projections of varying lengths protruding out of Amoeba's body to capture food and for movement.
4. A tissue is a group of similar cells performing a specific function.
5. Nucleolus is a smaller spherical body in the nucleus.
6. Gene controls the transfer of a hereditary characteristic from parents to offsprings.
7. Several small coloured bodies in cytoplasm of plant cells are called plastids.

(C) True / False

1. Cell is the basic unit of single celled living organism.
2. Multicellular organisms are made of more than one cell.
3. Cell membrane provides shape to the cell.
4. Cell membrane is a rigid structure.
5. Cell wall is present in all living organisms.
6. A tissue is a group of similar cells.
7. The basic components of a cell are cell membrane and cytoplasm.
8. Nucleus is part of nucleolus.
9. Chromosomes carry genes.
10. The cells having nuclear material without nuclear membrane is called eukaryotic cell.

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

(D) Quiz (Give answer in one word or one line)

1. Name a green coloured plastid.
2. Cell membrane is porous or non-porous.
3. Give an example of a coloured leaf.
4. Name blank looking structure in cytoplasm.
5. Components present in the cytoplasm.
6. A jelly like substance between the nucleus and the cell membrane.

Ans. 1. Chloroplast

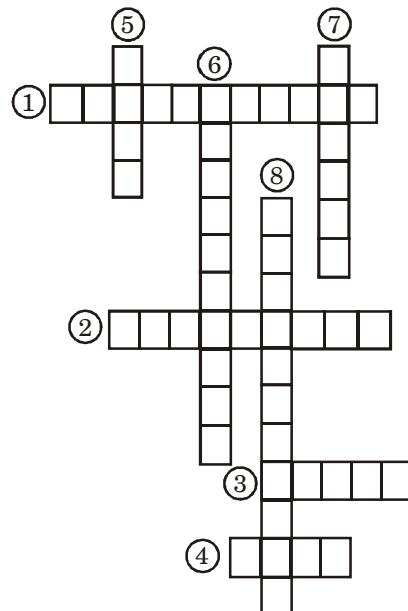
2. Porous
3. Tradescantia
4. Vacuole
5. Organelles
6. Cytoplasm.

(E) Puzzle**Across :**

1. Protruding projections of varying lengths in Amoeba.
2. A smaller spherical body in the nucleus.
3. Tissue together make it.
4. A unit of inheritance in living organism.

Down :

5. A basic unit of living organism.
6. Various other components of cell present in cytoplasm.
7. A group of similar cells.
8. Thread like structures in nucleus.

**Ans. Across :**

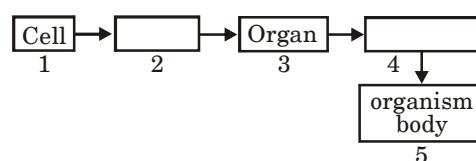
1. Pseudopodia
2. Nucleolus
3. Organ
4. Gene

Down :

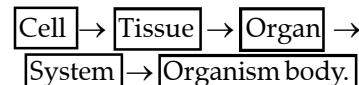
5. Cell
6. Organelles
7. Tissue
8. Chromosomes

(F) Flowchart

1. Complete the flow chart.



Ans.

**Extending Learning : Activity and Projects****Activity :**

To observe the basic components of cell.
Prepare a slide of onion peel and observe it under the microscope. Draw the structure seen and write your observation.



REPRODUCTION IN ANIMALS

Quick Review

- Reproduction is essential for the continuation of a species. It is a process by which animals can reproduce by themselves and of their own kinds.
- There are two modes of animal reproduction :
 - (a) Sexual reproduction
 - (b) Asexual reproduction.
- (a) **Sexual Reproduction :** This type of reproduction begins from the fusion of male and female gametes is called sexual reproduction.
Male reproductive organs :
 - The male reproductive organs include a pair of testes, two sperm ducts and a penis.
 - Testes produce male gametes called sperms.
 - Sperms are very small in size, has a head, a middle piece and a tail. It is a single cell.

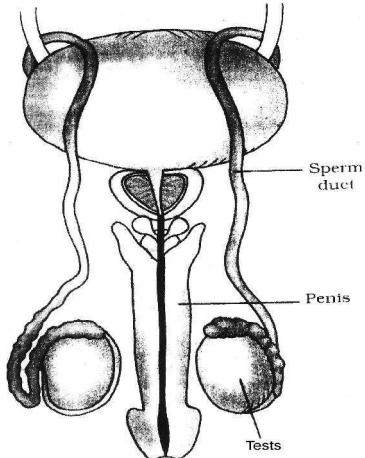


Fig. : Male Reproductive Organ

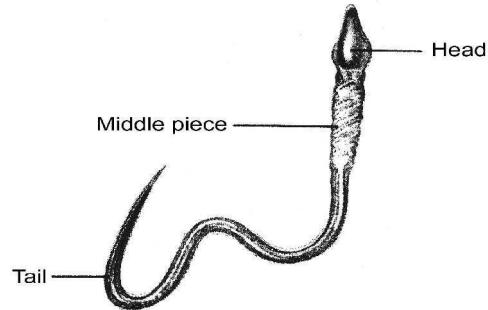


Fig. : Human Sperm

Female reproductive organs :

- The female reproductive organs are a pair of ovaries, oviduct (fallopian tube) and uterus.
- The ovary produces female gametes called ova (eggs). It is a single cell.

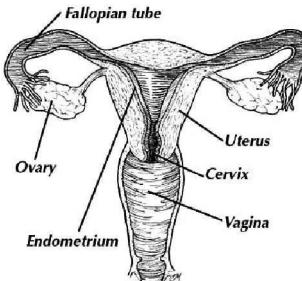


Fig. : Human Sperm

- Uterus is the part where development of the baby takes place.

Fertilization

- Fusion of the egg and sperm is called fertilization. This results in the formation of **fertilized egg or Zygote**.
- When fertilization takes place in the female body, it is called **internal fertilization**. e.g., cows, dogs, Humans.

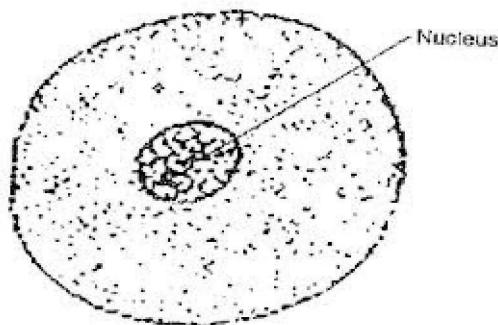


Fig. : Human ovum

- When fertilization takes place outside the body of the female, it is called **external fertilization** e.g., Frog, Fishes.

➤ Development of Embryo

- Fertilization results in zygote. Zygote begins to develop into embryo.

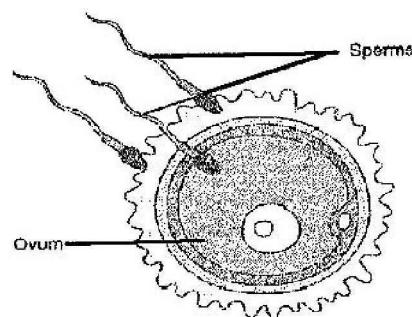


Fig. : Fertilization

- These cells begin to form groups that develop into different tissues and organs
- This developed structure is called **embryo**.
- Embryo continues to develop in the uterus.

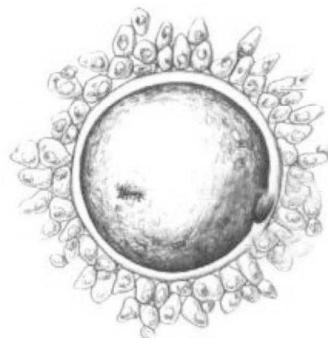


Fig. : Zygote

- The stage of the embryo in which all the body parts can be identified is called a **foetus**.
- When development of foetus is complete, the mother gives birth to a baby.

Viviparous and Oviparous Animals

- The animals that give birth to young ones are called viviparous animals. e.g., cat, dog, etc.
- The animals which lay eggs are called oviparous animals. e.g., Hen, Duck, Birds etc.

Young ones to adults

Life cycle of silk worm

Egg → Larva or Caterpillar → Pupa → Adult.

The transformation of the larva into an adult occurs through drastic changes, called **metamorphosis**.

- (b) **Asexual Reproduction** : A type of reproduction in which a single parent is involved, is called asexual reproduction. Some methods of asexual reproduction are :

- Budding (Hydra)
- Binary fission (Amoeba).

➤ **Story of Dolly, the Clone**

- Cloning is the production of an exact copy of a cell, any other living part, or a complete organism.
- It was first successfully performed by Ian Wilmut and his colleagues at the Roslin Institute in Edinburgh, Scotland. They cloned a sheep named Dolly. Dolly was born on 5th July, 1996 and died on 14th February, 2003.

Summative Assessment

Objective Type Questions [1 mark]

(A) Multiple Choice Questions

1. Hen's young one is called :
 - (a) Baby
 - (b) Chick
 - (c) Kitten
 - (d) Baby hen.
2. The fusion of male and female gametes is called :
 - (a) Asexual reproduction
 - (b) Sexual reproduction
 - (c) Budding
 - (d) Metamorphosis.
3. In humans, the development of embryo takes place in :
 - (a) Ovaries
 - (b) Oviduct
 - (c) Uterus
 - (d) None of these.
4. Asexual reproduction occurs in :
 - (a) Hydra
 - (b) Cat
 - (c) Dogs
 - (d) Frogs.
5. External fertilization occurs in :
 - (a) Hydra
 - (b) Birds
 - (c) Fishes
 - (d) Butterflies.
6. Each sperm cell is a cell.
 - (a) Single
 - (b) Multicellular
 - (c) Double
 - (d) None of all.
7. The formation of fertilized egg is called :
 - (a) Foetus
 - (b) Embryo
 - (c) Nucleus
 - (d) Zygote.
8. IVF means :
 - (a) Internal vitro fertilization
 - (b) In vitro fertilization
 - (c) In vitro foetus
 - (d) All are incorrect.

9. The first clone sheep's name is :

- (a) Jolly
- (b) Dolly
- (c) Molly
- (d) None.

10. Amoeba is reproduced by :

- (a) Sexual reproduction
- (b) Budding
- (c) Binary fission
- (d) Laying eggs.

Ans. 1. (b) Chick.

2. (b) Sexual reproduction.

3. (c) Uterus.

4. (a) Hydra.

5. (c) Fishes.

6. (a) Single.

7. (d) Zygote.

8. (b) In vitro fertilization.

9. (b) Dolly

10. (c) Binary fission.

(B) Fill in the blanks :

1. The fusion of male and female gametes is called reproduction.
2. The reproductive organs in male include, and
3. The fertilized egg is called
4. External fertilization occurs in
5. Animals that give birth to young ones are called
6. Reproduction in which a single parent is involved is called reproduction.
7. Amoeba is reproduced by,

8. is the production of an exact copy of a cell; any other living part; or a complete organism.

- Ans.** 1. Sexual.
 2. Testes, sperm duct, penis.
 3. Zygote.
 4. Frogs.
 5. Viviparous.
 6. Asexual.
 7. Binary fission.
 8. Cloning.

(C) Match the Column :

- | | |
|--------------|------------------------------------|
| 1. Budding | (A) When body parts are identified |
| 2. Eggs | (B) Fertilized egg |
| 3. Embryo | (C) Give birth to young ones |
| 4. Foetus | (D) Ovary |
| 5. Zygote | (E) Embedded in wall of Uterus |
| 6. Oviparous | (F) Hydra. |

- Ans.** 1. → (F), 2. → (D), 3. → (E), 4. → (A),
 5. → (B), 6. → (C).

Very Short Answer Type Questions [1 mark]**Q. 1. Define fertilization.**

Ans. The fusion of ovum and sperm is called fertilization.

Q. 2. Which babies are known as test-tube babies ?

Ans. Babies born through test-tube technique are called test-tube babies.

Q. 3. What is meant by ovulation ?

Ans. Release of ovum from ovary is called ovulation.

Q. 4. What is the function of tail in a sperm ?

Ans. The tail of sperm helps it to swim to reach the egg.

Q. 5. What is embryo ?

Ans. When zygote after repeated division starts to form group of different tissues and organs, it is called embryo.

Q. 6. What is foetus ?

Ans. The stage of embryo in which all the body parts can be identified is called a foetus.

Q. 7. Write different stages in life cycle of frog.

Ans. Eggs → Early tadpole → Late tadpole → Adult frog.

Q. 8. Write two types of asexual reproduction.

Ans. Budding, Binary Fission.

Q. 9. What is cloning ?

Ans. Cloning is the production of an exact copy of a cell, any other living part or a complete organism.

Short Answer Type Questions-I [2 marks]**Q. 1. Draw a labelled diagram of human ovum.**

Ans.

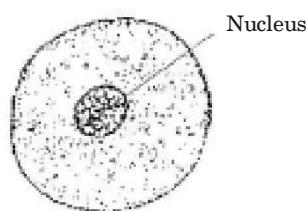


Fig. : Human Ovum

Q. 2. Amoeba reproduces by which process ? Explain in brief.

Ans. Amoeba reproduces by asexual reproduction, binary fission. It begins the process of reproduction by the division of its nucleus in two nuclei. This is followed by division of its body into two, where each part receives a nucleus. Finally two amoebae are produced from one parent amoeba. 2

Q. 3. What is Metamorphosis ? (NCERT)

Ans. The transformation of the larva into an adult through drastic changes is called metamorphosis. 2

Q. 4. Write difference between viviparous and oviparous animals.

Ans. Difference between viviparous and oviparous :

Viviparous	Oviparous
The animals that give birth to young ones are called viviparous animals. e.g., Human beings, Cats, dogs.	The animals that lay eggs are called oviparous animals. e.g., Frogs, fishes.

Q. 5. How is egg formed in the hen ?

Ans. After fertilization, the zygote divides repeatedly and travels down the oviduct. As it travels down, many protective layers are formed around it. The hard shell is formed

around the developing embryo. The hen finally lays the egg. 2

Q.6. Write difference between internal fertilization and external fertilization.

(NCERT)

Ans.

Internal fertilization	External Fertilization
Fertilization that takes place inside the female body is called internal fertilization. e.g., Human, cats, Dogs.	Fertilization in which the fusion of a male and a female gamete takes place outside the body of the female is called external fertilization. e.g., fish, star fish etc.

2

Q.7. What is IVF?

Ans. IVF is In-vitro fertilization. In such cases the doctor collects freshly released egg and sperm and keep them together for a few hours for fertilization. When fertilization occurs, the zygote is formed and allowed to develop for about a week and then, it is placed in the

mother's uterus. Babies born through this technique are called test-tube baby. 2

Q.8. Explain the structure of male reproductive system in human beings.

Ans. Male reproductive system : The male reproductive organs include a pair of testes, two sperm ducts and a penis. The testes produce the male gametes called sperms. Millions of sperms are produced by the testes.

2

Q.9. Draw a well labelled diagram of human sperm.

Ans. Human Sperm

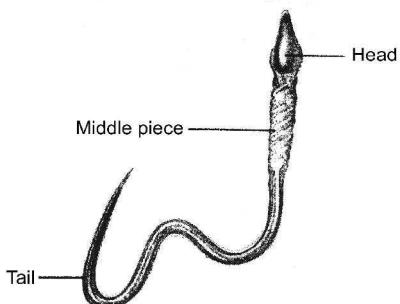


Fig. : Human Sperm

Short Answer Type Questions-II [3 marks]

Q.1. Draw a labelled diagram of female reproductive organs.

Ans.

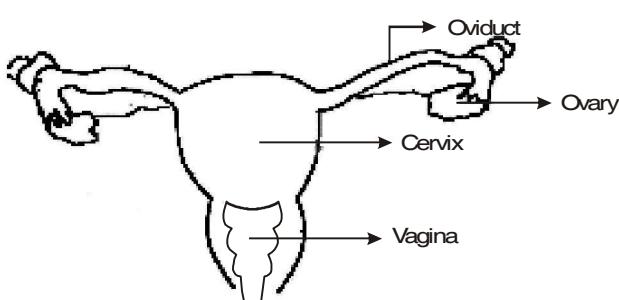


Fig. Female Reproductive Organs.

Q.2. Why the new individual inherits some characteristics from the mother and some from the father ?

Ans. The process of fertilization is the meeting of an egg cell from the mother and a sperm cell from the father. So the new individual inherits some characteristics from the mother and some from the father. 3

Q.3. How does external fertilization takes place ? Explain with an example.

Ans. Fertilization in which the fusion of a male and a female gamete takes place outside the body of a female is called external fertilization. It is very common in aquatic animals. During spring or rainy season, frogs and toads move to ponds and slow flowing streams. When the male and female come together in water, the female lays hundreds of eggs. A layer of jelly holds the eggs together and provides protection to the eggs. The male deposits sperm over them. The sperms come in contact with the eggs. This results in fertilization.

(2+1=3)

Q.4. Why do fishes and frogs lay eggs in hundreds ?

Ans. This is because the eggs and sperms get exposed to water movement, wind and rainfall. There are other animals in the pond, which may feed on eggs. Thus production of large number of eggs and sperms is necessary to ensure fertilization of atleast a few of them. 3

Q.5. Define asexual reproduction. Describe two methods of asexual reproduction. (NCERT)

Ans. Reproduction in which only a single parent is involved is called asexual reproduction. Two methods of asexual reproduction. (1+2=3)

- (a) Budding
- (b) Binary fission
- (a) **Budding :** In hydra there may be one or more bulges. These bulges are developing new individuals and they are called buds. When new individuals develop from the buds, it is called budding.

- (b) **Binary fission :** The process of reproduction by the division of its nucleus into two nuclei. This is followed by division of its body into two where each part receives a nucleus as it finally two amoebae are produced. (1+2=3)

Long Answer Type Questions [5 marks]

Q. 1. Explain the process of reproduction in human beings with suitable diagrams.

Ans. Reproduction in human beings : In human, internal reproduction takes place. There are two sexes in human beings—male & female. Male reproductive parts include a pair of testes, two sperm ducts and a penis. The testes produce the sperms. The female reproductive organs are a pair of ovaries, oviduct and the

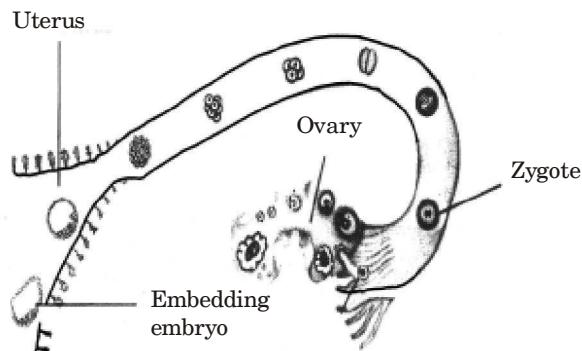


Fig. Reproduction in Human Beings

uterus. The ovary produces female gametes called ova. Fusion of the egg and the sperm is called fertilization. This results in the formation of a fertilized egg or zygote.

begins to develop into an embryo. The zygote repeatedly gives rise to a ball of cells. The cells then begin to form groups and organs of the body which form embryo. The stage of the embryo in which all the body parts can be identified is called foetus. When the development of the foetus is complete, the mother gives birth to the baby.

Q. 2. What are clones ? What are the various steps of this process ? Explain with examples.

Ans. Cloning is the production of an exact copy of a cell; any other living part, or a complete organism. Ian Wilmut and his colleagues at the Roslin Institute, Edinburgh, Scotland successfully cloned a sheep named Dolly.

Following steps were involved in cloning :

1. A cell was collected from the mammary gland of a female Finn Dorset sheep.
2. An egg was obtained from a Scottish black face ewe and its nucleus was removed.
3. The nucleus from the mammary gland cell of Dorset sheep was introduced in the egg.
4. This egg was then implanted in the uterus.

(1+4=5)

Value Based Questions [5 marks]

Q. 1. We hear and read about female foeticide, which is really a wrong practice. In some families, be it rural or urban, females are tortured for giving birth to a girl child. They do not seem to understand the scientific reason behind the birth of a boy or a girl. In your opinion, the approach of the society towards mother in this regard is correct or not ?

Ans. In rural and uneducated families till today in India female foeticide is a common practice.

The females are blamed forgiving birth to a female or girl child. But as per truth and scientific reason the sex of the child is determined by the male as they have XY chromosomes and female body have XX chromosome. If male produces X chromosome the born child will be female and if they produce Y chromosome male child will be born. Hence, we must educate the citizens regarding this through lectures, campaigns etc.

Formative Assessment

(A) Give answer in one word :

1. Name the process by which an animal can produce of its own kind.
2. Name the types of reproduction.
3. Name the male reproductive organs.
4. Name the female reproductive organs.
5. The sperm and egg fuse to form a single cell called.
6. Fertilization that takes place inside the body is called
7. Give two examples of external fertilization.
8. Name a viviparous animal.
9. Name a oviparous animal.

Ans. 1. Reproduction.

2. Sexual and asexual.
3. Testes, sperm ducts, penis
4. Ovary, uterus and oviducts.
5. Zygote.
6. Internal fertilization.
7. Frogs, fishes.
8. Cat
9. Birds.

(B) Oral Question : (Answer in one line)

1. Differentiate between embryo and foetus.
2. What is metamorphosis ?
3. What are layers in a poultry farm ?
4. What was the name given to the first cloned animal ? When was it born ?
5. Which babies are called test tube babies ?

Ans. 1. The zygote divides repeatedly to give rise to a ball of cells. This ball begins to form groups that develop into different tissues and organs of the body called embryo. Whereas the stage of embryo in which all the body parts can be seen called a foetus.

2. The transformation of the larva into an adult through drastic changes is called metamorphosis.
3. Egg laying hen in poultry farm are called layers.
4. The first clone sheep is Dolly. She was born on 5th July, 1996.
5. Babies born through IVF technique are called test-tube babies.

