

Key to

General

8

Science

REVISED EDITION



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1. Crop Production

- A. 1. maize 2. combine harvester 3. manure
4. sprinkler system 5. weeds 6. tilling the crops
7. seed drill
- B. 1. ploughing, levelling 2. animal husbandry 3. weedicide
4. rabi, kharif 5. manures, fertilisers 6. field fallow
7. drip
- C. 1. True 2. False 3. True
4. False 5. True 6. False
7. True
- D. 1. The kharif crops are grown during the rainy season. They are generally planted in June and harvested in October. An example of kharif crop is rice.
The rabi crops are grown during the winter season. They are generally planted in November and harvested in April. An example of a rabi crop is wheat.
2. The soil is turned and loosened for the following purposes:
(a) It makes the soil loose and allows the roots to penetrate deep
(b) It helps in aeration and enables the roots to breathe easily.
(c) It increases the ability of soil to retain water.
(d) It helps the soil to get mixed with fertilisers more uniformly.
3. Seeds should be sown at a proper distance from one another. This prevents overcrowding of plants and ensures proper supply of sunlight, water and nutrients to each plant.
4. Ploughing is the process of loosening and turning the soil. Levelling is the process of crushing large lumps of rocks that remain after ploughing.
5. Weeds compete with the main crop for air, sunlight and nutrients, which adversely affects the growth of crop.
6. The various tools that are used for ploughing the field are called agricultural implements. These implements are:
(a) A plough is used for cutting and turning the soil.
(b) A hoe is used for removing weeds and to loosen the soil.
(c) A cultivator has multiple blades and saves time and labour.
7. A chemical used to destroy weeds is called weedicide. It checks the growth of weeds without affecting the main crop.

Weedicides are poisonous for human beings. Thus, the farmers should cover their nose and mouth with a piece of cloth to protect themselves while spraying them.

8. If the same plant is grown in a field for a long time, it will consume some specific nutrients from the soil. Thus, the soil becomes deficient in some nutrients and loses its fertility.
9. The rearing of animals on a large scale for food and other purposes is called animal husbandry. Three food products obtained from animals are milk, honey and meat.

Crossword

Across:

- | | | |
|---------------|-----------|------------------|
| 2. Harvesting | 4. Rabi | 6. Crop rotation |
| 9. Manure | 10. Pests | |

Down:

- | | | |
|-----------------|---------------|-----------|
| 1. Broadcasting | 3. Irrigation | 5. Plough |
| 7. Agriculture | 8. Weedicide | |

Hints for HOTS

1. Too much water spoils the wheat crop.
2. Insecticides and other harmful chemicals may be present on them.
3. Chemical fertilisers are toxic and run off into water bodies.

2. Microorganisms

- | | | |
|-------------|-------------------|-----------------|
| A. 1. virus | 2. cocci | 3. algae |
| 4. alcohol | 5. housefly | 6. fermentation |
| 7. plants | 8. pasteurization | |
- B. 1. nitrogen 2. microbiology 3. virus
4. casein 5. yeast 6. pathogen
7. Rhizobium 8. Antibiotics
- C. 1. False 2. True 3. False
4. True 5. False 6. False
7. True 8. True
- D. 1. Microorganisms such as bacteria and fungi act as decomposers. They obtain nutrients by breaking down the remains of dead plants and animals and transfer them to the soil. Some bacteria are used in sewage treatment plants where they help in the decaying of waste organic matter.
2. Viruses are different from other microorganisms as they are harmful not only to other living organisms such as plants and animals but to other microorganisms also.

3. Three communicable diseases caused by microorganisms in animals and their mode of transmission are:
 - (a) Anthrax – transmitted by grazing.
 - (b) Foot and mouth disease – transmitted by physical contact.
 - (c) Bird flu – transmitted by physical contact.
4. A vaccine is a special type of medicine which provides protection or increases our immunity against a particular disease. When it is introduced in the body of a healthy person, either by swallowing or injection, the body produces antibodies to fight against the disease. These antibodies remain in the body and protect the body from future attacks by the same microbes.
5. Bacteria, parasites, viruses, and many other harmful microbes may contaminate food or water. These microbes grow in food or water under favourable conditions like warm temperature, moisture and air. Under these conditions, microbes often produce toxic substances and make the food or water unfit for consumption. Consuming such contaminated food or water leads to an illness called food poisoning.
6. The various ways through which pathogens may enter the body of a healthy person are:
 - (a) breathing
 - (b) infected food and water
 - (c) physical contact with an infected person
 - (d) carriers of microbes
7. Microorganisms are capable of surviving under extreme conditions. Under unfavourable conditions, they form a hard, protective coating around them called cyst. Once the conditions become favourable, they break out from the cyst and become active again.

Hints for HOTS

1. Wastes get decomposed and rot due to microorganisms present in drains.
2. Mango pickles contain preservatives that prevent rotting.
3. Higher temperature promotes growth of microorganisms.
4. To wash off dirt and microorganisms present in it.
5. They may have side effects and may kill useful microorganisms too.

Crossword

Across:

- | | | |
|-------------|------------------|-------------|
| 2. Casein | 4. Preservatives | 6. Microbes |
| 8. Pathogen | 10. Malaria | |

Down:

- | | | |
|------------|------------|--------------|
| 1. Yeast | 3. Vaccine | 5. Rhizobium |
| 7. Carrier | 9. Virion | |

3. Synthetic Fibres and Plastics

- A. 1. nylon 2. rayon 3. polystyrene
4. teflon 5. bakelite
6. non-biodegradable substances 7. polyester
- B. 1. polymer 2. poor 3. Acrylic
4. chemicals 5. thermoplastics 6. Synthetic
7. Nylon, melamine
- C. 1. False 2. True 3. True
4. False 5. False 6. False
7. False
- D. 1. A polymer is a large molecule made up of many small molecules of the same kind combined together chemically. A monomer is a small molecule which combines with a large number of molecules of the same type to form a polymer.
2. The process of combining small monomers to form a polymer is called polymerisation.
3. Polyester is a polymer of many ester units. Terylene is the most commonly used form of polyester. It is lightweight, strong and elastic in nature. It is resistant to wrinkles and easy to wash. It is used to make sarees, dress materials, curtains, etc. It is used for making sails of sailboats.
4. Clothes made from synthetic fibres are not safe to be worn in kitchen as they catch fire quickly and stick to the body causing severe burns.
5. Three properties of plastics that make them superior over other materials are:
(a) Plastics are resistant to chemicals and do not get corroded easily.
(b) Plastics are lightweight, strong and durable.
(c) Plastics are insulators of heat and electricity.
6. A thermoplastic is a plastic that becomes soft and mouldable when hot and sets into a rigid form when cooled. It can be moulded repeatedly, after heating, into desired shapes and sizes. A thermosetting plastic is a plastic which can be moulded into a desired shape only once. Once set, it cannot be remoulded again. It is comparatively harder and stronger than a thermoplastic.

Crossword

Across:

2. Polyester 4. Polymerisation 8. Monomers
9. Cellulose 10. Melamine

Down:

- | | | |
|---------------------|-----------|----------|
| 1. Nonbiodegradable | 3. Nylon | 5. Rayon |
| 6. Thermoplastic | 7. Teflon | |

Hints for HOTS

1. They do not react with chemicals or spices.
 2. Synthetic fibres burn rapidly and stick to skin.
 3. These do not absorb sweat, catch fire easily and do not let air pass through them.
-

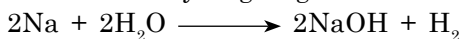
4. Metals and Non-metals

- | | | |
|-----------------|--------------------|-------------|
| A. 1. potassium | 2. mercury | 3. hydrogen |
| 4. acidic | 5. red litmus blue | 6. sodium |
| 7. graphite | 8. electroplating | |
- B. 1. solids 2. poor 3. Malleability
4. Zinc 5. Alloys 6. rusting
7. displacement 8. salt, hydrogen
- C. 1. True 2. True 3. False
4. True 5. False 6. True
7. False 8. False
- D. 1. Malleability is the property of a substance to be beaten into thin sheets without breaking. Ductility is the property of a substance to be drawn into thin wires.
2. Metals are used for making electric wires as they are good conductors of electricity.
3. Sonority is the property of a substance to produce a ringing sound when struck with a hard substance. Metal are sonorous and produce a ringing sound when hit by a hard object. Non-metals are non-sonorous and do not produce a ringing sound when struck with a hard object.
4. Sodium and potassium catch fire very easily when left in open air. Therefore, they are kept immersed in kerosene oil.
5. An arrangement of metals in the form of a list, in order of their decreasing reactivity, is called the reactivity series of metals. The most reactive metal is potassium and the least reactive metal is platinum.
6. Iron is more reactive than copper. Thus, it is able to displace copper from its salt solution while copper cannot displace iron from its salt solution.
7. (a) Iron displaces copper from copper sulphate solution to form iron sulphate solution and copper. The blue colour of the solution changes to green.
- $\text{Fe} + \text{CuSO}_4 \longrightarrow \text{FeSO}_4 + \text{Cu}$

- (b) No reaction occurs as silver is less reactive than copper.
 (c) When magnesium reacts with dilute sulphuric acid, magnesium sulphate is formed and hydrogen gas is released.