(C) True / False

1. Male gametes are produced by penis.

2. A sperm is a multicellular body.
3. An egg cell is a single cell.
4. Ovary produces female gametes called eggs.
5. In human beings a single matured egg is released into the oviduct by one of the ovaries every month.
6. In fertilization, an egg cell comes from mother cell and sperm from father cell.
7. External fertilization also takes place inside female body.
8. Zygote is divided repeatedly and sticks to oviduct.

Ans. 1. False, 2. False, 3. True, 4. True, 5. True, 6. True, 7. False, 8. False.

(D) Quiz (Give answer in one word or one line)

1. Male gametes are termed as ?
2. Female gametes are produced by which organ's ?
3. It is an example of external fertilization.
4. Stage of the embryo in which all the body parts can be identified.
5. Animals that lay eggs.
6. Example for viviparous animals.
7. Larva of butterfly is also called as ?
8. Individuals develop from the buds in hydra, name the type of reproduction.

Ans. 1. Sperms

2. Ovary
3. Frogs
4. Foetus
5. Oviparous
6. Cats and dogs
7. Caterpillar
8. Budding.

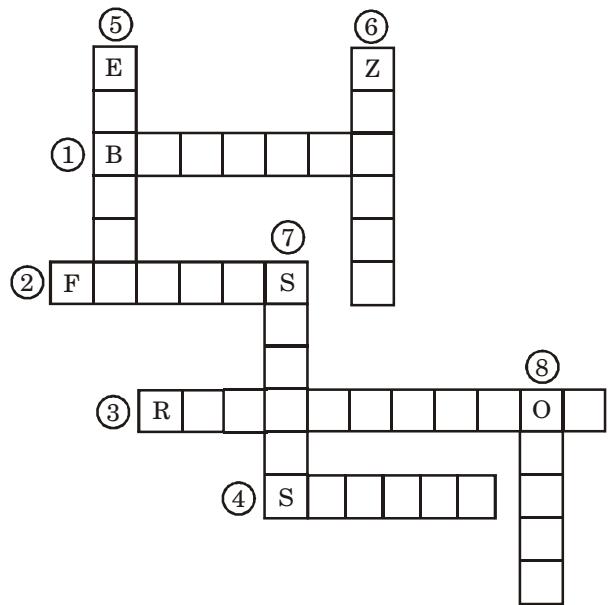
(E) Puzzle

Across :

1. A type of asexual reproduction.
2. Stage of embryo.
3. Process by which animals reproduce.
4. Male gametes.

Down :

5. This gets embedded in the wall of the uterus.
6. A fertilized egg.
7. Male gametes.
8. It produces female gametes.

**Ans. Across :**

1. Budding
2. Foetus
3. Reproduction
4. Sperms.

Down :

5. Embryo
6. Zygote
7. Sperms
8. Ovary.

Extending Learning : Activity and Projects

Activity : With the help of a permanent slide observe the process of binary fission in Amoeba.



REACHING THE AGE OF ADOLESCENCE

Quick Review

- The period of life, when the body undergoes changes, leading to reproductive maturity is called **adolescence**.
- Adolescence begins around the age of 11 and lasts upto 18 or 19 years of age. Those who come under this age group are called teenagers.
- The human body undergoes several changes during adolescence. These changes mark the onset of puberty.
- **Changes at Puberty :**
 - **Calculation for full height (Formula)**

$$\frac{\text{Present height (cm)}}{\% \text{ of full height at this age}} \times 100.$$

(% of full height is calculated as given in the chart.)

Generally girls grow faster than boys but by about 18 years of age, both reach their maximum heights.

Chart of Age and Height

Age in years	% of full height	
	Boys	Girls
8	72%	77%
9	75%	81%
10	78%	84%
11	81%	88%
12	84%	91%
13	88%	95%
14	92%	98%
15	95%	99%
16	98%	99.5%
17	99%	100%
18	100%	100%

- **Change in Body Shape :** Changes occurring in adolescent boys and girls are different. In boys, shoulders generally broaden, muscles of body grow. In girls, the region below waist becomes wider.
- **Change in voice :** At puberty the voice box or larynx begins to grow. In boys Adam's apple (Protruding part of the throat) is seen and their voice box becomes larger. Girls have high pitched voice.
- **Increased activity of Sweat and Sebaceous Glands :** Increased activity of these glands causes acne and pimples on the face at this time.

— **Development of Sex Organs :** At this age, male sex organs such as penis, testes are completely developed. Testes begin to produce sperms.

In girls ovaries enlarge and start releasing mature eggs.

Reaching Mental, Intellectual and Emotional Maturity.

Intellectual development takes place and they spend considerable time in thinking.

- **Secondary Sexual Characters :** In boys, testes produce sperms, boys begin to grow facial hair, on their chest, hair grow under the arm and in the region above the thighs or the pubic region. These are called secondary sexual characters. Male sex hormone testosterone is secreted at the onset of puberty. In girls, ova are formed. Breasts begins to develop, hair grows under arms and in the region above the thighs or the pubic region. The female sex hormone estrogen is released. Release of sex hormones is controlled by the pituitary gland.

- Endocrine glands release hormones into the blood stream to reach a particular body part called target site. It responds to the hormones.
- In female, the reproductive phase of life begins at puberty and generally lasts till the age of 45 to 50 years. Ovum matures and if fertilization does not occur, the released egg and the thickened lining of the uterus along with blood is shed off and is called **menstruation**. It occurs once in 28 to 30 days. The first flow is termed as menarche and stoppage phase is called menopause.

- **Sex Determination (Boy/Girl)**

Sex chromosome present in the nucleus of sperm and ova determines the sex in human beings. Pair of sex chromosomes in female is XX and in male is XY. When sperm carrying X chromosome fuses with ova the child will be a female. Whereas when sperm carrying Y chromosomes fuses with ova the child will be a male.

- **Other Hormones :**

Thyroid gland — Thyroxine

Adrenal gland — Adrenaline

Pancreas — Insulin.

Reproductive Health.

The diet for an adolescent has to be carefully planned. He / she should take a balanced diet.

- **Personal Hygiene :** For teenagers because the increased activity of sweat glands sometime makes body smelly. All parts of the body should be washed and cleaned properly everyday.
- **Physical Exercise :** Walking and playing in fresh air keeps the body fit and healthy.
- **Say 'No' to Drugs :** If you take some drugs, just say 'No' Unless it is prescribed by the doctor. Drugs are addictive. They ruin health and happiness both.

Summative Assessment

Objective Type Questions [1 mark]

(A) Multiple Choice Questions

1. The right meal for adolescents consists of :
 - (a) Chips, noodles etc
 - (b) Chapati, Dal, vegetables
 - (c) Rice, noodles, burger
 - (d) Vegetable cutlet, puri, cold drink.
2. Reproductive age in women starts when :
 - (a) Menstruation starts
 - (b) Breast starts developing
 - (c) Body weight increases
 - (d) All of the above.
3. Protruding part of the throat in a boy is called :

(a) Voice box	(b) Larynx
(c) Adam's Apple	(d) All.
4. Secondary sexual character not present in male :

(a) Growth of facial hair	(b) Hair grows under the arms
(c) Hair grows in the region above thighs	(d) Development of breast
5. Reproductive phase in females is from the age of :

(a) 10-12 years to 45-50 years	(b) 18-21 years to 30-35 years
(c) 21-23 years to 40-45 years	(d) 25-30 years to 40-45 years.
6. Sex chromosomes in a female body are :

(a) X	(b) Y
(c) XX	(d) XY.
7. Adrenaline is produced by the :

(a) Pancreas	(b) Thyroid gland
(c) Adrenal gland	(d) All the above.

this period, the wall of uterus becomes thick so as it receives the fertilized egg. If fertilization does not occur, the egg and the thickened lining of uterus along with its blood vessels are shed off. This causes bleeding in women, and is called menstruation. 2

Q. 3. Write note on Adam's apple. (NCERT)

Ans. At puberty, the larynx begins to grow. Boys develop larger voice boxes. The growing voice box in boys can be seen as a protruding part of the throat called Adam's apple. 2

Q. 4. What are secondary sexual characters ? (NCERT)

Ans. During puberty in girls, breasts begin to develop and boys begin to grow facial hair that is, moustaches and beard. Boys also develop hair on their chest. In both boys and girls, hair grows under the arms and in the region above the thighs or the pubic region. They are called secondary sexual characters. 2

Q. 5. Write the formula to calculate the full height of a child.

Ans. Calculation for full height (cm).

$$\frac{\text{Present Height (cm)}}{\% \text{ of full height at this age}} \times 100.$$

Q. 6. What are the drawbacks of adolescent Pregnancy ?

Ans. In our country, the legal age for marriage is 18

years for girls and 21 years for boys. This is because teenage mothers are not prepared mentally or physically for motherhood. Early marriage and motherhood cause health problems in the mother and the child. 2

Q. 7. What happens due to increased activity of sweat and sebaceous glands ?

Ans. During puberty, the secretion of sweat glands and sebaceous glands (Oil glands) increases. Many young people get acne and pimples on the face due to the increased activity of these glands in the skin. 2

Q. 8. What is target site ?

Ans. Endocrine glands release hormones into the blood stream to reach a particular body part called target site. 2

Q. 9. Write any two myths about adolescence.

Ans. Two myths occur during adolescence are.

- (i) A girl gets pregnant if she looks at boys during menstruation.
- (ii) A girl should not be allowed to work in the kitchen during menstruation. 2

Q. 10. What an adolescent must do for personal hygiene ?

Ans. For personal hygiene an adolescent should have a bath at least once every day, because increased activity of sweat glands makes body smelly. If cleanliness is not maintained there can be bacterial infection. Girl should take special care of cleanliness during the time of menstrual flow. 2

Short Answer Type Questions-II [3 marks]

Q. 1. What are sex hormones ? Why are they named so ? State their functions. (NCERT)

Ans. Hormones that control the changes occurring in the body during adolescence are called sex hormones. The male sex hormone testosterone is secreted by testes while female sex hormone estrogen is secreted by ovary.

Testosterone causes development of secondary sexual characters in boys such as broadening of chest, growth of hair on face and other parts of the body, enlargement of larynx etc.

Estrogen makes the breasts develop, milk secreting glands develop inside the breast. 3

Q. 2. What is the function of pituitary gland ?

Ans. Pituitary gland exerts hormonal control over testes and ovary which secrete their own hormone testosterone and estrogen respectively. These hormones help in the development of secondary sexual characters during adolescence. Pituitary gland also secretes another hormone called growth hormone that helps in growth of body. 3

Q. 3. Write a short note on nutritional needs of the adolescents.

Ans. Adolescence is a stage of rapid growth and development. Hence, the diet for an adolescent has to be carefully planned. They should be provided a balanced diet, which means that meal should include proteins, carbohydrates, fats and vitamins in requisite proportions, e.g., Milk is a balanced food itself. Fruits provide nourishment. Iron builds blood and iron rich food such as leafy vegetables, jaggery, meat, citrus, indian gooseberry are good for adolescents. 3

Q. 4. What is the role of hormones in completing the life history of frogs ?

Ans. In the life cycle of frog the tadpole passes through certain stages to become a frog. It is controlled by thyroxine, the hormone produced by thyroid. It requires the presence of iodine water. If water in which tadpoles are growing does not contain sufficient iodine, the tadpoles cannot become adults. 3

Q. 5. Name the disease or side effects caused by deficiency of following hormones :

- (a) Thyroxine (b) Insulin
- (c) Adrenaline (d) Growth hormone.

- Ans.** (i) Thyroxine produced by thyroid gland. A person was suffering from 'goitre' disease.
- (ii) Person suffers from diabetes if pancreas do not produce the hormone insulin in sufficient quantities.
- (iii) Adrenal glands produce hormone adrenaline, which helps the body to adjust to stress, when a person is very angry, embarrassed or worried.
- (iv) Pituitary gland secretes growth hormone that is necessary for the normal growth of a person.
- 3

Q. 6. How is the sex of the baby determined ?

Ans. The sex of the baby is determined by sex chromosomes that are X and Y. In human beings, the female have a pair of XX chromosomes, whereas a male body has one 'X' and 'Y' chromosome. When a sperm containing 'X' chromosomes fertilizes the egg, the zygote receives two X chromosomes and

develops into a female child. If the sperm contributes a 'Y' chromosome to the egg at fertilization the zygote develops into a male child.

2

Q. 7. How adolescence affects in reaching mental, intellectual and emotional maturity ?

Ans. Adolescence is also a period of change in a person's way of thinking. They are more independent than before and are also self conscious.

Intellectual development takes place and they tend to spend considerable time in thinking. It is time of one's life when the brain has the greatest capacity for learning. An adolescent may feel insecure while trying to adjust to the changes in the body and mind.

2

Q. 8. Why is pituitary gland called 'master Gland' ?

Ans. It is called so as it is the most important endocrine gland. Its size is just equal to a small pea. The hormones secreted by pituitary gland stimulate testes and ovaries to secrete their hormones. It also regulates the activity of other endocrine glands.

2

Long Answer Type Questions [5 marks]

Q. 1. List all the changes that occur during puberty. Explain in brief. (NCERT)

Ans. The human body undergoes several changes during adolescence. These changes mark the onset of puberty. It ends when an adolescent reaches reproductive maturity. The changes taking place in the body are :

- (i) Increase in height.
- (ii) Change in body shape. The boys shoulders become wider and in the girls the region below the waist becomes wider.
- (iii) Change in voice—in the boys, the voice box enlarges and can be seen as the protruding part of the throat called Adam's apple. In girls, it is hardly visible.
- (iv) Increased activity of sweat and sebaceous gland which may cause acne and pimples.
- (v) Sex organs develop fully and reach maturity.
- (vi) They also reach upto mental, intellectual and emotional maturity.
- (vii) Secondary sexual characters also develop. For example, in male hair on face, under arms. In girls, under arms and

hair grow above the thighs. (any five)
(1×5=5)

Q. 2. Explain reproductive phase of life in humans.

Ans. Reproductive phase of life in humans :

Adolescents become capable of reproduction when their testes and ovaries begin to produce gametes. The hormone testosterone in male is secreted by testes. In female, the reproductive phase begins at puberty—10 to 12 yrs to 45-50 yrs.

The ovum matures and is released by one of the ovaries once in 28 to 30 days. During this period, the wall of the uterus becomes thick. If it is fertilized, it results in pregnancy. If fertilization does not occur, the eggs and the thickened lining of the uterus along with blood vessels is shed off. This causes menstruation. Sex is also determined by the sex hormones X and Y. Male have 'XY' chromosomes and female have 'XX' chromosome in their body. The baby child will be male if the sperm contributes 'Y' chromosome and child will be female if the sperm releases 'X' chromosomes. Hence, males are responsible for sex determination in humans.

Value Based Questions [5 marks]

Q. 1. You have learnt the scientific facts about to human reproduction. There are many wrong honors that you should now be able to discard as informed adolescents. There are some myths and taboos regarding them. Explain few of them and discuss their solutions.

Ans. There are myths and taboos regarding bodily changes that adolescents experience. Some of these are discussed as follows :

(a) A girl becomes pregnant if she looks at boys during menstruation.

Ans. It is totally incorrect a girl can be only pregnant if her mature egg forms zygote with the sperm cell.

(b) The mother is responsible for the sex of her child.

Ans. It is false as male is responsible for the sex of his child.

Formative Assessment

(A) Oral Questions : (Answer in one word)

1. The period of life, when the body undergoes changes, leading to reproductive maturity.
2. The human body undergoes many changes during adolescence.
3. The boys develop louder voice as it grows.
4. What is the protruding part of the throat called ?
5. Name two duct glands.
6. Name two ductless glands.
7. Name male hormone.
8. Name female hormone.
9. Name the first menstruation flow.
10. Name the gland that controls secretion of sex hormones.

Ans. 1. Adolescence

2. Puberty
3. Larynx
4. Adam's apple
5. Oil glands, sweat glands
6. Thyroid, pancreas
7. Testosterone
8. Estrogen
9. Menarche
10. Pituitary Gland.

(B) Oral Questions : (Answer in one word)

1. What kind of voices a boy and a girl have at the time of adolescence ?
2. Name the sex hormones released by male and female human body.
3. In female, reproductive phase of life begins at what age ?
4. What is menopause ?
5. Name the hormone produced by thyroid gland.
6. What type of diet should be taken by a male / female at adolescence.
7. What is the legal age for marriage for a boy and a girl.

Ans. 1. The girls have a high pitched voice whereas boys have a deep voice.

2. Female ovaries begin to produce female hormone, estrogen. Male testes produce male hormone, testosterone.

3. The female reproductive phase in life begins at puberty (10 to 12 years of age) and generally lasts till the age (45 to 50 yrs).

4. At 40 to 50 years of age, the menstrual cycle stops. Stoppage of menstruation is termed menopause.

5. Thyroxine.

6. Balance diet.

7. Legal age for marriage is 18 years for girls and 21 years for boys.

(C) True / False

1. Drugs should always be taken on the prescription of doctor.
2. Junk food is a healthy diet during adolescence.
3. Adolescence is a stage of slow growth and development.
4. Diabetes is caused by imbalance of insulin.
5. Male have XX chromosomes whereas female have XY chromosomes.
6. Females are responsible for the sex determination of a child.
7. The first menstruation flow is termed as menopause.

Ans. 1. True, 2. False, 3. False, 4. True, 5. False, 6. False, 7. False.

(D) Quiz : (Give answer in one word or one line)

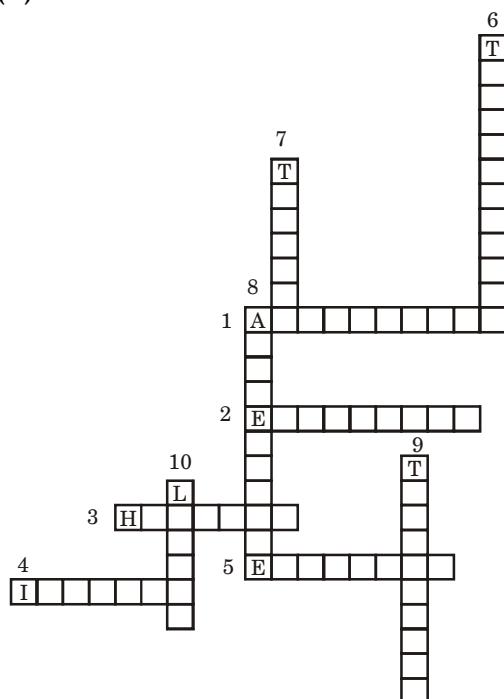
1. A particular body gland that releases hormones adrenalin in blood stream.
2. During puberty the secretion of which glands increases ?
3. Give an example of secondary sexual character.

4. Name the hormone that controls frog's life cycle.
5. Name few nutritious food items.

Ans. 1. Adrenal gland.

2. Sweat glands.
3. Hair grow at various body parts.
4. Thyroxine.
5. Meat, fruits, milk, eggs, grains.

(E) Puzzle



Across :

1. Protruding voice box in boys.
2. Glands without ducts.
3. Secretion of endocrine glands.

4. Pancreatic hormone.
5. Female hormone.

Down:

6. Male hormone.
7. Secretes thyroxine.
8. Another term for teenage.
9. Hormones reach here through blood stream.
10. Voice box.

Ans. Across :

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

Down:

6. Testosterone
7. Thyroid
8. Adolescence
9. Target site

10. Larynx

Extending Learning : Activity and Projects

1. Prepare a project file to compare the changes during adolescence in boys and girls as follow :
 - Choose ten girls and ten boys.
 - Take their interview regarding changes in their body.
 - Change in height.
 - Change in body shape.
 - Change invoice .
 - Feeling due to changes in the body.
 - Paste their pictures (Childhood and current photograph).



FORCE AND PRESSURE

Quick Review

- A push or a pull on an object is called a force.
- **Exploring Forces :** Forces applied on **an object in the same direction add** to one another.
 - If the two forces act in the opposite directions on an object, the net force acting on it is the **difference between the two forces**.
 - The strength of a force is usually expressed by its magnitude.
- A force :
 - May make an object move from rest.
 - May change the speed of an object if it is moving.
 - May change the direction of motion of an object.
 - May bring about a change in the shape of an object.
 - May cause some or all of these effects.
- Force can be of two types :

Contact Force	Non-Contact Force
Muscular force	Magnetic force
Frictional force	Gravitational force
Mechanical force	Electrostatic force.
- The force responsible for changing the state of motion of objects is the force of friction. It always acts on all the moving bodies and its direction is always opposite to the direction of motion.
- The force acting on a unit area of a surface is called pressure.

$$\text{Pressure} = \text{Force} / \text{Area}$$
- Liquid and gases exert pressure on the walls of the container.
 The pressure exerted by air around us is known as atmospheric pressure.

Summative Assessment

Very Short Answer Type Questions [1 mark]

Q. 1. What is a force ?

Ans. Force could be a push or pull on an object.

Q. 2. What is the magnitude of the force when it acts in the opposite directions on an object ?

Ans. If two forces act in the opposite directions on an object, the net force acting on it is the difference between the two forces.

Q. 3. What happens when more than one force may be acting on an object ?

Ans. The effect on the object is due to the net force acting on it.

Q. 4. What is the contact force ?

Ans. A force that appears due to physical contact of two objects is called contact force.

Q. 5. Which force is responsible for wearing out tyres of motor vehicles ?

Ans. Tyres of motor vehicles wear out due to frictional force between tyres and the road.

Q. 6. What is an electrostatic force ?

Ans. The force exerted by a charged body on another charged or uncharged body is known as electrostatic force.

Q. 7. What is pressure ?

Ans. The force acting on a unit area of a surface is called pressure.

Q. 8. What would be the pressure if a force of 25 N is applied over an area of 100 m² ?

$$\text{Ans. Pressure} = \frac{\text{Force}}{\text{Area}} = \frac{25}{100} = 0.4 \text{ Nm}^{-2}$$

$$= 0.4 \text{ Pascals.}$$

Q. 9. What is atmosphere ?

Ans. The envelop of air surrounding the Earth is known as atmosphere.

Q. 10. A force can act on an object without being in contact with it. What is it called ?

Ans. It is called non-contact force.

Short Answer Type Questions-I [2 marks]

Q. 1. What is the state of motion ? How does it changes the state of an object ?

Ans. The state of motion of an object is described by its speed and the direction of motion. An object may be at rest or in motion, both are its state of motion. It can be changed by acting of force on that object. 2

Q. 2. Enlist the types of contact forces.

Ans. Contact forces can be of two types :
 (a) Muscular forces.
 (b) Force of friction. (1+1=2)

Q. 3. A ball rolling along the ground gradually slows down and finally comes to rest ? Why does this happen ? What is the effect of this force ?

Ans. The force responsible for changing the state of motion of ball is the force of friction. The ball will come to rest position. This force causes wear and tear of the objects in motion. 2

Q. 4. Enlist the types of non-contact forces.

Ans. Non-contact forces :
 (a) Gravitational force
 (b) Magnetic force
 (c) Electrostatic force 2

Q. 5. Define frictional force.

Ans. The force responsible for wearing out tyres of motor vehicle is force of friction. 2

Q. 6. Why cutting vegetables with a blunt knife is not easier ?

Ans. Because of the larger area, smaller the pressure means blunt knife have large area instead of sharp knife. So less pressure will be on vegetable which makes it tough to cut. 2

Q. 7. Why is it easy to fix the pointed nail into wooden plank ?

Ans. Because the area of the pointed end of the nail is much smaller than that of its head. The same force, therefore, produces a pressure sufficient to push the pointed end of the nail into the wooden plank. 2

Q. 8. How can you prove that pressure is exerted by liquids ?

Ans. Take a transparent glass tube. The length of tube should be about 15 cm. Take a thin sheet of a good rubber. Stretch the rubber and fix tightly over one end of the pipe. Hold the tube in vertical position. Pour water in it. The rubber sheet bulges out. This bulging is due to the pressure exerted by water. Hence it is proved. 2

Q. 9. Give two examples of situations in which applied force causes a change in the shape of an object. (NCERT)

Ans. (i) We press a balloon to change its shape.
 (ii) We make chapati from a ball of dough.

Q. 10. Give two examples of each situation in which you push or pull to change the state of motion of an object. (NCERT)

Ans. (i) We push the door to open it.
 (ii) We pull the drawer to open it. (1+1=2)

Short Answer Type Questions-II [3 marks]

Q. 1. Name the forces acting on a plastic bucket containing water held above the ground level in your hand. Discuss why the forces acting on the bucket do not bring a change in its state of motion. (NCERT)

Ans. Muscular force and gravitation forces are acting on the plastic bucket. The force does not bring the change in its state of motion because they are acting in opposite direction with equal magnitudes. The effect of the

gravitational force will pull it down if the muscular force grows weak. The body will feel the stretch of gravitational force and will have to bend to cancel the magnitude of gravitational force. 3

Q. 2. Describe each effect of the force given below with one example.

- (a) Make an object move from rest.
- (b) May change the speed of an object.
- (c) May bring about a change in the shape of an object.

Ans. Effect of the force on following situations :

- (a) A child is standing on his bicycle. He exerts force on pedal which moves the cycle on the road. It indicates that an object can move from rest with effect of force.
- (b) A car is moving on the road in a slow speed. Applying force on the accelerator will increase the speed of the car.

(c) Take lump of dough in a plate. Make chapatis from that dough by rolling roller and putting pressure on it. It changes the shape by force. 3

Q. 3. What is atmospheric pressure ? How can we get an idea about the magnitude of atmospheric pressure ?

Ans. The envelop of air surrounding the earth is known as the atmosphere. The pressure exerted by this air is known as atmospheric pressure. The magnitude of atmospheric pressure can be felt by following experiment. Take a good quality rubber sucker. Press it hard on a smooth plane surface. When we press the sucker, most of the air between its cup and surface escapes out. The sucker sticks to the surface because the pressure of atmosphere acts on it. To pull the sucker off the surface, the applied force should be large. This activity might give you an idea about the magnitude of atmospheric pressure. 3

Long Answer Type Questions [5 marks]

Q. 1. Experimentally explain that pressure is exerted by liquid and gases on the wall of the containers.

Ans. Pressure exerted by liquid and gases on the wall of container can be explained by the following experiments.

Take a plastic bottle. Fix a cylindrical glass tube (a few cms long) near its bottom. Make sure that the water does not leak from the joint. Cover the mouth of glass tube with a thin rubber sheet. Fill the bottle upto half with water. The bulging of the rubber sheet in the case indicates that water exerts pressure on the sides of container or we can say that liquid exerts pressure on the walls of container.

In the case of gas, when we inflate a balloon the balloon will be filled with air and air exerts pressure and its shape has changed. So we find that gases, too, exert pressure on the walls of their container. 5

Q. 2. What are contact and non-contact forces ? Explain briefly with suitable examples.

Ans. Forces can be of two types :

1. Contact forces.
2. Non-contact forces.

(1) Contact forces : The forces that come into play when two objects come in contact with each other.

(a) Muscular force : The force which is exerted due to action of muscles is known as the muscular force. e.g., running, bending, walking etc.

(b) Frictional Force : The force responsible for changing the state of motion of an object. Equal and opposite forces are being exerted on an object when its surface comes in contact with other surface. e.g., a car or scooter comes to rest.

(2) Non-contact forces : The forces that can be exerted from a distance without establishing a contact are called the non-contact forces.

(a) Magnetic force : Force exerted by a magnet on another magnet or magnetic substance like iron is called magnetic force.

(b) Electrostatic force : Force exerted by a charged body on another charged body or uncharged body is called electrostatic force. e.g., If we rub a comb with hair and bring it near some small bits of paper it attracts the bits of paper towards itself. This is electrostatic force.

(c) Force of gravity : The earth pulls every freely falling object towards its centre. The force exerted by the Earth is called the force of gravity. 5

Value Based Questions [3 marks]

Q. 1. Through this chapter you are able to understand what is friction. On the basis of friction ask why do you sprinkle fine powder on the carrom board. Why your parents poured few drops of oil on the hinges of a door.

Ans. Actually friction is a one kind of force caused by the irregularities on the two surface in

contact. We have to do lot of work in some cases. We need to decrease the friction and in some cases we need to increase the friction. While playing carrom board we need smooth and slippery movement so we sprinkle fine powder to decrease the friction. Same as for the smooth movement of doors oil drops are poured on the hinges of a door. 5

Formative Assessment

(A) Oral Questions : (Answer in one word or in one line)

1. What a push or a pull on an object is called ?
2. What will be the magnitude of the force applied on an object in the same direction ?
3. Give examples to show the effect of the force on the following :
 - (a) To make an object move from rest.
 - (b) To change the direction of motion.
 - (c) To change in the shape of object.
4. What type of force is developed when you rub a comb through your dry hair ?
5. In which unit is pressure measured ?
6. What kind of force is the friction ?
7. How is strength of force expressed ?
8. What is the muscular force ?

Ans. 1. Force.

2. Force will be added to one another.
3. (a) Starting a car
- (b) Hit the ball with bat.
- (c) Pressure on the air filled balloon.
4. Electrostatic force.
5. Pascal or Newton/metre²
6. Friction is a force changing state of motion.
7. By its magnitude.
8. The force resulting due to the action of muscles is known as muscular force.

(B) True / False

1. A force arises due to the interaction between two objects.
2. Force has only magnitude.
3. Liquids and gases do not exert pressure on the walls of the container.
4. The force of atmospheric pressure is negligible.
5. Water in rivers flows downwards due to the force of gravity.

6. The force exerted by a magnet on a piece of iron is also a contact force.
7. Muscular force is a contact force.
8. Force is unable to change the shape of an object.

Ans. 1. True, 2. False, 3. False, 4. False, 5. True, 6. False, 7. True, 8. False.

(C) Quiz : (Give answer in one word or one line)

1. Name two contact forces.
2. Name two non-contact forces.
3. Give an example of friction force.
4. Attraction or repulsion between objects is which type of force ?
5. The force acting on a unit area of a surface is called ?
6. Objects or things fall towards the Earth because it pulls them. It is the example of which force.
7. What kind of force is it when a force is exerted by a magnet on a piece of iron ?
8. Which kind of force always acts on all the moving objects and its direction is always opposite to the direction of motion ?

Ans. 1. Muscular, frictional force.

2. Gravitational, magnetic force.
3. A moving ball stops.
4. Magnetic.
5. Pressure.
6. Gravitational.
7. Magnetic.
8. Frictional force.

(D) Puzzle

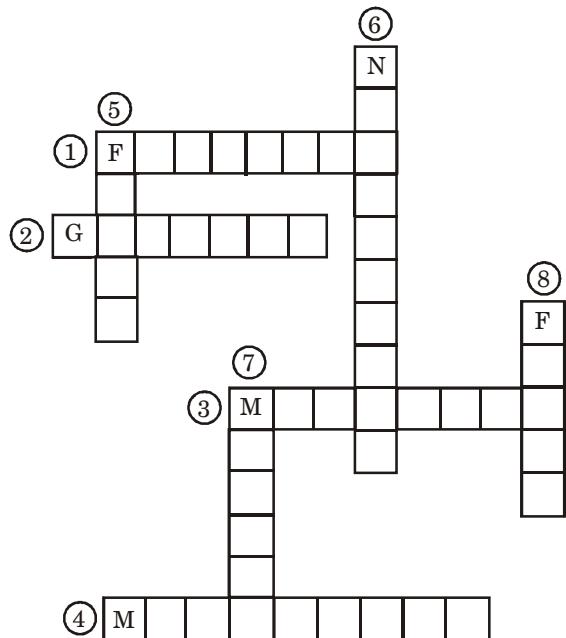
Across :

1. This force always acts on all the moving objects.
2. Objects fall towards the earth due to what ?
3. Force resulting due to action of muscles.

4. The strength of object is expressed by.

Down :

5. A push or pull.
6. Electrostatic force is an example of this.
7. Force can give this to rest object.
8. A push or pull.



Ans. Across :

1. Friction.
2. Gravity.
3. Muscular.
4. Magnitude.

Down :

5. Force.
6. Non-contact.
7. Motion.
8. Force.



FRICTION

Quick Review

- Any object, moving over the surface of another object, slows down when no external force is applied on it. This is due to the force of friction.
- Friction depends on the nature of surfaces in contact.
 - Force of friction is less on smooth surfaces.
 - Force of friction is greater on rough surfaces.
- The force required to overcome friction at the instant when an object starts moving from the rest is a measure of static friction.
- The force required to keep the object moving at a given speed is a measure of sliding friction.
- Friction is a necessary evil that makes us walk, write, hold things etc.
- **Increasing and reducing friction :**
 - Friction can be increased by making the contact surface rough. e.g., the treaded tyres of cars, trucks, provide better grip with the ground.
 - When it is needed to reduce the friction, the contact surface is smoothed or the substances which reduce friction called **lubricants**, are used.
- **Rolling friction :** When one body rolls over the surface of another body, the resistance to its motion is called rolling friction.
- **Fluid friction :** Fluids exert force of friction on objects in motion through them. The frictional force exerted by fluids is also called **drag**.
- Sliding friction is slightly less than static friction.
- **Factors affecting friction :**
 - (a) It depends on nature of surfaces in contact.
 - (b) More between rough surfaces and less between smooth surfaces.
 - (c) It depends on how hard the two surfaces press together.
 - (d) It is independent on the area of contact.
- The frictional force on an object in a fluid depends on
 - (a) its speed with respect to the fluid.
 - (b) the shape of the object.
 - (c) the nature of the fluid.
- To overcome drag, objects are provided with special shape called streamline. For e.g., shape of an aeroplane, bird etc.
- **Action of lubricant :** It avoids interlocking of irregularities on the two surfaces in contact with each other. e.g., grease, oil etc.

Summative Assessment

Very Short Answer Type Questions (1 mark)

- Q. 1. Is the friction same for all the surfaces ?**
Ans. No, it is not same for all the surfaces. 1

Q. 2. Which surface produces more friction ?
Ans. Rough surfaces produce more friction. 1

Q. 3. Which surface produces less friction ?
Ans. Smooth surfaces produce less friction. 1

Q. 4. What is the direction of frictional force ?
Ans. Its direction is always opposite to the direction of motion. 1

Q. 5. Which is less sliding friction or static friction ?
Ans. Sliding friction is less than the static friction. 1

6. What does friction do to soles of shoes ?
Ans. Friction wears out soles of our shoes. 1

7. Why does a matchstick catch fire when it is rubbed on a rough surface.
Ans. Matchstick catches fire due to friction. 1

Short Answer Type Questions—I (2 marks)

- | | |
|--|--|
| Q. 1. How many types of friction are there ? | Ans. There are three types of friction : |
| (a) Static | (b) Sliding |
| (c) Rolling | 2 |
| Q. 2. Why is it difficult to move on a wet marble floor ? | Ans. It is difficult to move on a wet marble floor because wet floor reduces the friction and it becomes slippery. 2 |
| Q. 3. Why are the tyres of cars and trucks treaded ? | Ans. The treaded tyres of cars and trucks provide better grip on the road. 2 |
| Q. 4. Why do kabaddi players rub their hands with soil ? | Ans. Because their hands become rough with soil and they get better grip on their opponents. 2 |
| Q. 5. Give two examples where friction is undesirable. | Ans. (1) We sprinkle fine powder on carrom board to reduce friction.
(2) Drops of oil are poured on the hinges of a door so that the door moves smoothly.
(1+1=2) |
| Q. 6. What do you mean by lubricants ? | Ans. The substances which reduce friction are called lubricants. e.g., oil, creams and grease. 2 |
| Q. 7. What is a drag ? | Ans. The frictional force exerted by fluids is called drag. 2 |
| Q. 8. When does rolling friction come into play ? | Ans. When a body rolls on other body, rolling friction comes into play. 2 |
| Q. 9. Name two methods of reducing friction with examples. | Ans. Two methods of reducing friction :
(1) Rolling : The rolling wheels attached to luggage bags make it comfortable for passengers to carry them because rolling reduces friction and is smaller than sliding friction.
(2) Sliding : By polishing surfaces or by applying a lubricant. (1+1=2) |
| Q. 10. What does frictional force exerted on an object in a fluid depend on ? | Ans. Frictional force on an object in a fluid depends on the speed with respect to the fluid and the nature of fluid. It also depends on the shape of the object. e.g., all vehicles are designed to have shapes that reduce fluid friction. Shape of boats and ships is streamlined. 2 |

Short Answer Type Questions-II [3 marks]

- Q. 1. What is the cause of friction ?**
Ans. Friction is caused by the irregularities on the two surfaces in contact. Even those surfaces that appear smooth have a large number of irregularities in them. The irregularity on the two surfaces lock each surface into one another. 3

Q. 2. You spill a bucket of soapy water on a marble floor accidentally. Would this make it easier or more difficult for you to walk on the floor ? Why ? (NCERT)

Ans. A bucket of soapy water spills on a marble floor accidentally. It is difficult to walk on it. The soap on floor reduces the friction and the foot is unable to make a proper grip on the floor and it starts slipping on the floor. 3

Q. 3. Explain why sportsmen use shoes with spikes. (NCERT)

Ans. Sports men use shoes with spike to increase the friction so that the shoes do not slip while they run or play. 3

Q. 4. Explain why objects moving in fluids must have special shapes. (NCERT)

Ans. When objects move through fluids, they have to overcome friction acting on them. In this process they lose energy. Objects are given special shapes that would make them lose less energy in over-coming friction. Stream lined shape is the shape that overcomes the friction of fluid easily. 3

Q. 5. Explain why sliding friction is less than static friction. (NCERT)

Ans. Sliding friction is always less than static friction. As two sliding objects find less time to get interlocked against each other, so they get less friction. 3

Q. 6. Mention three examples that show that friction produces heat.

Ans. Following examples show that friction produces heat :

- (a) Warming of our palms when we rub them.
- (b) Jar of mixer becomes hot when it runs.
- (c) Warming of the parts of a machine when it is operated. (1+1+1=3)

Q. 7. Friction is called a necessary evil. Why ?

Ans. Friction is called a necessary evil because we cannot do anything without friction and it also shows effects. No movement would come to an end without friction. No body would rest without friction. We cannot write with pen or pencil if there is no friction. If an object starts moving, it would never stop if there was no friction. It is also necessary for grip and bringing movements to rest.

3

Long Answer Type Questions [5 marks]

Q. 1. Give examples to show that friction is both a friend and a foe.

Ans. Friction is a friend because :

- (i) we can not write with pen or pencil, if there is no friction.
- (ii) we are unable to write on the black board with a chalk.
- (iii) if an object starts moving, it would never stop.
- (iv) the vehicles cannot be started or stopped.
- (v) we cannot fix a nail on the wall or tie a knot without friction

Friction as foe because :

- (i) it wears out materials whether they are screws, ball bearings.
- (ii) the shoes wear out due to friction.
- (iii) friction also produces heat. When a machine is operated, heat is generated that causes wastage of energy.
- (iv) the tyres of cars, buses and trucks etc also wear out due to friction.

(v) Friction reduces the speed due to which more force is required. 5

Q. 2. Discuss the various ways to reduce the friction.

Ans. Friction may be reduced in the following ways :

(1) Polishing the surface : We polish the rubbing surfaces to reduce their unevenness and make them smooth.

(2) Lubricating the surface : To reduce friction in order to increase efficiency when oil, grease or graphite is applied between the moving parts of a machine, a thin layer is formed there and moving surfaces do not directly rub against each other. These substances are lubricants which reduce the friction.

(3) Using wheels and ball bearings : By using wheels and ball bearing we convert sliding friction into rolling friction. This reduces friction between the two contact surfaces and helps us to save energy, effort and time.

(4) **Streamlining** : Objects are given special shapes, such as streamlined body to aeroplanes. Their bodies shapes them and make them lose less energy in overcoming friction. Hence, all vehicles are designed to have shapes that reduce fluid friction. 5

Q. 3. Name the factors that affect friction.

Ans. Factors affecting friction :

- (a) It depends on the nature of surfaces in contact.
- (b) It is more between rough surfaces and less between smooth surfaces.
- (c) It depends on how hard the two surfaces press together.
- (d) It is independent of the area of contact.

Formative Assessment

(A) Oral Questions : (Answer in one word)

1. Name the force that always opposes the applied force.
2. On what factor does force of friction depend ?
3. Give an example which shows that friction can produce heat.
4. Name the friction when wheels are used to carry heavy weights.
5. Name the friction that is overcome by most machines by the use of ball bearings. Name the type of friction with which it is replaced.
6. What makes it difficult to walk on wet floor ?
7. Why are soles of the shoes and the tyres of the vehicles treaded ?
8. How can fluid friction be minimized ?
9. Can we reduce friction to zero ?
10. Can friction never be entirely eliminated ?

Ans. 1. Friction.

2. Contact surface.
3. Rubbing of palm.
4. Rolling friction.
5. Sliding friction replaced rolling friction.
6. Smooth surface decreases friction.
7. Due to force of friction.
8. Changing the shape of machine.
9. No, because no surface is perfectly smooth.
10. No.

(B) True / False

1. Friction increases with mass of objects in contact.
2. Friction can be entirely eliminated.
3. Friction does not cause any wastage of energy.
4. Heat is produced due to friction.

5. Friction depends on nature of surfaces in contact.

6. The friction force on an object in a fluid depends only on its speed.
7. The friction force also depends on the shape of the object and the nature of fluid.
8. Use of ball bearing between the hubs are the example of rolling friction.
9. Use of lubricants increases the friction.
10. Stricking a match stick produces fire by friction.

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

(C) Quiz : (Give answer in one word or one line)

1. Name the type of friction for the following examples :
 - (a) A moving ball stops.
 - (b) A child is pulling luggage with wheel bag.
 - (c) Axles of ceiling fans and bicycles.
 - (d) Shape of an aeroplane.
 - (e) Pushing a cart.

Ans. (a) Friction, (b) Rolling friction, (c) Sliding friction, (d) Fluid friction, (e) Friction.

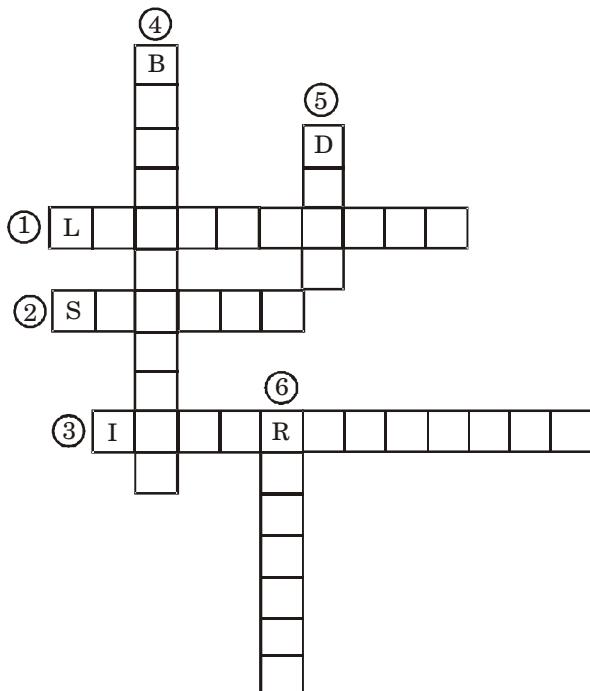
(D) Puzzle

Across :

1. The substance that reduces friction.
2. Friction when we try to move an object at rest.
3. Apply a force to overcome.

Down :

4. Axles of bicycles.
5. The frictional force exerted by fluids is called.
6. Body rolls over the surface of another body.



Ans. Across :

1. Lubricants.

2. Static.

3. Interlocking.

Down :

4. Ball bearing.

5. Drag.

6. Rolling.

Extending learning : Activities and projects

1. Do some activities while performing following experiments to check different types of friction :

(a) Skate on rough surface and smooth surface.

(b) Take few pencils and roll a book on it.