- (d) When sodium is put into water, sodium hydroxide is formed and hydrogen gas is released.



A large amount of heat is released during this reaction.

Crossword

Across:

- | | | |
|------------------|--------------|--------------|
| 2. Malleability | 4. Aluminium | 6. Ductility |
| 7. Galvanization | 9. Sonority | |

Down:

- | | | |
|--------------|---------------|-----------|
| 1. Element | 2. Metallurgy | 3. Litmus |
| 5. Metalloid | 8. Lustre | |

Hints for HOTS

- Acids react with metals and dissolve them.
- Silver is expensive.
- Non-metal, chlorine.

5. Coal and Petroleum

- A. 1. anthracite 2. CNG 3. air
 4. LPG 5. compressed natural gas
 6. black gold 7. coke
 8. fractional distillation
- B. 1. 85 2. Coal, petroleum, natural gas
 3. Natural gas 4. carbonization
 5. coke, coal tar, coal gas
 6. refining of petroleum 7. petrochemicals
 8. Fractional distillation
- C. 1. False 2. False 3. True
 4. False 5. True 6. True
 7. True
- D. 1. Fossil fuels are formed as a result of decomposition of fossils due to high temperature, pressure and lack of air inside the Earth. Fossil fuels contain high percentages of carbon and compounds of carbon.
 2. The slow process of conversion of remains of dead plants buried deep under the Earth into coal is called carbonization.

3. Natural resources are the materials available in abundance in nature that can be used by humans for various purposes. These include metals, non-metals, soil, water, air, sunlight and fuels.
4. Petrochemicals are chemical products derived from petroleum or natural gas. Some of the petrochemicals obtained from the components of petroleum include toluene, benzene, ethylene, ethanol and propylene.
5. Fossil fuels are considered exhaustible resources of energy because they are limited in quantity and will not be replenished quickly once exhausted.
6. Inexhaustible resources are those resources which are available in unlimited quantity in nature and do not get exhausted or depleted by human activities. Inexhaustible resources are also known as renewable resources as they get replenished through natural processes.
Exhaustible resources are those resources which are available in limited quantity in nature and can be exhausted because of their continuous and excessive use by humans. Exhaustible resources are also known as non-renewable resources as they do not get replenished through natural processes.
7. The different types of coal and the carbon content in them are:
 - (a) Lignite – 60% to 70% carbon
 - (b) Bituminous – 70% to 85% carbon
 - (c) Anthracite – above 85% carbon

- | | | |
|--------------|------------|---------------|
| F. (a) Coal | (b) Burner | (c) Test tube |
| (d) Coal gas | (e) Water | (f) Coal tar |

Crossword

Across:

- | | | |
|-------------------|-------------|--------|
| 4. Petrochemicals | 7. Diesel | 8. PNG |
| 9. Coal tar | 10. Fossils | |

Down:

- | | | |
|------------------|--------------|--------------|
| 1. Anthracite | 2. Kerosene | 3. Petroleum |
| 5. Carbonization | 6. Renewable | |

Hints for HOTS

1. They do not produce sufficient amount of energy.
2. It is less polluting, easily transportable and produces more energy.
3. Requires extreme temperature and pressure

6. Combustion and Flame

- A. 1. coal 2. outermost zone 3. blue
4. carbon monoxide 5. hydrogen 6. flame
7. rapid or fast combustion 8. fire extinguisher
- B. 1. coal/wood 2. kJ/kg 3. yellow
4. ignition temperature 5. Water
6. combustible 7. exothermic
8. sulphuric acid and sodium bicarbonate
- C. 1. False 2. False 3. True
4. False 5. False 6. True
7. True 8. True
- D. 1. Combustion is the chemical process of burning a substance in the presence of oxygen to produce energy in form of heat and light. Combustion of a substance is an exothermic reaction that releases energy in the form of heat and light.
2. Acid rain is the rainfall that contains dissolved acids such as sulphuric acid and nitric acid in it. Acid rain destroys plants, marine life, soil fertility, buildings and monuments, and can cause skin disorders.
3. Global warming is the phenomenon of increase in the average temperature of Earth due to presence of gases such as carbon dioxide and methane in the atmosphere.
4. Ignition temperature is the minimum temperature at which a substance burns in the presence of oxygen. Combustion of a substance cannot occur if its temperature is lower than its ignition temperature.
5. The calorific value of a fuel is the amount of heat produced by the complete combustion of 1 kg of the fuel. Its units are kJ/kg.
6. The conditions necessary for combustion are:
(a) Presence of a combustible substance.
(b) Presence of a supporter of combustion.
(c) Attainment of ignition temperature.
7. Water is a good conductor of electricity. If water is poured on an electrical fire, it may result in the person receiving an electric shock.
8. When a substance is burnt in air, all parts of the substance do not receive same amount of air to burn. The parts where the supply of air is sufficient undergo complete combustion and produce a blue flame.

Hints for HOTS

1. Holes of the burner may be choked.
2. To cut off supply of air.
3. Dry leaves have a lower ignition temperature.
4. Iron gets oxidized during rusting.

Crossword

Across:

- | | | |
|---------------|-------------------------|--------------|
| 5. Combustion | 6. Ignition temperature | 8. Explosion |
| 9. Fuel | 10. Black | |

Down:

- | | | |
|--------------------|----------------|----------|
| 1. Calorific value | 2. Spontaneous | 3. Flame |
| 4. Oxygen | 7. Inflammable | |
-

7. Conservation of Plants and Animals

- A. 1. desertification 2. ecosystem 3. IUCN
4. 1973 5. flora 6. siberian crane
7. Uttarakhand 8. Switzerland
- B. 1. homo sapiens 2. Asiatic lion 3. UNESCO
4. Biodiversity 5. Endangered species
6. Red Book Data
7. recycling 8. one-horned rhino
- C. 1. False 2. False 3. True
4. True 5. True 6. False
7. False 8. True
- D. 1. Flora refers to plant life of a particular geographical region whereas fauna refers to animal species found in the region.
2. The existence of a diverse variety of plants, animals and other living organisms in a place is known as biodiversity. Biodiversity is very important for all living organisms. Plants produce food which is consumed by animals. Animals help plants by dispersal of seeds and providing manure through excretion. Thus, biodiversity ensures coexistence and mutual dependence among various forms of life.
3. Extinct species are those species that were not able to adapt themselves to the climatic changes and disappeared from the Earth, e.g. pink headed duck, dinosaur and dodo.
4. Endangered species are those species that are in danger of extinction soon, e.g. Great Indian bustard and one-horned rhinoceros.
5. Deforestation leads to large scale cutting of trees. Loss of trees leads to soil erosion. This results in decreased vegetation in

the region and decreased precipitation. The conversion of fertile land into a desert is called desertification.

6. Endemic species are the species with a habitat restricted to one area. They are unique to a specific region, state or a country. Two examples of endemic species are lion-tailed macaque and the Asiatic lion.
7. Red Data Book is a collection of records of all the endangered plants and animals. Species are classified into different categories like extinct, critically endangered, vulnerable and threatened. It is published by IUCN.
8. The migratory species shift temporarily in search of food, water, suitable temperature and place for reproduction. When conditions at their native place become favourable, they return back. Siberian crane is an example of a migratory species.

Crossword

Across:

- | | | |
|--------------|-------------------|--------------|
| 2. Habitat | 5. Deforestation | 8. Ecosystem |
| 9. Bharatpur | 10. Afforestation | |

Down:

- | | | |
|------------|-----------------|--------------|
| 1. Fauna | 3. Biodiversity | 4. Migration |
| 6. Endemic | 7. Vulnerable | |

Hints for HOTS

1. Changes in environment, shortage of food, etc.
 2. Controlled vs uncontrolled, artificial vs natural, etc.
 3. There are artificial relationships between organisms based on controlled measures.
 4. Reuse paper bags, use newspaper for lining shelves, recycle paper for writing, etc.
-

8. Structure and Function of Cell

- | | | |
|-----------------------|-----------------|-----------------|
| A. 1. Robert Hooke | 2. cell wall | 3. chromosomes |
| 4. lysosomes | 5. mitochondria | 6. chromoplasts |
| 7. cell | 8. cytoplasm | |
| B. 1. Protoplasm | 2. Nucleus | |
| 3. Schneider, Schwann | | 4. organelles |
| 5. slide | 6. Chromosomes | 7. organ system |
| 8. cytoplasm | | |
| C. 1. False | 2. False | 3. True |
| 4. False | 5. True | 6. False |
| 7. True | 8. False | |