(c) While riding a cycle watch axles of bicycles.

(d) Make a paper plane and fly it in the air. Observe and write your observations in brief.

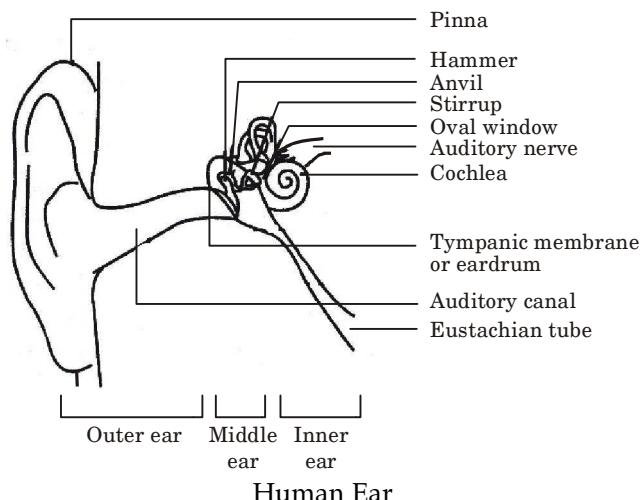


13

SOUND

Quick Review

- Sound is a form of energy.
- Sound is produced by a vibrating body.
- To and fro or back and forth motion of an object is called vibration.
- Sound is produced by humans through the voice box or the larynx. It is situated at the upper end of the wind pipe. Two vocal cords, are stretched across the voice box and have a narrow slit between them. When the lungs force air through the slit, the vocal cords vibrate and produce sound.
- Sound needs a medium for propagation.
- We hear sound through our ears.
- **Amplitude** is the maximum distance from mean position. Loudness of sound depends upon its amplitude.
- **Time period** : The time taken by a vibrating body to complete one oscillation.
- **Frequency** is the number of oscillations per second. The SI unit of frequency is Hertz. The frequency determines the shrillness or pitch of a sound. Usually male has low pitched (bass) sound and female has high pitched sound (shrill).
- 20 Hz to 20,000 Hz is audible sound for human beings. Sound less than 20 Hz frequency is called **infrasonic sound** and sound more than 20 kHz is called **ultrasonic sound**.
- Unpleasant sound called noise may cause health problems to humans beings.
- **Noise pollution** : Televisions, transistors, radios at high volumes, desert coolers, air conditioners, horn of vehicles etc. cause noise pollution.
- **Measures to limit noise pollution** : Silence devices must be installed in aircraft engines, transport vehicles etc. Trees must be planted along the roads and around buildings to cut down on the sound.



- We hear sound through our ears. The human ear has three main parts :
 - (a) **Outer ear** : It has a canal at the end of which is a stretched membrane called eardrum. The sound waves pass through ear canal and eardrum to vibrate.
 - (b) **Middle ear** : It has a set of three bones that are linked together and attached to the eardrum. These bones receive vibrations from eardrum and pass on to the inner ear.
 - (c) **Inner ear** : The inner ear receives vibrations from the middle ear and changes them into nerve impulses that are interpreted by the brain and we hear the sound.
- If v = velocity of sound wave, n = frequency of sound wave, λ = wavelength of sound wave.
then
$$v = n\lambda$$

Maximum speed of sound is in solids, followed by liquids and then in gases.

Summative Assessment

Objective Type Questions (1 mark)

(A) Multiple Choice Questions

1. Sound can travel through :
 - (a) Gases only
 - (b) Solids only
 - (c) Liquids only
 - (d) Solids, liquid and gases.
2. Loudness depends upon :
 - (a) Frequency
 - (b) Oscillation
 - (c) Vocal cords
 - (d) Amplitude.
3. Frequency determines the :
 - (a) Pitch
 - (b) Frequency
 - (b) Vocal cords
 - (d) Amplitude.
4. Audible range for human being :
 - (a) 20 Hz-2000 Hz
 - (b) 20 Hz-20,000 Hz
 - (c) 2 Hz-2000 Hz
 - (d) 200 Hz-2000 Hz
5. Sound is a type of :
 - (a) Energy
 - (b) Force
 - (c) Pressure
 - (d) Charge.
6. Pitch of the sound depends on its :
 - (a) Noise
 - (b) Amplitude
 - (c) Frequency
 - (d) Medium of proposal.
7. The voice of females are :
 - (a) High pitched
 - (b) Low pitched
 - (c) Normal
 - (d) None of these.
8. The number of oscillations per second is called :
 - (a) Frequency
 - (b) Amplitude
 - (c) Hertz
 - (d) All the above.

Ans. 1. (d) Solids, liquids and gases.

2. (d) Amplitude.
3. (a) Pitch.
4. (b) 20 Hz to 20,000 Hz.
5. (a) Energy.
6. (c) Frequency.

7. (a) High pitched.
8. (a) Frequency.

(B) Fill in the blanks :

1. is produced by vibrating objects.
2. In human being, the vibration of the produces sound.
3. The frequency is expressed in
4. Larger the amplitude of vibration, the is the sound.
5. Unpleasant sounds are called
6. on the roadside and everywhere can reduce noise pollution.
7. Loudness is determined by
8. Dogs have the ability to hear sounds of frequencies higher than Hz.

Ans. 1. Sound.

2. Vocal cords.
3. Hertz.
4. Louder.
5. Noise.
6. Plantation.
7. Amplitude.
8. 20,000 Hz.

(C) Match the Column :

- | | |
|----------------|------------------------------|
| 1. Audible. | (A) Amplitude. |
| 2. Eardrum | (B) Voice box. |
| 3. Hertz | (C) 20 Hz to 20,000 Hz |
| 4. Larynx | (D) Thin membrane in ear. |
| 5. Loudness | (E) Frequency determines it. |
| 6. Oscillation | (F) Voice box on this. |
| 7. Pitch | (G) One complete vibration. |
| 8. Wind pipe | (H) Unit of frequency. |

Ans. 1. → (C), 2. → (D), 3. → (H), 4. → (B),
5. → (A), 6. → (G), 7. → (E), 8. → (F).

Very Short Answer Type Questions [1 mark]

Q. 1. Define sound.

Ans. Sound is a type of energy that makes us hear.

Q. 2. What is vibration ?

Ans. The to and fro motion of an object is called vibration.

Q. 3. What is the other name of voice box ?

Ans. Larynx.

Q. 4. Which two properties of sound help us to recognize it ?

Ans. Frequency, amplitude.

Q. 5. Which animal can hear sounds of frequencies higher than 20,000 Hz ?

Ans. Dogs, cats.

Q. 6. Write a common ill effect of noise pollution.

Ans. Hypertension.

Q. 7. Does sound travel through all mediums?

Ans. Yes, it travels through all mediums such as solid, liquid and gases.

Q. 8. Write a precaution to prevent eardrum damage.

Ans. Never put a sharp, pointed or hard thing into your ear.

Q. 9. Define 1 Hertz.

Ans. 1 Hz is one oscillation per second.

Q. 10. What is the unit of loudness. At and after which range noise becomes painful ?

Ans. Decibel, at about 80 dB and afterwards the noise becomes audibly painful.

Short Answer Type Questions—I [2 marks]

Q. 1. A pendulum oscillates 40 times in 4 sec. Find its time period and frequency. (NCERT)

$$\text{Ans. Time period} = \frac{t}{\text{No of oscillations}} = \frac{4}{40} \\ = 0.1$$

$$\text{Frequency} = \frac{\text{No of oscillations}}{\text{Time}} = \frac{40}{0.4} \\ = 10 \text{ Hertz. } 2$$

Q. 2. 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 ? (NCERT)

$$\text{Ans. Time period} = \frac{1}{500} = 0.002 \text{ sec. } 2$$

Q. 3. Sketch larynx and explain its function. (NCERT)

Ans. In humans, the sound is produced by the voice box or the larynx.

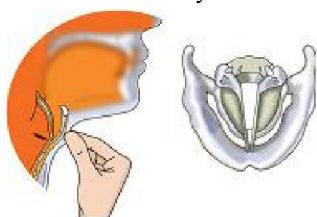


Fig. : Voice box in humans

Functioning : It is the upper end of the wind pipe. Two vocal cords are stretched across the voice box. It leaves a narrow slit between them for the passage of air. When the lungs force air through the slit, the vocal cords vibrate, producing sound. 2

Q. 4. Why are the voices of men, women and children are different ?

Ans. The vocal cords in men are about 20 mm long. In women these are about 5 mm shorter. Children have very short vocal cords. This is the reason that why the voices of men, women and children are different. 2

Q. 5. Compare the sound of drum and whistle.

Ans. The frequency determines the shrillness or pitch of a sound. A drum vibrates with low frequency. Therefore, it produces low pitched sound. Whistle has a high frequency and therefore, produces a sound of higher pitch. 2

Q. 6. Sound needs a medium for propagation. Explain it with an experiment.

Ans. Sound needs a medium for propagation. Take a metal or glass tumbler. Place a cellphone in it. Ask your friend to give a ring on this cellphone. Listen to the ring carefully. Now surround the rim of the tumbler with your hands. Suck all the air in the tumbler. Once again make a ring in cellphone. Sound will completely stop because air has been removed completely from the vessel and form vacuum. Hence sound needs a medium for propagation.

Q. 7. What is the difference between noise and musical sound ?

Ans. Unpleasant sounds are called noise and the sounds that seem pleasing to the ear is called musical sound. 2

Q. 8. What is ultrasound ? What are its uses ?

Ans. Sound frequencies higher than 20,000 Hz are called ultrasound. It is used as diagnostic

tool in medical science. It is also used to relieve pains in joints, muscles. It is used to detect flaws in metals and structures, to test the thickness of various parts. 2

Q. 9. What are the harms of noise pollution ? (NCERT)

Ans. Harms of noise pollution : Presence of excessive noise in the surrounding area may cause.

- Lack of sleep.

- Hypertension (High blood pressure).
- Anxiety and other health disorders.
- Temporary or even permanent impairment of hearing. 2

Q. 10. What is noise pollution ?

Ans. Presence of unwanted and excessive sounds in the environment is called noise pollution. It causes discomfort to us. Excessive sounds are produced by horns, loudspeakers, crackers and machines.

Short Answer Type Questions-II [3 marks]

Q. 1. Which part of the following objects vibrate when sound is produced.

- Ringing of a sound bell.
- Buzzing of insects.
- Bursting of balloon.
- Brushing of table.
- Playing a sitar.
- Dholak.
- Sitar.
- Flute.

Ans. (a) Vibration of metal surface.

- Flapping of wings.
- Air vibrates to produce sound.
- Vibrations of membrane.
- Vibration of string.
- Stretched membrane.
- Strings.
- Air column.

3

Q. 2. What is hearing impairment ? How do people over come this problem ?

Ans. Hearing impairment means not able to hear properly. Partial disability is generally the result of a disease, injury or age. Children with impaired hearing need special care by learning sign language. Technological devices for the hearing impaired have made it possible for such person to improve their quality of life. 3

Q. 3. What is frequency ? How does it affect the quality of sounds ?

Ans. The number of oscillations per second is called frequency. Its unit is Hertz. Frequency determines the shrillness of sounds. It is also called pitch of sound. The high frequency makes the high pitch and if the pitch is low, the frequency is less. High pitched sound (females) is shrill whereas low pitched sound (males) is hoarse. 3

Q. 4. (a) Define an oscillation ?

- Hertz

Ans. (a) **Oscillation :** The to and fro motion of an object is called vibration. This motion is also called oscillatory motion. (b) The number of oscillations per second is called the frequency in Hertz (Hz). A frequency of 1 Hz is one oscillation per second. (1½+1½=3)

Q. 5. What do you mean by vacuum ? What happens to the loudness of sound in vacuum ?

Ans. The decreasing amount of air decreases loudness of sound. When air is removed completely from a vessel, it is said that there is a vacuum. If all air is sucked from the vessel the sound would stop completely. The sound cannot travel through a vacuum.

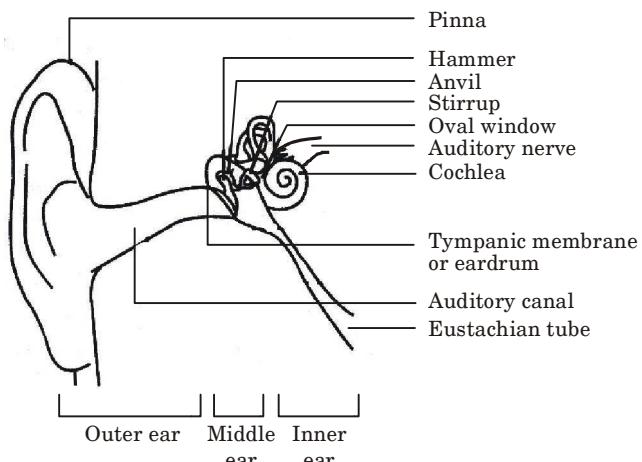


Fig. : Human Ear

Q. 6. Explain the structure of human ear and its functions.

Ans. Structure and function of human ear : The hearing organs in humans are ears. It is divided into three parts—outer, inner and middle ear. Middle ear has a stretched structure called ear drum. When ears receive sound, it enters down the ear canal and reaches eardrum. Sound vibrations, vibrates the eardrum and it sends vibrations to inner ear from which vibrations are sent to the brain for interpretation of sound.

Q. 7. Name three bones present in the middle ear.

Ans. Malleus Incus Stapes (M.I.S.).

Q. 8. Write two functions of human ears.

Ans. (1) They help us in listening any sound.
(2) They act as balancing organs.

Long Answer Type Questions [5 marks]

Q. 1. How can noise pollution be controlled ?

Ans. Presence of excessive noise in the surrounding may cause noise pollution, which is harmful to human health. Here are some measures to limit noise pollution :

- Noise producing industries should be setup away from residential areas.
- Silencing devices must be installed in aircraft engines, transport vehicles, industrial machines and heavy

appliances.

- Use of automobile horn should be minimized.
- TV and music system should be run at low volumes.
- Trees must be planted along the sides of the roads and around buildings to cut down the sounds reaching the residents.

5

Value Based Questions [5 marks]

Q. 1. Presence of excessive or unwanted sounds in the environment is called noise pollution. List some sources of noise pollution. What are the harms of noise pollution. What are the measures to control noise pollution ?

Ans. Sources of Noise Pollution : Major sources of noise pollution are — sounds of vehicles, explosions including bursting of crackers, machines, loudspeakers etc. At home high volume of television, transistor radio and sound of some kitchen appliances, desert cooler etc. all contribute to noise pollution.

Name of Noise Pollution Diseases : This noise pollution may cause many health related problems. Lack of sleep, hypertension, anxiety and many more health disorders may cause, such as impairment of hearing.

Measures Undertaken to limit Noise Pollution : For this, silencing devices must be installed in machines. All noisy operations must be conducted away from any residential area. TV and music should be run at low volumes. Trees must be planted along the roads and around the buildings to cut down the sounds.

5

Formative Assessment

(A) Oral Questions : (Answer in one word)

1. How is sound produced ?
2. Define vibration.
3. Name two instruments that are commonly used in different parts of our country.
4. Name the organ by which sound is produced in human body.
5. What does sound need to propagate ?
6. On which property does loudness of sound depend ?
7. Here sound is unable to propagate. Name it.
8. Name the thin membrane of our ear.
9. What happens if our eardrum gets damaged ?
10. What determines the shrillness or pitch of a sound ?
11. What is audible sound range for human

beings ?

12. Which sound frequency is inaudible for human beings ?

Ans. 1. By vibrations.

2. To and fro or back and forth movement of a body is called vibration.
3. Dholak, sitar.
4. Voice box, larynx.
5. Medium.
6. Amplitude.
7. Vacuum.
8. Eardrum.
9. Hearing impairment.
10. Frequency.
11. 20 Hz to 20,000 Hz.
12. Less than 20 Hz (Infrasound) more than 20,000 Hz (Ultrasound).

(B) True / False

1. Only air can cause pollution, not sound.
2. Plantation of trees can reduce the sound pollution.
3. Health disorders can be caused by noise pollution.
4. Unpleasant sounds are called music.
5. Nobody can hear sounds of frequencies higher than 20,000 Hz.
6. A bird makes a high-pitched sound whereas a lion makes a low pitched roar.
7. Loudness of sound depends upon pitch.
8. Sound can travel through wood or metal.
9. Sound is produced in human by voice box and the larynx.
10. Only to and fro motion of an object is called vibration.

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

(C) Quiz : (Name them)

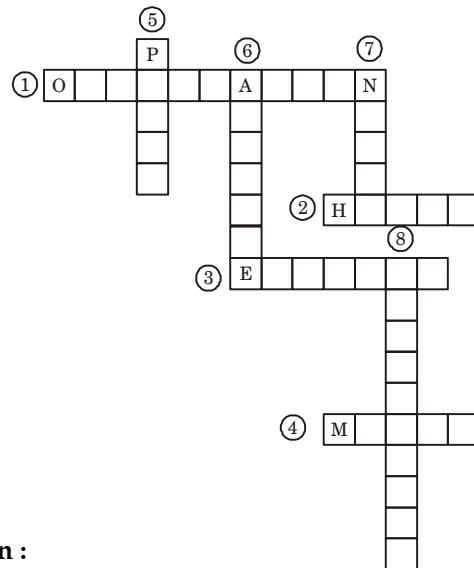
1. To and fro or back and forth motion of an object.
2. Sound producing organ of human body.
3. Sound needs it to propagate.
4. One complete vibration is called.
5. Frequency is expressed in what ?
6. Maximum displacement from mean position.
7. What does the frequency determine ?
8. Unpleasant sounds are called ?
9. Sounds of vehicles, explosions including bursting of crackers, machines, loud-speakers etc. cause it.

Ans. 1. Vibration.

2. Voice box, larynx.
3. Medium.
4. Oscillation.
5. Hertz.
6. Amplitude.
7. Pitch.
8. Noise.
9. Sound pollution.

(D) Puzzle**Across :**

1. A complete frequency.
2. Unit of frequency.
3. A thin stretched membrane in the ear.
4. Pleasant sound

**Down :**

5. Frequency determines it.
6. Hearing range.
7. Unpleasant sound.
8. More than 20,000 Hz range.

Across :

- | | |
|-----------------|---------------|
| 1. Oscillation. | 5. Pitch. |
| 2. Hertz. | 6. Audible |
| 3. Eardrum. | 7. Noise |
| 4. Music | 8. Ultrasonic |

Down :

- | | |
|-----------------|---------------|
| 1. Oscillation. | 5. Pitch. |
| 2. Hertz. | 6. Audible |
| 3. Eardrum. | 7. Noise |
| 4. Music | 8. Ultrasonic |

Extending Learning : Activity and Projects
Identify the sources of noise pollution in your locality. Discuss with your parents, friends and neighbours. Suggest how to control noise pollution. Prepare a brief report and present it in the class. **(NCERT)**



CHEMICAL EFFECTS OF ELECTRIC CURRENT

Quick Review

- Some liquids are good conductors of electricity and some are poor conductors.
- The heating effect of current, the filament of bulb gets heated and starts glowing. If current is weak, the filament does not get heated and it does not glow.
- LED (Light Emitting Diodes) can be used in place of electric bulb in the tester. LED glows even if a weak electric current flows through it.
- Distilled water is a poor conductor of electricity. Impure water or salt dissolved water can conduct electricity.
- The passage of an electric current through a conducting solution causes chemical reaction. As a result bubbles of gas may be formed on the electrodes. Deposits can also be seen on electrodes.
- Electroplating is the process of depositing a layer of any desired metal on another material by means of electricity.
- Electroplating is widely used in industries for coating one metal object with another metals.
- The electrode connected to the positive terminal of battery is called anode and the one connected to the negative terminal of the battery is called cathode.

Summative Assessment

Objective Type Questions [1 mark]

(A) Multiple Choice Questions

1. This glows even when a weak electric current flows through it :
(a) LED (b) Bulb
(c) Tube light (d) All.
2. Plastic wire is :
(a) A bad conductor
(b) A good conductor
(c) An insulator (d) none of these.
3. Adding salt to distilled water makes it :
(a) Insulator (b) Good conductor
(c) Nothing (d) Salty.

4. Deposits of metal may be seen on :
(a) Container (b) in the solution
(c) Electrodes (d) None of above.
5. An electrolyte is :
(a) A metal (b) A solution
(c) A liquid that conduct currents
(d) All.
6. Electrolysis of water containing a little amount of dil. H_2SO_4 given :
(a) H_2 only (b) O_2 only
(c) No reaction (d) H_2 & O_2 both.

7. The article to be electroplated is made of :
(a) An anode (b) Cathode
(c) In solution (d) Any.

8. Which liquid will not show deflection if compass is in circuit of the tester ?
(a) Lemon juice (b) Vinegar
(c) Tap water (d) Vegetable oil.

Ans. 1. (a) LED
2. (c) An insulator
3. (b) Good conductor
4. (c) Electrodes
5. (c) A liquid that can conduct currents
6. (d) H_2 and O_2 both
7. (b) Cathode
8. (d) Vegetable oil.

(B) Fill in the blanks :

1. Most liquids that conduct electricity are solutions of , and
 2. The passage of an electric current through a solution causes effects.
 3. If you pass current through copper sulphate solution, copper gets deposited on the plate connected to the terminal of the battery.
 4. The process of depositing a layer of any desired metal on another material by means of electricity is called
 5. is an example of an electrolytic solution.

- water is a poor conductor of electricity.
 - An electric lamp glows due to effect of electric current.
 - does not corrode easily.

Ans. 1. Acids, bases, salts.

2. Chemical.
 3. Negative.
 4. Electroplating.
 5. Copper sulphate solution.
 6. Distilled.
 7. Heating.
 8. Plastic.

(C) Match the Column :

- | | |
|---|-------------------------|
| 1. Insulator | (A) Electric circuit. |
| 2. Conductor | (B) Conducts current. |
| 3. Closed path | (C) Prevent rusting. |
| 4. Solution of distilled water and salt | (D) Rubber. |
| 5. Electroplating | (E) Copper. |
| 6. Copper and aluminium | (F) Electrodes. |
| 7. A tester | (G) Good conductor. |
| 8. Carbon rod | (H) Detect the current. |
| 9. Lemon juice | (I) Good Conductors. |

Ans. 1. \rightarrow (D), 2. \rightarrow (E), 3. \rightarrow (A), 4. \rightarrow (B),

Very Short Answer Type Questions (1 mark)

Q. 1. What are good conductors of electricity ?

Ans. The materials that allow electric current to pass through them are called good conductors of electricity. 1

Q. 2. Give two examples of good conductors.

Ans. Silver, copper. 1

Q. 3. Why is it dangerous to touch appliances with wet hand ?

Ans. Our body is a good conductor of electricity and wet hands are also good conductors. Hence, by touching electrical appliances with wet hands electricity passes through our body and we feel a shock. 1

Q. 4. What is electric current ?

Ans. The flow of electricity is called electric current. 1

Q. 5. Which effect of current causes the bulbs to glow ?

Ans. Heating effect.

Q. 6. What is the magnetic effect of electric current?

Ans. The electric current also produces magnetic effect. A current carrying conductor behaves like a magnet. 1

Q. 7. What is distilled water ?

Ans. The water that does not contain salts is called distilled water. 1

Q. 8. What are electrodes ?

Ans. The metal rods dipped in liquids to which a cell is attached are called electrodes. 1

Short Answer Type Questions—I (2 marks)

Q. 1. What is a tester ?

Ans. The instrument that is used to check the flow of electric current is called tester. It is attached

to the terminals of the electric circuits. If the bulb of the tester glows, it confirms that current is flowing through the circuit. 2

Q. 2. The bulb does not glow in the setup shown. List the possible reasons. Explain your answer. (NCERT)

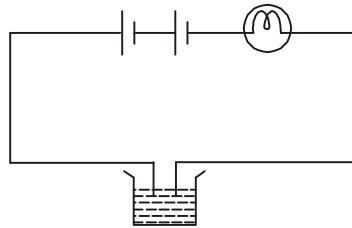


Fig. Set up

Ans. The bulb does not glow due to the following reasons :

- (i) Bulb may be fused.
- (ii) Liquid is non-conducting.
- (iii) Cells may be used up.
- (iv) Connections of the circuit may be loose.

2

Q. 3. Does pure water conduct electricity ? If not, what can we do to make it conducting ? (NCERT)

Ans. Pure water is bad conductor of electricity. To make it conducting, some salt may be added into water. The dissolved salt makes it a good conductor of electricity.

2

Q. 4. Is it safe for the electrician to carry out electrical repair outdoors during heavy down pour ? Explain. (NCERT)

Ans. No, it is highly dangerous to carry out electric repair out door during heavy down pour because rain water and our body both are highly conducting and electricity can easily pass through. Thus, we experience high shock and it may cause electrocution.

2

Q. 5. Paheli had heard that rain water is as good as distilled water. Hence, she collected some rain water using a tester. To her surprise she found that the compass needle showed deflection. What could be the reasons ? (NCERT)

Ans. Paheli had heard a truth that rain water is as good as distilled water. But the dissolved impurities present in atmosphere enter into it and makes it a good conductor. So, it shows deflection when she checks it with a tester.

2

Q. 6. Prepare a list of objects around you that are electroplated. (NCERT)

Ans. Objects that are generally electro-plated are as follows :

- Ornaments.
- Wheel rims of vehicles.
- Tin cans.
- Handles of vehicles.
- Electric decorative appliances.

- Kitchen gas burner.
- Fan blades.
- Pots of metals
- Utensils etc.
- Door and window handles.

2

Q. 7. The ordinary water can conduct electricity while distilled water can not. Explain why ?

Ans. The ordinary water that we get from the tap, river, lakes and ponds is not as pure as distilled water. It contains so many impurities in the form of salts. These impurities make it good conductor of electricity. As distilled water is free from salt, it is unable to conduct electricity.

2

Q. 8. Write a short note on LED.

Ans. LEDs are Light Emitting Diodes. They are used to check electric current. Even when a weak electric current flows through it, they glows. These are available in many colours such as red, green, yellow, blue and white. LEO has two wires, one is longer and the other is shorter. Larger wire is connected with + ve terminal and – ve to the shorter terminals.

2

Q. 9. When do you need magnetic compass to test the conduction of electricity ?

Ans. If current is small, the bulb does not glow on passing electric current through the tester. Hence to check the small current we need magnetic compass to test the conduction.

2

Q. 10. Can some fruits and vegetables conduct electricity ? Explain with an example.

Ans. Some fruits and vegetables also conduct electricity. It is explained with the following example.

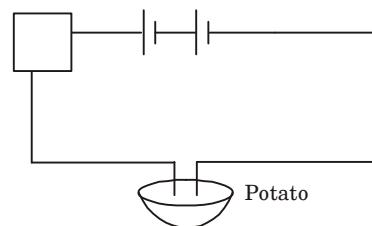


Fig. Experiment to show Potato conducts electricity

- Cut a potato into two halves.
- Insert the copper wires of a tester into it.
- Keep it for an hour.
- There appears a greenish blue spot on the potato around one wire.
- It is because the current produces a chemical effect on potato.
- Hence, it is clear that vegetables conduct electricity.

2

Short Answer Type Questions-II [3 marks]

Q. 1. Experimentally prove that solutions of acids, bases and salts conduct electricity.

Ans. The solutions of acids, bases and salts conduct electricity. This can be experimentally proved by following method :

- Take three clean plastic or rubber caps of bottles.
- Pour about two teaspoon full of distilled water in each of them.
- Add few drops of lemon juice in one cap.
- Add a few drops of as base as caustic soda in second cap.
- Add little salt to third cap to form salt solution.
- Now conduct electricity through each. An electric current flows through all the conducting solutions thus indicating that acids, bases and salts conduct electricity. 3

Q. 2. What are the chemical effects of electric current ? Explain with an example.

Ans. Chemical effects of electric current can be explained by following experiment :

- Take two carbon rods with metal caps. Clean their metal cap.

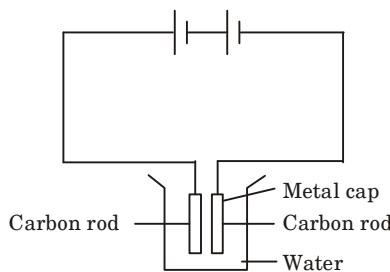


Fig. : Passing current through water

- Wrap copper wires around the metal caps of the carbon rods and join them to a battery.
- Pour a cup full of water in a glass bowl and add a tea spoon of salt.
- Immerse the electrodes in solution but metal caps should be out of the water.
- Wait for 5 min.
- Observe the electrodes.
- The passage of an electric current through a conducting solution causes chemical reaction. As a result, bubbles

of gas are formed in the electrode. Deposits of metal may be seen on electrodes. Change of colour of solution may occur. These are some of the chemical effects of the electric current. 3

Q. 3. Discuss two methods of testing a conductor or an insulator.

Ans. The following methods are used to test the conduction :

- (i) The conductivity of substance can be checked by using electric bulb. When the liquid between the two ends of the tester allows the electric current to pass, the circuit of the tester becomes complete. The current flows in the circuit and the bulb glows. If the circuit of tester is not complete the bulb does not glow. This method does not work when current is very small.

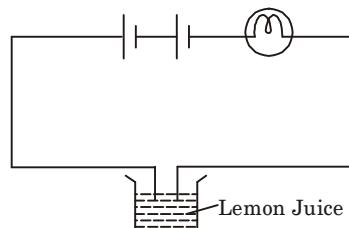


Fig. : Testing Conduction of Electricity

- (ii) We can use another effect of an electric current to test the conduction. A magnetic tester is also used to test conductivity. When current is allowed to pass through it, it creates a magnetic field and the compass shows deflection. The deflection of compass shows that the current is passing through circuit.

Magnetic Compass

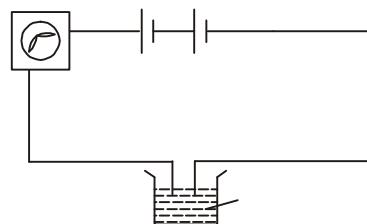


Fig. Testing conduction of Electricity using magnetic compass

Long Answer Type Questions [5 marks]

1. What is electroplating ? What are its advantages ?

Ans. The process of depositing a layer of any desired metal on another material by means

of electricity is called electro plating.

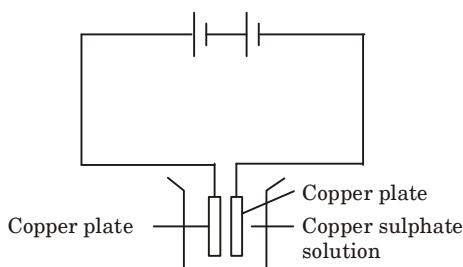


Fig. : A simple circuit showing electroplating

Advantages of Electroplating :

- (i) It is used to coat a desired metal on other metal.
- (ii) It protects the metals from corrosion.
- (iii) It also prevents the metallic surface from rusting.
- (iv) Some cheap and dull metals are coated with costly and shining metals for ornamental use.
- (v) It can make more reactive metals like iron less reactive.
- (vi) Coating of chromium on metals give lustre to objects.

5

Value Based Questions [5 marks]

Q. 1. One day Rohan went to his friend's house. He was surprised to see that most of the electrical appliances at his house were functional. For example, tube light and fan in all rooms, two TV's, computer, light of toilet and kitchen all were switched on. Rohan told his friend that this is not the way to use electricity. Now the question arises whether this habit of consuming electrical energy is acceptable or not? Will it not affect the economical condition of family as well

as the nation ? How ?
Ans. No, it is highly unacceptable. It is the wastage of national energy resource and these kind of habits should be punished or fined. It can affect the economical condition of family and nation both. As they have to pay much more amount as bill and nation have to produce more electricity by using more resources or they have to decrease the amount of power supply. 3

Formative Assessment

(A) Oral Questions : (Answer in one word)

1. Do liquids conduct electricity ?
2. Give example of an liquid conductor.
3. Can distilled water conduct electricity ?
4. How can we test that liquids conduct electricity ?
5. Name one substance which makes a liquid good conductor of electricity.
6. Among these which are conductors/insulators—Lemon juice, Vinegar, Milk, Honey, Tap water, Vegetable oil.

Ans. 1. Yes, liquids can conduct electricity.
2. Tap water, lemon juice.

3. No.
4. By tester.
5. Salts.

6. Conductors : Lemon, Vinegar, Tap water.
Insulators : Vegetable oil, Honey, Milk.

(B) True/False

1. Plastics are the good conductors of

electricity.

2. Flow of electrons is called electric current.
3. Materials that do not allow electric current to pass through them easily, are good conductors of electricity.
4. Only solids can conduct electricity.
5. Distilled water is poor conductor of electricity.
6. Tester is used to test the conductivity of liquid.
7. Electric bulb glows due to chemical effect of electricity.
8. The bulb gets heated to a high temperature and it starts glowing when electric current passes through it.
9. Poor conductors also allow electricity to pass under certain conditions.
10. Lemon juice shows deflection means that it is a good conductor.

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

(C) Quiz ; (Name them)

1. What are the uses of tester ?
2. How will you make distilled water as super conductor ?
3. What are the main benefits of electro-plating ?
4. What is LED ?
5. Which solutions of most liquids conduct electricity ?
6. What happens when electric current is passed through a conducting solution ?
7. Name the British chemist who had shown that if electrodes were immersed in water and current is passed bubbles of O₂ and H₂ gas are produced.
8. What happens when electric current is passed through the copper sulphate solution as electrolyte ?

Ans. 1. To check the flow of electric current.

2. By adding salts.
3. To prevent from corrosion.
4. Light Emitting Diode.
5. Solutions of acids, bases and salts.
6. Chemical reactions.
7. William Michalson.
8. It dissociates into copper and sulphate ions.

(D) Puzzle**Across :**

1. Two rods in electric solution are called.
2. Plastics are this to heat and electricity.
3. This glows even on weak current.
4. Used to check the current.

Down :

5. Process when a metal coated on other metal.
6. Free ends joined with it.
7. An electrolytic solution.

8. An electrolyte.

Ans. Across :

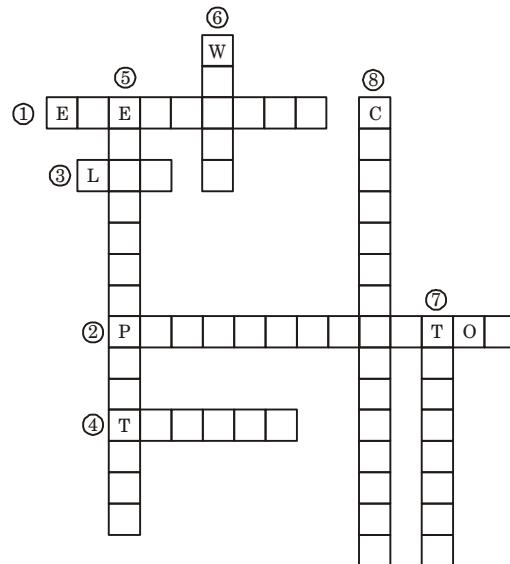
1. Electrodes.
2. Poor conductor.
3. LED.
4. Tester.

Down :

5. Electroplating.
6. Wires.
7. Tap water.
8. Copper sulphate.

Extended Learning : Activities and Projects

1. Make a short project. Observe the different things that are electroplated. Make a file under the following headings :
 - (i) Name of the article.
 - (ii) Electroplated by metal.
 - (iii) Process.
 - (iv) Picture.



SOME NATURAL PHENOMENA

Quick Review

- Cyclones, tsunami, earthquakes, droughts, lightning etc., are some destructive natural phenomena.
- **Lightning** is an electric spark, on a huge scale.
- In 1752, **Benjamin Franklin, an American scientist**, showed that lightning and the spark from clothes are essentially same phenomena.
 - Rub a plastic with soft cotton cloth, It can attract very small pieces of paper.
 - When a plastic refill is rubbed with polythene it attracts paper pieces.
 - In all the above activities the rubbed acquires a small electric charge. These objects are called **charged objects**.
 - There are two types of charges—positive charge and negative charge. Like charges repel and unlike charges attract each other.
 - It is a convention to call the charge acquired by a glass rod when it is rubbed with silk as **positive**. The other kind of charge is said to be **negative**.
 - A device can be used to test whether an object is carrying charge or not. This device is known as **electroscope**.
 - The process of transferring of charge from a charged object to the Earth is called **earthing**.
 - Earthing is provided in a building to protect us from electrical shocks due to any leakage of electric current.
 - Lightning strike can destroy life and property.
- Lightning conductor is a device used to protect tall buildings from the effect of lightning.
 - **Earthquakes** : An earthquake is sudden shaking or trembling of the earth, which lasts for a very short time.
 - **Earthquakes** can cause floods, tsunami, landslides etc.
 - The tremors are caused by the disturbance deep down inside the earth crust. The outermost layer of the earth is not in one piece. It is fragmented and each fragment are called plate. These plates are in continuous motion. When they brush past one another, they cause disturbance resulting in an earthquake on the earth surface. The weak zones of the Earth plates are also known as **Seismic or Fault Zones**.
 - The power of an earthquake is expressed in terms of a magnitude on a scale called the Richter scale.

Summative Assessment

Objective Type Questions

(A) Multiple Choice Questions

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 woolen cloth
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.
3. Lightning is also an :
 - (a) Electric current
 - (b) Electric spark on a huge scale
 - (c) Electric charge
 - (d) Small electric spark.
4. A device can be used to test whether an object is carrying charge or not :
 - (a) Seismograph
 - (b) Lightning conductor
 - (c) Richter scale
 - (d) Electroscope.
5. Earthing is provided in buildings to protect us from :
 - (a) Clouds
 - (b) Rain
 - (c) Electric shocks
 - (d) All.
6. A sudden shaking or trembling of the Earth which lasts for a very short time :
 - (a) Earthquake
 - (b) Tsunami
 - (c) Cyclone
 - (d) None.
7. Tremors are caused by the disturbance deep down inside the uppermost layer of the earth called :
 - (a) Mantle
 - (b) Crust
 - (c) Outer core
 - (d) Inner core.
8. Destructive earthquakes have magnitudes higher than :
 - (a) 7
 - (b) 9
 - (c) 5
 - (d) 3.

Ans. 1. (b) Copper rod.

2. (b) Becomes positively charged while the cloth has a negative charge.
3. (b) Electric spark on a huge scale.

4. (d) Electroscope.

5. (c) Electric shocks.
6. (a) Earthquake.
7. (b) Crust.
8. (a) 7.

(B) Fill in the blanks :

1. Some objects can be charged by with other objects.
2. Like charges and unlike charges each other.
3. The electric charge produced by rubbing is called charge.
4. When charge move, they constitute an current.
5. An may be used to detect whether a body is charged or not.
6. strike could destroy life and property.
7. An is a sudden shaking or trembling of the Earth.
8. Destructive energy of an earthquake is measured on the

Ans. 1. Rubbing.

2. Repel, attract.
3. Static.
4. Electric.
5. Electroscope.
6. Lightning.
7. Earthquake.
8. Richter scale.

(C) Match the Column :

- | | |
|-------------------|--|
| 1. Richter scale | (A) Electric current |
| 2. Earthquake | (B) Seismic |
| 3. Resin | (C) Static charge |
| 4. Thunderstorm | (D) Charge detecting device |
| 5. Lightning rod | (E) Lightning |
| 6. Rubbing | (F) Amber |
| 7. Moving charge | (G) Meeting of the +ve and -ve charges |
| 8. Weak zone. | (H) Protects houses. |
| 9. Rubbing. | (I) Earthquake. |
| 10. Electroscope. | (J) Shaking of earth. |
- Ans.** 1. → (I), 2. → (J), 3. → (F), 4. → (G),
 5. → (H), 6. → (C), 7. → (A), 8. → (B),
 9. → (E), 10. → (D).

Very Short Answer Type Questions [1 mark]

Q. 1. Name two destructive phenomenon.

Ans. Lightning, earthquake. 1

Q. 2. What are two types of charges ?

Ans. Positive charge, negative charge. 1

Q. 3. What is lightning ?

Ans. Lightning is an electric spark on a huge scale. 1

Q. 4. What is amber ? what happens when amber is rubbed with fur ?

Ans. Amber is a kind of resin. It attracts light objects when rubbed with fur. 1

Q. 5. What is static electricity ?

Ans. The electricity generated by rubbing is called static electricity. 1

Q. 6. Who discovered the static electricity or lightning in clouds ?

Ans. Benjamin Franklin in 1752. 1

Q. 7. What are charged objects ?

Ans. The objects that acquire small charges on rubbing are called charged objects. 1

Q. 8. What is an electric current ?

Ans. When charges move then the electricity is called electric current. 1

Q. 9. What are the safe places during thunder-storm ?

Ans. The covered vehicles and buildings are safe during thunderstorm. 1

10. Name the device used to save multi- storeyed building from lightning.

Ans. Lighting conductor. 1

Q. 11. What are other natural phenomenon caused by earthquake ?

Ans. Earthquake can cause floods, landslides, tsunami and epidemic. 1

Q. 12. Name the instrument used to measure earthquake.

Ans. Richter scale. 1

Short Answer Type Questions-I [2 marks]

Q. 1. What is earthing ? What is its importance ?

Ans. The process of transferring of charge from a charged object to the earth is called earthing. It is provided in buildings to protect us from electrical shocks due to any leakage of electric current. 2

Q. 2. What is an earthquake ? What is its cause ?

Ans. An earthquake is a sudden shaking or trembling of the earth, which lasts for a very short time. 2

Q. 3. What are seismic or fault zones ?

Ans. Since earthquakes are caused by the movement of plates the boundaries of the plates are the weak zones where earthquake occurs. These weak zones are also known as seismic or fault zones. 2

Q. 4. Sometime, a crackling sound is heard while taking off a sweater during winters. (NCERT)

Ans. A crackling sound occurs when we are taking off sweater during winters because there is a electric discharge between sweater and body due to rubbing. Some energy is always released with electric discharge, in the form of crack-ling sound. 2

Q. 5. Explain why a charged body loses its charges if we touch it with our hand. (NCERT)

Ans. When we touch a charged body, it loses its charge due to earthing. Our body is also a good conductor of electricity. It transfers the charge to the earth through our body. 2

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

Ans. Destructive energy of an earthquake is measured by Richter scale. An earthquake measures 3 on the scale can be recorded on this scale. Earthquake with magnitude 3 will not be so destructive. 2

Q. 7. Explain why a charged balloon is repelled by another charged balloon whereas an uncharged balloon is attracted by another charged balloon.

Ans. Charged balloon is repelled by another charged balloon because both carry same charge. Where as uncharged balloon is attracted by charged balloon due to unlike charges. 2

Q. 8. List three states in India where earth quakes are more likely to strike.

Ans. Kashmir, Rajasthan, Gujarat.

Q. 9. What are the causes of sparking ?

Ans. Tue causes of sparking are :

- (i) On electric pole wire when get loose.
- (ii) Breaking of electric wire during thunder storm.
- (iii) Loose connection between plug and socket. 2

Q. 10. What are lightning safety measures ?

- Ans.** During lightning and thunderstorm no open place is safe.
— Hearing thunder is an alert to rush to a

safer place.

- After hearing the last thunder, wait for sometime before coming out of the safe place. 2

Short Answer Type Questions-II [3 marks]

Q. 1. Write Do's and Don'ts during a thunderstorm.**Ans. Outside the house :**

- Open vehicles, such as motor bikes, tractors, construction machinery, open cars are not safe.
- Open fields, tall trees, shelters in park, elevated place do not protect us from lightning strokes.
- Carrying an umbrella is also not safe.
- Stay away from poles or other metal objects.

Inside the house :

- During a thunderstorm contact with telephone cords, electrical wires and metal pipes should be avoided.
- It is safe to use mobile phone.
- Bathing should be avoided.
- Electrical appliances like computers, TVs etc should be unplugged. Electrical lights can remain on. 3

Q. 2. What are lightning conductors ? How it is used ?

- Ans.** Lightning conductors are the devices used to protect buildings from the effect of lightning. It is a metallic rod, taller than the building, installed in the walls of the buildings during its construction. One end of the rod is kept out in the air and the other is buried deep in the ground. The rod provides easy route for the transfer of electric charge to the ground. 3

Q. 3. What are seismic waves ? How it can be measured ?

- Ans.** The tremor produces waves on the surface of the earth. These waves are called seismic waves.

The waves are recorded by an instrument called the seismograph. This instrument is simply a vibrating rod or a pendulum, which

starts vibrating when tremors occur. A pen is attached to the vibrating system that records the seismic waves on a paper. By studying these waves, scientists can construct a complete map of the earthquake. 3

Q. 4. Describe with the help of a diagram an instrument which can be used to detect a charged body. (NCERT)

- Ans.** Electroscope is a device used to detect the presence of charge on an object.

- It acts on the principle that like charges repel each other and unlike charges attract each other.
- An electroscope has a metal rod with thin metal strip or leaf attached to its bottom. At the top, the rod enters into the glass box.
- Charge a refill and touch its top part. When metal strips receive the same charge from the charged refill, they repel each other.

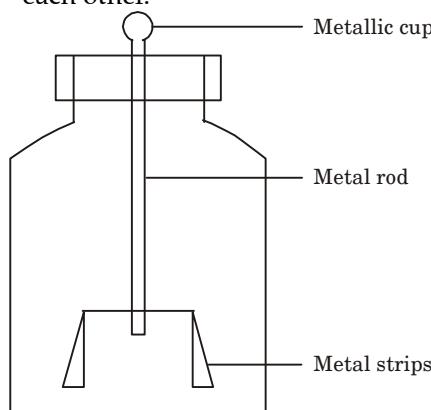


Fig. Electroscope

- When they attract each other, it means that a refill charge is opposite charge. Hence, this device can be used to detect whether an object is carrying charge or not. Either they are same or opposite charges. 3

Long Answer Type Questions [5 marks]

Q. 1. Explain protection against earthquake.**Ans. Protection against earthquakes :**

Earthquakes cannot be predicted. They can be highly destructive. It is, therefore,

important that we take necessary precautions to protect ourselves all the time. It is advisable to make the structure simple so that it is 'Quake Safe'.

- Consult qualified architects and structural engineers.
- In highly seismic area, the use of mud and timber is better. They keep roofs light.
- Fix shelves and cupboards to the walls.
- Be careful where you hang wall clocks, photo frames, water heaters etc.
- Building can catch fire during earthquake. So all buildings, must have fire fighting equipments in working order.

In the event that an earthquake does strike, take the following steps to protect yourself.

At home : Take shelter under a table, stay away from tall and heavy objects and if you are in bed, do not get up. Protect your head with a pillow.

Outdoors : Find a clean spot, away from buildings, trees, and over headed power lines, Drop to ground. If you are in car or bus do not come out.

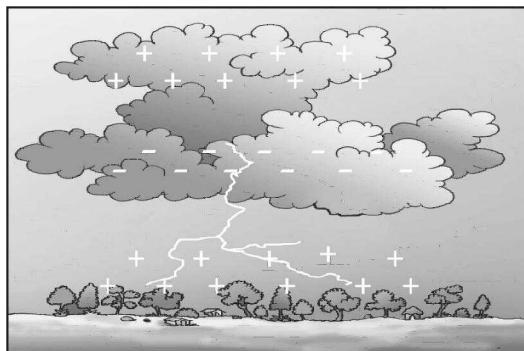
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Q. 2. Explain the mechanism of thunder storms.

Ans. Mechanism of thunderstrom or the story of lightning : During the development of a thunderstorm, the air current moves up-

wards while the water droplets move downwards. These vigorous movement cause separation of charges. By a process, the positive charges collect near the upper edges of the clouds and the negative charges accumulate near the lower edges. There is accumulation of the charges near the ground also. When the magnitude of accumulated charges becomes very large, negative and positive charges meet. It produces streaks of light and sound. This process is called electric discharge.

5



Value Based Questions [3 marks]

Q. 1. During the natural disaster (tsunami) in Japan, the nuclear reactors were damaged, due to which hazardous radiation affected the large areas.

- What was the reason for this damage ?
- How did it affected the people and environment ?
- Do you think that nuclear energy is good for nature ?

Ans. During the natural disaster (tsunami) in Japan, the nuclear reactor were damaged, due to which hazardous radiation affected the large

area :

- That was the uranium and other big elements which radiate large amount of heat and energy and it is very harmful for living beings.
- For people they can effect on skin, eyes even on genes also and the particles embeded in enviroment which continous pollute it with emitting radiations.
- When they are precautionally used in good of human than only it is good because small amount of atom gives huge amount of energy.

5

Formative Assessment

(A) Oral Questions : (Answer in One Word)

- How can objects be charged ?
- What are two kinds of charges ?
- What is static charge ?
- What happens when charge moves ?
- Name an instrument that is used to detect whether a body is charged or not.
- Define earthing.
- How can buildings be protected by lightning ?

- Which charge is developed when a glass rod is rubbed with a piece of silk cloth ?

Ans. 1. By rubbing.

- Positive and negative charges.
- Charges developed by rubbing.
- Conduct electricity.
- Electroscope.
- Transferring of charge from a charged object to the Earth.
- By using lightning conductors.
- Positive.

(B) True / False

1. Like charges attract each other.
2. A charged glass rod attracts a charged plastic rod.
3. Lightning conductors cannot protect a building from lightning.
4. Earthquakes can be predicted in advance.
5. In ancient time when lightning occurred, people thought that the wrath of Gods was visiting them.
6. When a plastic refill is rubbed with polyethene, no electric charge is developed.
7. When a glass rod is rubbed with silk, charge developed on rod is negative.
8. The current in a circuit makes a bulb glow is a motion of charge.
9. If a thunderstorm occurs, there is always a possibility of lightning and cyclones accompanying it.
10. During earthquake if you are in bed, get up early and rush.

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

(C) Quiz : (Name them)

1. An electric spark on a huge scale.
2. An American scientist who showed the lightning in day to day activity.
3. The object with charge is called.
4. A device used to detect the charged and uncharged body.
5. The process of transferring of charge from a charged object to the Earth.
6. A device used to protect building from the effect of lightning.
7. A natural disaster occurred in the Indian Ocean on 26th Dec, 2004.
8. A scale to check the power of an earth-quake.
9. An instrument that records seismic waves.
10. Fragmented layer of the earth.

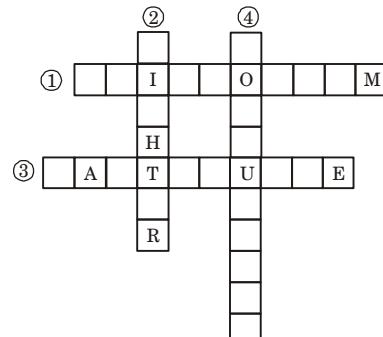
Ans. 1. Lightning.
 2. Benjamin Franklin.
 3. Charged objects.
 4. Electroscope.
 5. Earthing.
 6. Lightning conductors.
 7. Tsunami.
 8. Richter scale.
 9. Seismograph.
 10. Plates.

(D) Puzzle**Across :**

1. The graph used to record of seismic waves.
3. Sudden movement in the Earth plates.

Down :

2. The scale used to measure the magnitude of earthquake
4. A method of charging a neutral material.

**Ans. Across :**

1. Seismograph

3. Earthquake**Down :**

2. Richter
4. Conduction

Extended Learning : Activities and Projects.

Make a project file on earthquake according to following headings :

- (a) Definition and few pictures of earthquake.
- (b) Mark earthquake prone area on World map and map of India separately.
- (c) Collect the information and present it in tabular form.

Major earthquake in the world	
Country	
City	
Richter scale	

Write on :

- (d) Protection against earthquakes.
- (e) Programs and training run by government organization for protection against earthquake.
- (f) Latest technique about earthquake.



Quick Review

- When light from an object enters our eyes then only we can see the objects. The light may have been emitted by the object, or may have been reflected by it.
 - A polished or a shiny surface acts as a **mirror**. A mirror can change the direction of light that falls on it.
 - After striking the mirror, the ray of light is reflected in another direction. The light ray, that strikes on any surface, is called **incident ray**. The ray that comes back from the surface after reflection is known as the **reflected ray**.
- Normal :** The perpendicular to the surface, at the point of incidence is called normal.
- Angle of Incidence :** The angle between the normal and the incident ray is called the angle of incidence.
- Angle of Reflection :** The angle between the normal and the reflected ray is called the angle of reflection.
- The laws of reflection are :
 - The angle of incidence is equal to the angle of reflection.
 - The incident ray, the normal and the reflected ray, all lie in the same plane.

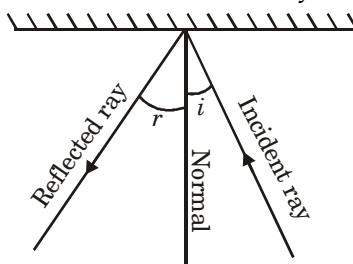


Fig. : Angle of incidence and angle of reflection

- **Lateral inversion :** In an image formed by a mirror, the left side of the object appears on the right and the right appears on the left. This is known as **lateral inversion**.
- When all the parallel rays reflected from a plane surface are not parallel, the reflection is known as **diffused or irregular reflection**.
- Reflection from a smooth surface like that of a mirror is called **regular reflection**.

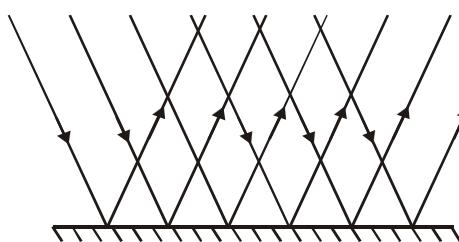


Fig. Regular reflection

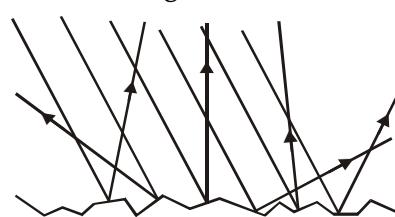


Fig. Rays reflected from irregular surface

➤ **Multiple Images :** Number of images are formed by mirrors placed at an angle to one another. e.g., Kaleidoscope.

➤ Splitting of light into its colours is known as **dispersion of light**. Rainbow is a natural phenomena showing dispersion.

➤ **Human eye :** It is roughly spherical in shape.

Cornea : Transparent front part of eye.

Pupil : A small opening in the cornea.

Iris : Coloured part of eyes, it controls the size of pupil.

Lens : Focuses light on retina.

Retina : Site of image formation.

Cones and Rods : There are two kinds of cells present in Retina.

(i) Cones, that are sensitive to bright light

(ii) Rods, which are sensitive to dim light.

Blind Spot : At the junction of the optic nerve and the retina there are no sensory cells so no vision is possible at this spot. This is called the blind spot.

Yellow Spot : It is located in the centre of the retina. It has maximum concentration of light sensitive cells.

➤ The most comfortable distance at which one can read with a normal eye is about 25 cm. It is also called least distance of distinct vision.

➤ Some persons can see objects close to them clearly but cannot see distant object. On the other hand some can see the distant objects clearly but unable to see nearby objects. These are eyesight defects and can be corrected by using correct power lens.

➤ **Care of Eyes :** Use suitable spectacles. Too little or too much light is bad. Do not look at the sun directly, wash your eyes frequently.

➤ Visually challenged persons can read and write using **Braille** system. It has 63 dot patterns or characters. Each character represents a letter, a combination of letters, a common word or a grammatical sign.

$$\begin{array}{ccc} C & A & T \\ \bullet \cdot & \cdot \cdot & \cdot : \\ \cdot \cdot & \cdot \cdot & \cdot : \end{array} = \text{CAT}$$

➤ **Kaleidoscope :** It is based on the principle of multiple reflections. It consists of three plane mirrors (whereas a periscope, a similar device consists of two plane mirrors). These three mirrors are inclined at an angle of 60° to each other in a tube. (hard card board tube). One end of the tube is closed with the two circular glass discs. The inner being transparent glass and the outer ground glass.

— Glass pieces or bangle pieces of various colours are kept between the two discs.

— Due to reflection, hexagonal patterns of coloured bangles can be seen.

— An interesting feature of kaleidoscope is that you will never see the same pattern again.

➤ **Persistence of Vision :** The impression of an image persists for about $1/16$ of a second on the retina even after we have stopped seeing the object. If still images of a moving object are flashed on the eye at a rate faster than $1/16$ second, then the eye perceives this object as moving.

➤ Owl can see very well in the night. It has a large cornea and a large pupil to allow more light in its eyes. Its retina has a large number of rods but only a few cones. These features allow the owl to see at night.

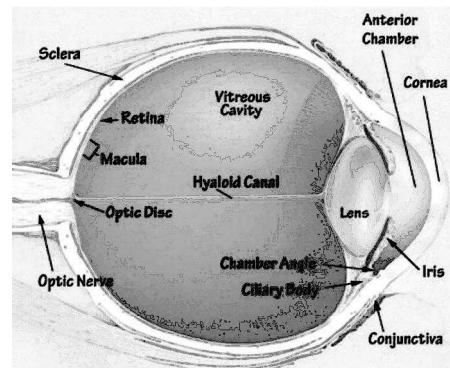


Fig. Human Eye

Summative Assessment

Objective Type Questions (1 mark)

(A) Multiple Choice Questions

(B) Fill in the blanks :

2. Regular reflection.
 3. Lateral.
 4. Kaleidoscope, multiple.
 5. Dispersion
 6. Cornea, iris, pupil, lens, retina, optic nerve.
 7. Nearby, distant.
 8. Braille.
 9. 25 cm.
 10. Spectacles.
 11. 1/16.

(C) Match the Column :

- | | |
|--------------------------|---|
| 1. Cornea | (A) No image formed. |
| 2. Pupil | (B) Image formed. |
| 3. Blind spot | (C) Spectrum. |
| 4. Rods | (D) Front part of eye. |
| 5. Cones | (E) Dispersion of light. |
| 6. Iris | (F) Small opening in the cornea. |
| 7. Retina | (G) Sensitive to dim light. |
| 8. Rainbow | (H) Sensitive to bright light. |
| 9. Band of seven colours | (I) Controls the size of pupil |
| s. | 1. → (D), 2. → (F), 3. → (A), 4. → (G),
5. → (H), 6. → (I), 7. → (B), 8. → (E),
9. → (C). |

Very Short Answer Type Questions [1 mark]

Q. 1. What makes things visible ?

Ans. Light makes things visible. 1

Q. 2. What is mirror ?

Ans. A polished or a shiny surface can act as a mirror. 1

Q. 3. What is the relation between angle of incidence and angle of reflection ?

Ans. The angle of incidence is always equal to angle of reflection. 1

Q. 4. What is lateral inversion ?

Ans. In an image formed by a mirror, the left side appears on the right side and the right side appears on the left side. This is known as lateral inversion. 1

Q. 5. What are multiple images ?

Ans. Images formed by mirrors placed at an angle to one another are called multiple images. 1

Q. 6. What is sunlight ? How many colours it consists of ?

Ans. The sunlight is referred to as white light. It

consists of seven colours. 1

Q. 7. Where is image formed in human eye ?

Ans. Image is formed on retina in human eye. 1

Q. 8. What is the work of iris ?

Ans. Iris controls the amount of light entering into the eye through the pupil. 1

Q. 9. How many kinds of nerve cells are there in retina ?

Ans. There are two kinds of cells.

- (i) Cones : Sensitive to bright light.
- (ii) Rods : Sensitive to dim light. $(\frac{1}{2} + \frac{1}{2} = 1)$

Q. 10. Who invented the system of reading for blind people ?

Ans. Louis Braille invented the system of reading for blind people. 1

Q. 11. At what angles are mirrors inclined in a Kaleidoscope and a periscope respectively ?

Ans. Kaleidoscope – 60°

Periscope – 45° $(\frac{1}{2} + \frac{1}{2} = 1)$

Short Answer Type Questions-I [2 marks]

Q. 1. Write two laws of reflection.

Ans. The two laws of reflection :

- (a) The incident ray, reflected ray and normal lies in the same plane.
- (b) Angle of incidence is always equal to angle of reflection. $(1+1=2)$

Q. 2. Write difference between regular and irregular reflection.

Ans. Difference between regular and diffused reflection :

Regular	Diffused
(i) It takes place on a smooth and shining surface.	It takes place on rough surface.
(ii) All rays are parallel after reflection.	Reflected rays are in different direction.

$(1+1=2)$

Q. 3. What is a blind spot ?

Ans. At the junction of the optic nerve and the retina, there are no rods and cones. Hence, no vision is possible at the spot. This spot is called blind spot. 2

Q. 4. What is Cataract ?

Ans. It is the eye disease in which eye lens becomes opaque and eyesight becomes foggy. This disease is treated by removing the

opaque lens and inserting a new artificial lens. 2

Q. 5. What are the functions of eyelids ?

Ans. Nature has provided eyes with eyelids to prevent any object from entering into it. Eyelids also shut out light when not required. 2

Q. 6. What is the comfortable distance to read, for a normal eye ? What types of defects an human eye can have ?

Ans. The comfortable distance to read objects is 25 cm. Some persons can see objects close to them clearly, but cannot see distant objects so clearly. On the other hand, some persons can not see objects close by clearly, but they can see distant objects quite well. These are called Myopia and Hypermetropia respectively. 2

Q. 7. Lack of which vitamin causes troubles in our eyes ? Name some food stuff to cure this problem.

Ans. Lack of Vitamin A in food stuff is responsible for many eye troubles. Most common among them is night blindness. One should, therefore, include in the diet components which have vitamin A. Raw carrots, broccoli, green vegetables and cod liver oil are rich in Vitamin A. Eggs, milk, curd, cheese, butter and fruits such as papaya and mango are also rich in Vitamin A. 2

Q. 8. Name few famous visually challenged Indians with great achievements to their credit.

Ans. Some visually challenged Indians have great achievements to their credit.

Diwakar : A child prodigy (Singer).

Ravindra Jain : Sangeet prabhakar degree from Allahabad. (Lyricist, Singer, Music Composer). Lal Advani : Established an association for special education and rehabilitation of disabled in India. 2

Short Answer Type Questions-II [3 marks]

Q. 1. What is Kaleidoscope ? How it can be made ? What are its uses ?

Ans. Kalaeidoscope is an instrument used to make numerous beautiful patterns.

To make a Kaleidoscope, get three rectangular mirror strips. Join them together to form a prism. Close one end of tube by cardboard disc having a hole in the centre. Paste a piece of transparent plastic sheet at the other end. Put several small pieces of coloured glass bangles. Allow enough space for the coloured pieces to move around. 3 A numerous beautiful patterns will be formed. It is used by designers of wall papers and fabrics and artists to get new ideas for new patterns.

Q. 2. Write the structure and function of human eye.

Ans. Human eye : The eye has a roughly spherical shape. The outer coat of eye is white. Its transparent front part is called cornea. Behind cornea a dark muscular structure is situated called iris. There is a small opening called the pupil. The size of the pupil is controlled by the iris. The iris controls the amount of light entering into the eye. The lens focuses light on the back of the eye, on a layer called retina. The retina contains several nerve cells. They transmit impulses to the brain through the optic nerve and hence, image is formed.

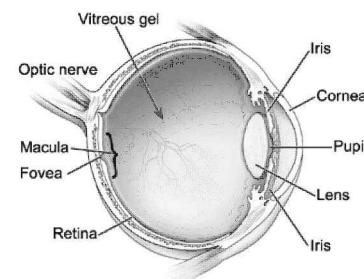


Fig. Human Eye

3

Q. 3. What is the Braille system ?

Ans. The most popular resource for visually challenged person is Braille.

The present system was adopted in 1932. There is Braille code for common languages, mathematics and scientific notations.

It has 63 dots patterns or characters. Each character represents a letter, a combination of letters, a common word or a sign.

Dots are arranged in cells of two vertical rows of three dots each.

e.g.,

C	A	T
• •	• -	- • = CAT
--	--	• •
--	--	• -

These patterns when embossed on braille sheets, help visually challenged person to recognize words by touching. 3

Long Answer Type Questions [5 marks]

Q. 1. How you can take care of the eyes ?

Ans. Care of the eyes : It is necessary to take proper care of eyes. Few suggestions are as follows :

- (i) If advised, use suitable spectacles.
- (ii) Too little or too much light is bad for eyes. Insufficient light causes eye strain and headaches.

(iii) Do not look at the Sun or a powerful light directly.

(iv) Never rub your eyes. If particles of dust go into your eyes wash your eyes with clean water.

(v) Always read at the normal distance for vision. Do not read by bringing the book too close to your eyes or keeping it too far. (1×5=5)

Value Based Questions [3 marks]

Q. 1. 'Vision' is one of the wonderful gifts given to us by God. But most of the people never take care of their eyes. Care of eyes should be taken. Suggest some methods for proper eye care ?

Ans. It is necessary to take proper care of your eyes. If there is any problem we should go to the eye specialist. Following are some precautions :

- (i) Use suitable spectacles
- (ii) Too little and too much light is bad for eyes.
- (iii) Do not look at the Sun directly.
- (iv) Never rub your eyes.
- (v) Wash your eyes with clean water.
- (vi) Always read at the normal distance for vision

5

Q. 2. In a class room, there were four or five students who were not able to read the matter written on the blackboard. The other students of the class helped them to sit at the front seat, so that they can also read the matter written on the blackboard. What can be the reason behind it? What will you recommend to these students and what precautions will you insist ?

Ans. If students are unable to read the matter written on the black board, it indicates that they are suffering from short sightedness. These deffects of the eyes can be corrected, by using suitable corrective lenses (spectacles of suitable power). 5

Formative Assessment

(A) Oral Questions : (Answer in one word)

1. What makes things visible ?
2. The light ray, that strikes any surface is called ?
3. The ray that comes back from the surface after reflection is called as.
4. Relation between angle of incidence and angle of reflection.
5. The type of image formed by a plane mirror is called ?
6. What do we call the reflections which appear from plane and irregular surfaces ?
7. What forms when reflected light is reflected again ?
8. Name an instrument to make numerous beautiful patterns.
9. The splitting of light is known as.
10. Name the part of an eye where there is no vision.
11. Name the coloured part of human eye.
12. Name the site of image formation in an eye.
13. What is the most popular system for visually challenged person ?
14. Name two foods rich in Vitamin A.

Ans. 1. Light.

2. Incident ray.
3. Reflected ray.
4. Angle of incidence is equal to the angle of reflection.
5. Laterally inverted

6. Regular and irregular reflection.

7. Multiple images.
8. Kaleidoscope.
9. Dispersion.
10. Blind spot.
11. Iris.
12. Retina.
13. Braille system.
14. Raw carrots, Broccoli.

(B) True / False

1. Too little or too much light is bad for eyes.
2. An unpolished or dull surface can act as a mirror.
3. Angle of incidence and angle of reflection can be varied.
4. All the parallel rays reflected from a plane surface are not parallel. Such reflection is called diffused reflection.
5. An image formed by plane mirror is laterally inverted.
6. On the blind spot a clear image is formed.
7. Two mirrors inclined to each other give multiple images.
8. Braille is used to make a blind person read and write.

Ans. 1. True, 2. False, 3. False, 4. True, 5. True, 6. False, 7. True, 8. True.

(C) Quiz : (Name them)

Name the following :

1. The ray that strikes the mirror.

2. A line drawn at the point where the incident ray strikes the mirror.
3. Name the place where the incident ray, the normal and reflected ray lies.
4. An image formed by a mirror is.
5. Reflection from smooth surface is.
6. Splitting of light into its colours.
7. Cells that are sensitive to bright light.
8. Cells that are sensitive to dim light.
9. When eye lens becomes cloudy what eye defect a person is said to have ?
10. Visually challenged persons can read and write with this resource.

Ans. 1. Incident ray.

2. Normal.
3. Plane surface.
4. Laterally inverted.
5. Regular.
6. Dispersion.
7. Cone cells.
8. Rods
9. Cataract.
10. Braille.

(D) Puzzle

Across :

1. A reflected ray forms angle of.....
2. When reflected rays are not parallel.
3. Cells sensitive to dim light.

4. Cells sensitive to bright light.

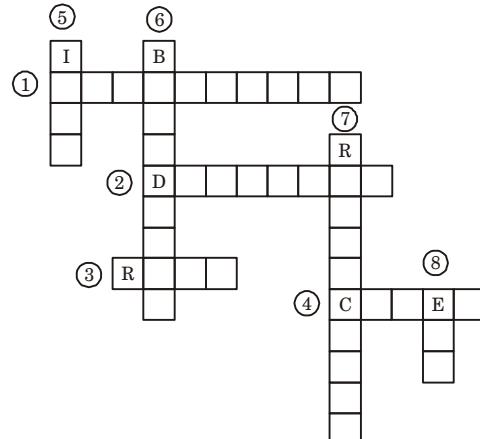
Down :

5. Coloured part of eye.
6. Spot with no sensory cells.
7. Light rays show this.
8. Vision organ in human body.

Extended learning : Activities and projects.

Activity :

1. Make a Kaleidoscope to study the numerous beautiful patterns.



Ans. Across :

- | | |
|----------------|--------------|
| 1. Reflection. | 2. Diffused. |
| 3. Rods. | 4. Cones. |

Down :

- | | |
|----------------|----------------|
| 5. Iris. | 6. Blind spot. |
| 7. Reflection. | 8. Eye. |



STARS AND THE SOLAR SYSTEM

Quick Review

- The stars, the planets, the moon and many other objects in the sky are called **celestial objects**.
- Moon does not produce its own light, whereas the Sun and other stars do.
The day on which the whole disc of moon is visible is known as the full-moon day.
On the fifteenth day, when the moon is not visible, the day is known as new-moon day.
- The various shapes of the bright part of the moon as seen during a month are called **phases of the moon**.
- The distance of stars is expressed in **light year**. One light year is the distance travelled by light in one year.
- The moon's surface is dusty and barren. There are many craters of different sizes. It also has steep and high mountains. It has no atmosphere and no water.
- The stars forming a group that has a recognisable shape is called a **constellation**.
E.g.— Ursa major (Big Dipper, the great bear or the Saptarishi).
 - Orion (Hunter), seen during winter in the late evenings).
 - Sirius (Brightest star in the sky).
 - Cassiopeia (Visible during winter in the early part of the night).
- **Solar system** : The Sun and the celestial bodies that revolve around it form the solar system. It consists of planets, comets, asteroids and meteors.
- The eight planets are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.
- A planet has a definite path (in which it revolves around the Sun,) called an **orbit**.
- Some planets are known to have moon /satellites revolving round them.
- There are many man-made satellites revolving round the earth. These are called **artificial satellites**.
- **Asteroids** : There is a large gap in between the orbits of Mars and Jupiter. This gap is occupied by a large number of small objects that revolve around the Sun. These are called asteroids.
Comets : They revolve around the Sun in highly elliptical orbits.
- **Meteors and Meteorites** : Shooting stars are called meteors. A meteor is usually a small object that occasionally enters the Earth's atmosphere. Some meteors are large and so they can reach the earth before they evaporate completely. The body that reaches the Earth is called a meteorite.
- Urs a Major is also called 'Big Dipper'. Dipper was a utensil that was used in olden days for drinking water.
- **Light year** : It is the distance covered by light at its speed in a year. The speed of light is 3×10^8 m/sec.
 $\therefore 1 \text{ light year} = 3 \times 10^8 \times 3600 \times 24 \times 30 \times 12 = 9.46 \times 10^{12}$ kms (Approx.)

- **Astronomical unit :** Distance between the Earth and the Sun is 150,000,000 (15 crore) kms. Light takes about 8·3 minutes to reach the Earth from the Sun. This distance between Earth and the Sun is also called 1 Astronomical Unit.
- **Phases of the moon :** When the bright portion of the moon visible from Earth is increasing, these phases are called waxing phase. When the bright portion is decreasing, this is called waning phase. When more than half of the moon is dark, it is called Crescent Moon. When more than half is bright, it is called Gibbous Moon.

Summative Assessment

Objective Type Questions

(A) Multiple Choice Questions :

1. Which is not a constellation ?

(a) Moon	(b) Ursa major
(c) Ursa minor	(d) Orion.
2. The moon surface contains :

(a) Water	(b) Atmosphere
(c) Craters	(d) All.
3. Large distances are expressed in another unit known as :

(a) Km	(b) Meter
(c) Light year	(d) cm.
4. Ursa major is not known as :

(a) Big Dipper	(b) Great bear
(c) Saptarishi	(d) Orion.
5. These celestial bodies are part of the solar system :

(a) Planets	(b) Comets
(c) Asteroids and meteors	(d) All.
6. Mars appears red due to the presence of large amount of :

(a) Iron oxide	(b) Copper oxide
(c) Calcium oxide	(d) Aluminium oxide.
7. The time taken by a planet to complete one rotation is called its :

(a) Period of revolution	(b) Period of rotation
(c) Both	(d) None of these.
8. A planet known as morning or evening star is :

(a) Saturn	(b) Venus
(c) Mercury	(d) Mars.
9. The outer planet is :

(a) Mercury	(b) Venus
(c) Earth	(d) Jupiter.
10. Which is not a planet ?

(a) Halley's comet	(b) Mars
(c) Jupiter	(d) Neptune.

11. Light year is a unit of :

- | | |
|--------------|---------------|
| (a) Time | (b) Speed |
| (c) Velocity | (d) Distance. |

Ans. 1. (a) Moon.

2. (c) Craters.
3. (c) Light year.
4. (d) Orion.
5. (d) All.
6. (a) Iron oxide.
7. (b) Period of rotation.
8. (b) Venus.
9. (d) Jupiter.
10. (a) Halleys, comet.
11. (d) Distance.

(B) Fill in the blanks :

1. are celestial bodies that emit light of their own.
2. It is convenient to express distance of stars in
3. Stars appear to move from to
4. are groups of stars that appear to form recognisable shapes.
5. A solar system consists of eight planets and a host of , and
6. A body revolving around another body is called a
7. is the brightest planet in the night sky.
8. is the largest planet of the solar system.
9. Artificial satellites are used for , and
10. was the first Indian Satellite.

Ans. 1. Stars.

2. Light year.
3. East, West.
4. Constellations.
5. Asteroids, comets, meteors.
6. Satellite.
7. Venus.
8. Jupiter.

9. Weather forecasting, long distance communication, remote sensing.
 10. Aryabhatta.

(C) Match the Column :

1. Mercury (A) Reddish.

2. Earth (B) Green.
 3. Mars (C) Yellow orange.
 4. Saturn (D) Yellow.
 5. Uranus (E) Blue-green.

Ans. 1. → (C), 2. → (E), 3. → (A), 4. → (D),
 5. → (B).

Very Short Answer Type Questions [1 mark]**Q. 1. What are celestial objects ?**

Ans. The stars, the planets, the moon and many objects in the sky are called celestial objects. 1

Q. 2. What is full moon day ?

Ans. The day on which the whole disc of the moon is visible is known as full moon day. 1

Q. 3. What is new moon day ?

Ans. On the fifteenth day the moon is not visible. This day is known as the new moon day. 1

Q. 4. What are phases of the moon ?

Ans. The various shapes of the bright part of the moon as seen during a month are called phases of the moon. 1

Q. 5. Who landed on the Moon first and when ?

Ans. American astronaut, Neil Armstrong, landed on the moon for the first time on July 1969. 1

Q. 6. What is the distance of Earth from the Sun ?

Ans. 150 million km. 1

Q. 7. Why stars are not visible during the day time ?

Ans. The stars are present in the sky during the day time also. They are not visible because of bright sunlight. 1

Q. 8. What do you mean by constellation ? Name any two.

Ans. The stars forming a group that has recognizable shape is called a constellation Ursa major & Orion. 1

Q. 9. What do you mean by solar system ? What does it consist ?

Ans. The sun and the celestial bodies which revolve around it form the solar system. It consists of large number of bodies such as planets, comets, asteroids and meteors. 1

Q. 10. What is IAU ?

Ans. IAU — International Astronomical Union. 1

Q. 11. Why pluto is now not considered as a planet of solar system ?

Ans. The IAU adopted a new definition of a planet.

Pluto does not fit in this definition. Hence, it is no longer a planet of the solar system. 1

Q. 12. Define satellite. Name the natural satellite of the Earth.

Ans. Any celestial body revolving around another celestial body is called its satellite. Moon is natural satellite of earth. 1

Q. 13. Why is venus called morning star or evening star ?

Ans. Venus appears in the Eastern sky before sunrise. Sometimes it appears in Western sky just after sunlight. Therefore it is often called a morning or an evening star. 1

Q. 14. Why does earth have seasons ?

Ans. The axis of rotation of the Earth is not perpendicular to the path of its orbit, but it is slightly tilted. The tilt is responsible for the change of seasons on the earth. 1

Q. 15. Write short note on Jupiter.

Ans. Jupiter is the largest planet of the solar system. The mass of Jupiter is about 318 times that of our Earth. It rotates very rapidly on its axis. It has large number of satellites. 1

Q. 16. Name the inner and outer planets of solar system.

Ans. Inner planets : Mercury, Venus, the Earth, Mars. 1

Outer planets : Jupiter, Saturn, Uranus, Neptune. 1

Q. 17. What are meteor showers ?

Ans. When the earth crosses the tail of a comet, swarms of meteors are seen. These are known as meteor showers. 1

Q. 18. What is the superstitions about the comets ?

Ans. Some people think that comets are messengers of disasters, such as wars, epidemics and floods. But these are all myths and superstitions. 1

Q. 19. What is the distance between the Earth and the Sun ?

Ans. 150,000,000 (15 crore) kms. or 1 A.U. 1

Short Answer Type Questions-I [2 marks]**Q. 1. Draw a diagram to show that earth accompanied by the moon is revolving**

around the Sun.

Ans.

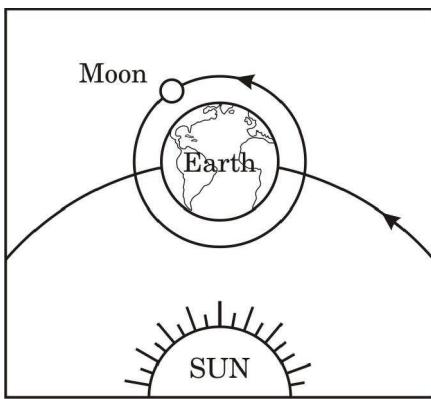


Fig. : Earth accompanied by moon revolving around the Sun.

Q. 6. What is the difference between stars and planets ?

Ans. Difference between stars and planets :

Stars	Planets
(a) Star twinkles in the sky.	They do not twinkle.
(b) They are fixed at a point.	They revolve around the Sun.
(c) They have their own light.	They have no light.
(d) They are very big in size.	They are smaller in comparison to stars.

Q. 7. What is an orbit ?

Ans. A planet has definite path in which it revolves around the Sun. This path is called as orbit. 2

Q. 8. What is an Asteroid ?

Ans. There is a large gap between the orbits of Mars and Jupiter. This gap is occupied by a large number of small objects that revolve around the Sun. These are called asteroids. It can be only seen through large telescopes. 2

Q. 9. What is a meteor ?

Ans. Sometimes we see bright streaks of light in the sky. These are commonly known as shooting stars, although they are meteors. It is usually a small object that occasionally enters into the Earth's atmosphere. At the time when they are at high speed, due to friction they glow and evaporate quickly. Hence, bright streak lasts for a very short time. 2

Q. 10. What is a meteorite ?

Ans. Some meteors are large and so they can reach the Earth before they evaporate completely. The body that reaches the Earth is called a meteorite. 2

Short Answer Type Questions-II [3 marks]

Q. 1. How are phases of moon formed ?

Ans. The day on which the whole disc of the moon is visible is known as full moon day. Thereafter, every night the size of the bright part of the moon becomes thinner and thinner. On the fifteenth day the moon is not visible, which is known as new moon day. The next day, only a small portion of the moon appears in the sky, known as crescent and then again the moon grows larger every day. On 15th day again we get full view of the moon. These various shapes are called phases. We see different phases of moon as a result of difference in sunlight reflected by moon.

Difference in sunlight incident on moon's surface arises due to revolution of moon around the earth. 3

Q. 2. Write in brief about any two constellations.

Ans. Ursa Major : We can see it during summer time in the early part of the night. It is also known as Big Dipper, the great bear or the Saptarishi. There are seven prominent stars in this. It appears like a big dipper or a question mark. Three stars in the handle of the ladle and four in its bowl.

Orion : It is seen during winters in late evening. It has seven or eight bright stars. It is also called hunter. Three middle stars

represent the belt of the hunter. The four bright stars appear to be arranged in the form of a quadrilateral. $(1\frac{1}{2} + 1\frac{1}{2} = 3)$

Q.3. Write the difference between revolution and rotation.

Ans. Difference between revolution and rotation.

Revolution	Rotation
(i) The time taken by a planet to complete one revolution is called its period of revolution.	A planet also rotates on its own axis like a top. The time taken by a planet to complete one rotation is called its period of rotation.
(ii) The period of revolution increases as the distance of the planet increases from the Sun.	It is always fixed.

Q.4. What are artificial satellites ? What are their uses ?

Ans. There are many man-made satellites revolving round the Earth. These are called artificial satellites. They are launched from the Earth. They revolve around the Earth much closer than Earth's natural satellite. 3

Artificial satellites have many practical applications. They are used for forecasting weather, transmitting television and radio signals etc. They are used for telecommunication and remote sensing. 3

Q.5. Explain how the Earth rotates on a tilted axis.

Ans. The plane of the equator is called the equatorial plane. The plane in which the Earth revolves round the Sun is called the orbital plane of the Earth. These two planes are inclined to each other at an angle of 23.5° . This means that the axis of the Earth is inclined to its orbital plane at an angle of 66.5° .

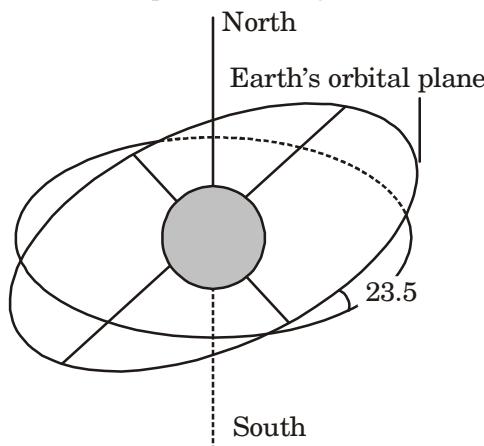


Fig. : Earth rotates on a tilted axis

Q.6. What is waxing and vaning of moon ?

Ans. Different phases of moon are visible from the Earth. This change in shapes occurs due to variation in sunlight reflected by moon from its surface. At certain times, it appears to be bright whereas at others it appears to be dark. When brightness of moon is increasing, it is called waxing, when brightness of moon is decreasing, it is called vaning. 3

Long Answer Type Questions [5 marks]

Q.1. Write a short note about planets of the solar system.

Ans. There are eight planets in our solar system.

(a) **Mercury (Budh)** : It is nearest to the Sun. It is the smallest planet of our solar system. It is very difficult to visualize because it is near to the Sun. It has no satellite.

(b) **Venus (Shukra)** : It is nearest to the Earth. It is the brightest planet. It is also called as morning and evening star due to its appearance. It also has no moon or satellite. It rotates from East to West.

(c) **Earth (Prithvi)** : The earth is the only planet where life exists. It has special environmental conditions, right distance from the Sun, so has right temperature, presence of water and blanket of ozone

that makes life possible here.

(d) **Mars (Mangal)** : It is the first planet outside the orbit of the Earth. It appears reddish, so is called red planet. It has two small natural satellites.

(e) **Jupiter (Brihaspati)** : It is the largest planet. It rotates very rapidly on its axis. It has large number of satellites. It also has faint rings and large moons.

(f) **Saturn (Shani)** : Saturn is yellowish in colour. It has beautiful rings. It has large number of satellites. It is least dense, density is less than water.

(g) **Uranus and Neptune** : They are outermost planets of our solar system. Uranus rotates East to West, and has high rotation speed. (Any five) 5

Value Based Questions [3 marks]

Q. 1. You must have heard that there are number of artificial satellites that are orbiting the Earth. Tell in brief what are their actual uses. Name some satellites launched by India.

Ans. Artificial satellites have many practical applications. They are used for forecasting weather, transmitting television and radio signals. They are used for tele-communication and remote sensing.

India has built and launched several artificial satellites. Aryabhatta was the first Indian satellite. Some other Indian satellites are INSAT, IRS, Kalpana-I, EDUSAT etc.

ISRO, (Indian Space Research Organization), an Indian Space Research agency is prominently involved in launching new space satellites, time-to-time. 5

Formative Assessment

(A) Oral Questions : (Answer in one word)

1. Name the various shapes of the bright part of the moon.
2. The time period between one full moon to the next full moon.
3. Why life cannot exist on the moon ?
4. The distance of the Sun from the Earth.
5. Speed of light.
6. The distance of *Alpha Centauri*.
7. The stars forming a group that has a recognizable shape is called.
8. Name the constellations.
 - (a) Which can be seen during summer time in early part of the night ?
 - (b) The hunter.
 - (c) Look like a distorted letter W or M.
9. Name the path on which a planet moves.
10. A satellite of the Earth.
11. A morning or an evening star.
12. Name the outermost planets of the solar system.

Ans. 1. Phases of the moon.

2. 29 days.
3. Because there is no oxygen and no water.
4. 150,000,000 kilometers (150 million km)
5. Speed of light = 3×10^8 m/s
 $= 3 \times 10^5$ km/s

6. 4.3 light years.

7. Constellation.

8. (a) Ursa Major,
(b) Orion,
(c) Cassiopeia.

9. Orbit.

10. Moon.

11. Venus.

12. Neptune, Uranus.

(B) True/False

1. Artificial satellites are man-made.
2. Comets are messengers of disasters.
3. Asteroids can only be seen through large

telescopes.

4. Saturn is the most dense among all the planets.
5. Jupiter is the largest planet of the solar system.
6. Venus is not the brightest planet in the night sky.
7. Any celestial body revolving around another celestial body is always called artificial satellites.
8. A constellation have only 5-10 stars.
9. The orion is also called the hunter.
10. The stars are present in the sky during the day time also.

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

(C) Quiz : (Name them)

1. American astronaut who landed on the moon for the first time.
2. A unit to find the large distances.
3. The star lies close to the axis of rotation of the Earth.
4. Other name of Ursa Major.
5. Brightest star in the sky.
6. The source of almost all energy on the Earth.
7. The time taken by a planet to complete one rotation.
8. A natural satellite of the Earth.
9. Nearest planet to the Sun.
10. A red planet.
11. Largest planet of the Solar System.
12. How much is Jupiter is heavier than of our earth ?
13. What are shooting stars are called what ?
14. First Indian artificial satellite.

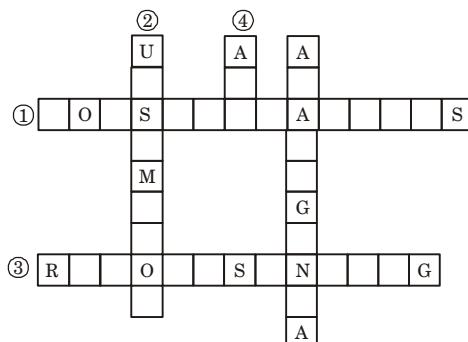
Ans. 1. Neil Armstrong,

2. Light year.
3. Alpha centauri.
4. Saptrishi.
5. Venus.
6. Sun.
7. Period of rotation.
8. Moon.

9. Mars.
10. Mercury.
11. Jupiter.
12. 318 times.
13. Comets.
14. Aryabhatta.

(D) Puzzle**Across :**

1. Group of stars
3. An use of artificial satellite

**Down :**

2. Constellation with seven stars looking like question mark
4. The other name of Milky way

Ans. Across :

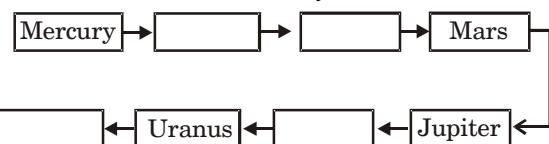
1. Constellations
3. Remotesensing

Down :

2. Ursa Major
4. Akash Ganga

(E) Flowchart

Planets in the Solar system :

**Ans.**

Mercury → Venus → Earth → Mars →
Jupiter → Neptune → Uranus → Saturn



CHAPTER
18

POLLUTION OF AIR AND WATER

Quick Review

- We all are aware that our environment is not what it used to be. We ourselves feel the impact of the degrading quality of air and water in our lives.
- **Air pollution :** When air is contaminated by unwanted substances that have a harmful effect on both the living and the non-living, it is known as air pollution.
- The substances that contaminate the air are called **air pollutants**. Such as smoke, dust, forest fires or volcanic eruptions. The other sources are factories, power plants, automobile exhausts and burning of fire wood and dung cakes.
- **Smog :** A thick fog-like layer in the atmosphere especially during winters, which is made up of smoke and fog.
- Major sources of gaseous orair pollutant are carbon monoxide, sulphur dioxide and nitrogen dioxide. Other pollutants are ChloroFluoro Carbons (CFCs) that are used in refrigerator, air conditioners and aerosol sprays.
- **Greenhouse effect :** The trapping of radiations by the Earth's atmosphere is called the greenhouse effect. Without this process, life would not have been possible on the Earth. But now it threatens life. CO₂ is one of the gases responsible for this effect.
- Due to green house effect, the average temperature is gradually increasing, called global warming.
- Gases like methane (CH₄), nitrous oxide (N₂O), CO₂ and vapour are called as Green-house gases.
- **Acid rain :** The gases such as sulphur dioxide (SO₂) and nitrogen dioxide (NO₂) reacts with water vapour in the atmosphere to form sulphuric acid and nitric acid and constitutes the acid rain.
- **Marble cancer :** (i) Acid rain has resulted in corrosion of the marble of the Taj. The phenomenon is called Marble Cancer.
(ii) Suspended Particulate matter (SPM) emitted from mathura oil refinery, has been responsible for yellowing of the marble of Taj.
- **CNG and LPG :** (i) The Supreme Court has ordered industries to switch to cleaner and safer fuels such as CNG (Compressed Natural Gas) and LPG (Liquified Petroleum Gas).
- **Water Pollution :** Whenever harmful substances such as sewage, toxic chemicals, silt etc. get mixed with water, the water becomes polluted.
- Ganga is one of the ten most endangered rivers in the world. An ambitious plan to save the river Ganga called Ganga Action Plan was launched in 1985.
- Water that is suitable for drinking is called potable water. 25% of the world's population is living without safe drinking water.

- At our individual level we should consciously save water and should not waste it. Reduce, reuse and recycle should be our mantra.

Summative Assessment

Objective Type Questions [1 mark]

(A) Multiple Choice Questions

1. Which of the following is not a green house gas ?
 - (a) Carbon dioxide
 - (b) Sulphur dioxide
 - (c) Methane
 - (d) Nitrogen.
2. Which do not cause air pollution ?
 - (a) Busy roads
 - (b) Growing plants
 - (c) Industrial smoke
 - (d) Dust.
3. Source of CFC's is :
 - (a) Industries
 - (b) Sewage
 - (c) Fuel
 - (d) Aerosol sprays.
4. Acid rain for marble is called :
 - (a) Marble cancer
 - (b) Yellow marble
 - (c) Contaminated marble
 - (d) All.
5. Gases responsible for global warming :
 - (a) Oxygen, carbon dioxide
 - (b) Only carbon dioxide
 - (c) Nitrogen
 - (d) Sulphur.
6. Which is not a safe fuel ?
 - (a) CNG
 - (b) LPG
 - (c) Cow dung cakes
 - (d) Unleaded Petrol
7. Alternative to fossil fuel to reduce pollution :
 - (a) Solar energy
 - (b) Hydro power
 - (c) Wind energy
 - (d) All.
8. Industries mainly cause water pollution :
 - (a) Agro bases industries
 - (b) Sugar mills
 - (c) Both
 - (d) Only 'b'.
9. A chemical method used for purifying water is :
 - (a) Filtration
 - (b) Chlorination
 - (c) Decantation
 - (d) None of these.
10. Air pollution causes :
 - (a) Respiratory problems
 - (b) Soil erosion
 - (c) Cholera
 - (d) Global warming.

Ans. 1. (d) Nitrogen.

2. (b) Growing plants.
3. (d) Aerosol sprays.
4. (a) Marble cancer.

5. (b) Only carbon dioxide.

6. (c) Cow dung cakes.

7. (d) All.

8. (d) Only 'b'.

9. (b) Chlorination.

10. (a) Respiratory problems.

(B) Fill in the blanks :

- are the substances that contaminate air and water.
- Increasing levels of green house gases like CO₂ are leading to
- is the contamination of water by substances harmful to life.
- Water which is purified and fit for drinking is known as
- destroys the ozone layer of the atmosphere.
- Two smokeless fuels are and
- Incomplete combustion of fuel produces
- Cholera is a borne disease.
- Corrosion of marble is known as
-, and should be our mantra to save water.

Ans. 1. Pollutants.

2. Global warming.

3. Water pollution.

4. Potable water.

5. CFCs.

6. LPG, CNG.

7. Carbon monoxide.

8. Water.

9. Marble cancer.

10. Reduce, Reuse and Recycle.

(C) Match the Column :

- | | |
|---------------------------|---|
| 1. Air pollution. | (A) CO ₂ gas trapping is excess. |
| 2. Chemical contamination | (B) Contaminated air and water. |
| 3. Global warming | (C) Safe drinking water. |
| 4. Green house effect. | (D) River Ganga. |

5. Pollutants (E) Air pollution.
 6. Potable water (F) Smoke and dust.
 7. Water pollution (G) Industrial waste.

8. Taj Mahal. (H) CO₂.
Ans. 1. → (F), 2. → (G), 3. → (H), 4. → (A),
 5. → (B), 6. → (C), 7. → (D), 8. → (E).

Very Short Answer Type Questions [1 mark]

Q. 1. We were imaging a time when clean air and water may no longer be available. Why ?

Ans. Due to environmental pollution. 1

Q. 2. Write the composition of air by volume.

Ans. 78% is nitrogen and about 21% of oxygen, 0.9% argon, 0.3% CO₂, rest other gases. 1

Q. 3. What are air pollutants ?

Ans. The substances that contaminate the air are called air pollutants. 1

Q. 4. How are vehicles responsible for air pollution ?

Ans. Vehicles produce high level of pollutants such as carbon monoxide, carbon dioxide, nitrogen oxide and smoke. 1

Q. 5. What is smog ?

Ans. A thick fog like layer in the atmosphere especially during winters, which is made of smoke and fog is called smog. 1

Q. 6. What steps are taken by this Supreme Court to save Taj Mahal ?

Ans. It has ordered industries to switch to cleaner fuels like CNG & LPG. The automobiles

should switch over to unleaded petrol in Taj zone. 1

Q. 7. Define greenhouse effect.

Ans. The trapping of radiations from sun rays by earth's atmosphere is called greenhouse effect. 1

Q. 8. What is Kyoto Protocol ?

Ans. Kyoto Protocol is an agreement to reduce the emission of green house gases. 1

Q. 9. Name few alternative fuels to reduce pollution.

Ans. CNG & LPG. 1

Q. 10. Define potable water.

Ans. Water that is suitable for drinking. 1

Q. 11. What is chlorination ?

Ans. Chlorination is a commonly used chemical method for purifying water. 1

Q. 12. Who organized 'Say no to cracker campaign'?

Ans. Children from many school organized "Say no to cracker" to reduce air pollution during Diwali. 1

Short Answer Type Questions-I [2 marks]

Q. 1. Describe green house effect in your own words. (NCERT)

Ans. Green house effect means warming the environment. A part of the radiation that falls on the Earth is absorbed by it and a part is reflected back into space. A part of the reflected radiation is trapped by the atmosphere. This trapping of radiation increases the temperature and warms up the atmosphere, called atmosphere effect. 2

Q. 2. Prepare a brief speech on global warming. (NCERT)

Ans. The average temperature of the Earth's atmosphere is gradually increasing and is called global warming. Excess of CO₂ in atmosphere causes pollution. Whereas CO₂ is continuously being released because of human activities. Deforestation leads to increase in CO₂. This increased CO₂ traps the heat and does not allow it to escape into space. As a result the average temperature of the earth's atmosphere is gradually

increasing, and it is called global warming. 2

Q. 3. Describe the threat to the beauty of the Taj Mahal. (NCERT)

Ans. The Taj Mahal is located in Agra. It is made up of white marble. The industries located in and around Agra like rubber processing, automobile, chemicals and especially the Mathura oil Refinery, have been responsible for producing pollutants like SO₂ and NO₂. These gases react with water vapour and rain, forming acid rain, Acid corrodes the marble of this monument and this is called marble cancer. 2

Q. 4. Why does the increased level of nutrients in the water effect the survival of aquatic organisms ? (NCERT)

Ans. Excessive quantities of chemical that get washed from the fields by any means such as fertilizers act as nutrient for algae to flourish. Once the algae die, they serve as food for decomposers like bacteria. A lot of oxygen in the water body gets used up. This

results in decrease in the oxygen level, which may kill aquatic organisms. This increase in algal content of water body is called **algal bloom** and reduced level of O_2 is left the water body. This process is called **Eutrophication.** 2

Q. 5. What has been done to reduce pollution in Delhi ?

Ans. Delhi is one of the most polluted cities in the world. It was choked by fumes released from automobiles running on diesel and petrol. A decision was taken to switch to fuel like CNG and unleaded petrol. These measures have resulted in cleaner air for the city. 2

Q. 6. What is the recent climate change report ?

Ans. The recent climate change report gives us only a limited time to keep greenhouse gases at the present level. Otherwise, the temperature may rise by more than 2°C by the end of the century, a level considered dangerous.

2

Q. 7. How can hot water can also be a pollutant ?

Ans. Hot water can also be a pollutant. This is usually the water from power plants and industries. It is released into the rivers. It raises the temperature of water body, adversely affecting the animals and plants living in it. 2

Q. 8. How untreated sewage is the major cause of water pollution ?

Ans. Sometimes untreated sewage is thrown directly into the rivers. It contains food waste, detergents, microorganisms etc. Thus, water gets contaminated with bacteria, fungi, viruses, parasites which can cause diseases such as cholera, typhoid and jaundice. 2

Q. 9. Write full form of CNG and LPG.

Ans. CNG : Compressed Natural Gas.

LPG : Liquified Petroleum Gas. 2

Q. 10. Explain the Ganga Action Plan in short.

Ans. The Ganga is said to be the holy river in India. It sustains most of the northern, central and eastern Indian population. Recently a study by World Wide Fund (WWF) reports that the Ganga is an endangered river. The town and cities through which it passes throw large quantities of garbage, untreated sewage, dead bodies, etc. makes river dead. A plan launched in 1985 to save this river is Ganga Action Plan. 2

Q. 11. Why Kanpur city in Uttar Pradesh has one of the most polluted stretches of the Ganga river ?

Ans. Kanpur city is situated at the bank of the river Ganga. Many people can be seen bathing, washing clothes, throwing garbage, iodols of gods, non-biodegradable polythenes. In addition Kanpur has more than 5000 industries. They discharge toxic chemical waste into the river. Hence, Kanpur really makes the Ganga polluted. 2

Short Answer Type Questions-II [3 marks]

Q. 1. What are the different ways by which water gets contaminated. (NCERT)

Ans. Water gets contaminated by the following ways :

- Many industries discharge harmful chemicals into river and streams.
- Water gets contaminated when untreated sewage is disposed off in river.
- Pesticides, weedicides and other chemicals also dissolve in water and gets contaminated.
- Breeding of micro-organisms makes water polluted. 3

Q. 2. At an individual level, how can you help in reducing air pollution. (NCERT)

Ans. At an individual level we can reduce the air pollution as follows :

- By using pollution free fuels such as CNG and LPG.

(b) Plant more trees.

(c) By using public transports.

(d) By giving general awareness to people about pollution. 3

Q. 3. Explain the difference between pure air and polluted air.

Ans. Pure air is free from unwanted particles such as germs, harmful gases, smoke, and excess dust. It should have correct composition of air whereas impure air contains smoke and dust from forest fire, power plants, automobile exhausts and burning of fire wood and cowdung cakes. 3

Q. 4. Explain circumstances leading to acid rain ? How does acid rain affect us ?

Ans. The industries located in area release many gases such as sulphur dioxide, carbon dioxide, nitrogen oxide etc. These oxides react with water vapour present in the

atmosphere to form acids such as, sulphuric acid, nitric acid etc. The acid drops with rain water on the Earth called acid rain. Acid rain corrodes the monuments, buildings, vehicles, human skin and also pollutes the land. 3

Q. 5. How are industries responsible for water pollution ?

Ans. Many industries discharge harmful chemicals into rivers and streams. Example, oil refineries, paper factories, textile, sugar mill and chemical factories. The chemical release includes arsenic, lead and flourine which lead to toxicity in plants and animals. Soil is also affected by impure water, causing changes in acidity, growth of worms etc. 3

Q. 6. How can water be made safe for drinking ? Explain in brief.

Ans. Water can be made safe for drinking by following ways :

(i) Water is filtered. Many filters are available in the markets used by people.

(ii) Some use boiling as a method for obtaining safe drinking water, boiling kills the germs present in the water.

(iii) Chlorination is a chemical method for purifying water. (1×3 = 3)

Q. 7. What are the measures being taken by people for generating awareness to reduce water pollution ?

Ans. Laws for industrial units should be strictly implemented so that polluted water is not disposed off directly into rivers and lakes. Water treatment plants should be installed in all industrial area. We should individually follow a mantra, Reduce, Reuse and Recycle. We can think of creative ideas like water used for washing can be reused for other tasks. Discharge of kitchen can be done in kitchen garden etc. (1×3 = 3)

Long Answer Type Questions [5 marks]

Q. 1. How does air get polluted ? Explain.

Ans. Air gets polluted by many reasons. Few of them are as follow :

- (a) Vehicles produce high level of pollutants like carbon monoxide, carbon dioxide, nitrogen oxide, smoke etc. These are very poisonous gases. Burning of fuel from vehicles also produce pollution.
- (b) Many industries are also responsible for causing air pollution. Petroleum refineries, release polluted gases such as sulphur dioxide, nitrogen dioxide etc. They cause respiratory problems, including lung damage.
- (c) Other kind of pollutants like CFCs which are largely used in refrigerators, air conditioners and aerosol sprays. These CFC's damage ozone layer, which

protects us from ultraviolet rays of the sun.

- (d) Some human activities like forest fire, burning of fire wood, cow dung cake, burning of chaff etc., cause air pollution.
- (e) Some natural phenomenon like fast dust storms volcanic eruption produce smoke and dust particles. 5

Q. 2. What is water pollution ? How it is caused ?

Ans. **Water pollution :** The mixing of harmful substances such as sewage, toxic chemicals, silt etc. in water is called water pollution.

Causes of water pollution :

- (i) Domestic discharge.
 - (ii) Industrial discharge.
 - (iii) Religious rituals.
 - (iv) Human activities.
- (Refer Short Answers). 5

Value Based Questions [5 marks]

Q. 1. My sister is in the habit of keeping the tap open while brushing her teeth. She loves to bath under shower. My neighbour uses hosepipe attached to drinking water supply pipe for washing his scooter and car. According to me their way of handling the most precious source water is absolutely wrong. Do you agree with me or not ? What changes in the above situation can be done to conserve water ?

Ans. If your sister and neighbour are wasting the precious water; I agree with you because we have very less amount of potable water on the Earth. As population increases there will be scarcity of this. To control this situation we must talk with them regarding importance of water and tell them alternative methods for their task, such as use bucket to take bath and clean their vehicles. 3

Q. 2. Water is one of our most precious commodities and no life can survive without it. It has been predicted that water scarcity will become the subject of 'Wars' in the near future. Write any two ways in which water is getting polluted. Write any two measures to stop water pollution at your level.

Ans. Water is an important and precious resource. Nowadays it is polluted with many harmful substances such as sewage, toxic chemicals,

silt etc. get mixed with water, the water become polluted. Many industries discharge harmful chemicals into rivers and streams. To avoid these situation many precaution on compulsory rules, must be taken as various physical and chemical processes in the sewage treatment plants must be done before water discharging into the water bodies. At our individual level we should consciously save water not waste. Reduce, Reuse and Recycle should be our Mantra. 3

Formative Assessment

(A) Oral Questions : (Answer in one word)

1. What is the composition of clear air ?
2. What does the contaminated air called?
3. Name any two air pollutants.
4. Name the gas produced during incomplete combustion.
5. Name the pollutants released from refrigerator, air conditioners and aerosol sprays.
6. What is trapping of radiation by the Earth's atmosphere called?
7. Name any one green house gas.
8. Name the glacier in the Himalayas that has started melting because of global warming.
9. Name two fuels used to measure the clean air for the city.
10. A festival to plant the trees is called.
11. Name some water pollutants.
12. Name the plan to save the Ganga river.
13. Name few of industries which are generally responsible for water pollution.
14. What should be our mantra to save water ?

Ans. 1. 78% nitrogen, 21% oxygen. 1% carbon dioxide, argon, methane, ozone and water vapour.

2. Unwanted substances in air, pollute the air, that air is called contaminated air.
3. Smoke and dust.
4. Carbon monoxide 'CO'.
5. Chlorofluorocarbons (CFCs).
6. Green house effect.
7. Carbon dioxide.
8. Glacier Gangotri in Himalayas.
9. CNG and LPG.
10. Van Mahotsava.

11. Sewage waste, toxic chemicals, industrial waste siltate.

12. Ganga Action Plan.
13. Textile, paper, oil refineries and Sugar mills.
14. Reduce Reuse and Recycle.

(B) True/False

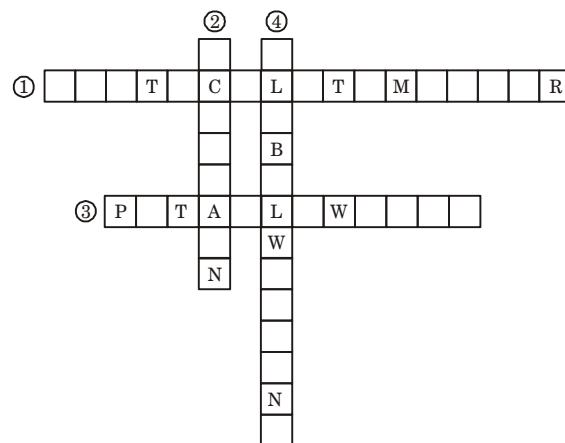
1. We are all aware that our environment was always like this. What it was used to be ?
2. Smoke and dust are also air pollutants.
3. Carbon dioxide is a poisonous gas.
4. The smog causes breathing difficulties.
5. Only refrigerators are responsible for CFC's.
6. Power plant gives out tiny ash particles, and pollute the atmosphere.
7. CNG and LPG are cleaner fuel.
8. CO is one of the gases responsible for green-house effect.
9. There is no threat for the Gangotri glacier.
10. "Say no to Cracker" made a big difference to the air pollution level around Diwali.
11. Sewage and toxic chemicals are major pollutants for water pollution.
12. The Ganga is clean in Kanpur city.
13. Decomposers use lot of oxygen in water body.
14. Hot water can also be a pollutant.
15. 100% of the world population have safe drinking water.

Ans. 1. False, 2. True, 3. False, 4. True, 5. False, 6. True, 7. True, 8. False, 9. False, 10. True, 11. True, 12. False, 13. True, 14. True, 15. False.

(C) Quiz : (Name them)

1. A mantra to save water.
2. Suitable water for drinking.
3. A chemical method for water purification.
4. Name two water borne diseases.

5. An ambitious plan to save the river Ganga.
 6. Name two water pollutants.
 7. Name a festival celebrated to grow more trees.
 8. Name the campaign organized by children to reduce air pollution during Diwali.
 9. Name an endangered glacier in the Himalayas.
 10. Name the gases causing global warming.
 11. Name some cleaner fuels.
- Ans.** 1. Reduce, Reuse and Recycle.
 2. Potable water.
 3. Chlorination.
 4. Cholera, Typhoid.
 5. Ganga Action Plan 1985.
 6. Sewage waste and toxic chemicals.
 7. Van Mahotsava.
 8. Say no to crackers.
 9. Gangotri.
 10. CO₂.
 11. CNG and LPG.

(D) Puzzle**Across :**

1. Minute solid particles suspended
3. Water fit for drinking

Down :

2. Cause for erosion of marble of the Taj Mahal
4. Increase in average temperature of the Earth's atmosphere.

Ans. Across :

1. Particulatematter
3. Potablewater

Down :

2. Acidrain
4. Global warming

Extending Learning : Activities and Projects

Activity : Form an environment club in your school and neighbourhood to make people aware regarding environment pollution. Teach them few methods to reduce pollution.

Project : Make a project file to check the water pollution in India under following headings :

1. List the major rivers in India. (State wise)
2. How is water polluted in these rivers ?
(Check all the measures and paste the photographs, such as industries, usage of local people, sewage pollution, holy bath etc.)
3. Precautions taken by government or other organizations. (Search on Internet).