- D. (a) lysosome (b) endoplasmic reticulum
(c) centrosome (d) golgi apparatus (e) cytoplasm
(f) nucleolus (g) nucleus (h) ribosome
(i) mitochondria

- E. 1. The cell was discovered in 1665 by Robert Hooke. He was examining thin slices of cork under a microscope. He observed small honeycomb like structures separated from each other by thin partitions. He called these structures cells.
2. Nucleus is a spherical body present inside the cell. It is called the brain of the cell as it controls all the activities of the cell.
3. The cell theory was proposed by two German scientists, Schleiden and Schwann, in 1938. It states that:
- (a) All living things or organisms are made up of one or more cells.
- (b) Cell is the basic structural and functional unit of all living beings.
- (c) New cells are created by the division of pre-existing cells.
4. A cell is the basic structural and functional unit of an organism. All the organs in a living organism are made up of cells. Thus, cells are called the building blocks of life.
5. Chromosomes are found inside a small spherical region called nucleolus that is present inside the nucleus of a cell. Chromosomes contain genes which transfer the characteristics of a cell to the new cell formed during cell division.
6. Pseudopodia are finger-like projections of the body of an amoeba. These pseudopodia help the amoeba to grab its food and move from one place to another.
7. Cell membrane is porous and semi-permeable as it allows substances to enter or leave the cell selectively.

Crossword

Across:

- | | | |
|------------|---------------|--------------|
| 3. Vacuole | 4. Paramecium | 8. Cytoplasm |
| 9. Nucleus | 10. Tissue | |

Down:

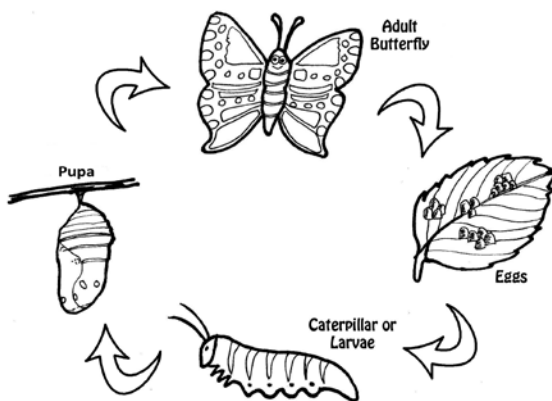
- | | | |
|---------------|--------------|-----------------|
| 1. Eukaryotes | 2. Ribosomes | 5. Mitochondria |
| 6. Lysosome | 7. Plastids | |

Hints for HOTS

1. The number and size of cells in organisms differs.
2. All flowers will be colourless and of same shade.
3. It decomposes into simpler substances that are used to form new cells.

9. Reproduction

- A. 1. all of these 2. both male and female cell
3. ova 4. frog 5. uterus
6. Dolly 7. crow
- B. 1. semen 2. womb 3. foetus
4. male, female 5. unicellular 6. sperm
7. penis 8. incubation
- C. 1. False 2. True 3. False
4. False 5. False 6. True
7. False 8. True
- D. 1. Reproduction helps in the continuation of a species and prevents it from becoming extinct. Reproduction also ensures passing on hereditary traits from one generation of organisms to the next generation and helps in continuous evolution of the organism.
- 2.



Life cycle of a butterfly

3. Once the zygote is formed, it undergoes cell division and cell differentiation. The developing stage of a zygote is called an embryo. The embryo derives its nutrition from the body of the female or the egg in which it develops. As development continues, it develops recognisable body parts. The stage of the embryo where all the body parts can be recognised is called the foetus.
4. Cloning is the process of creating an identical organism with the same genetic information as the existing one. As the child contains the genetic information from only one organism, it is an exact copy of the organism and is called a clone.

5. Gametes are the male and female reproductive cells in an organism. The human male gametes are called sperms and the female gametes are called ova.
6. The process of change of a larva or a caterpillar into an adult is called metamorphosis.
7. A new born baby is too small to look after itself and requires proper care and attention at all times. It is important that the mother feeds her milk to the new born baby until the baby is six months old. A baby should be vaccinated from time to time so that it gets protected from various diseases.

Hints for HOTS

1. One egg may be fertilised by multiple sperms.
2. Yes, through IVF and artificial insemination.
3. Blue whale is a mammal and does not lay eggs.

Crossword

Across:

- | | | |
|------------|-----------------|------------------|
| 3. Ovaries | 4. Reproduction | 5. Fertilisation |
| 7. Gametes | 8. Zygote | |

Down:

- | | | |
|------------|-----------|--------------|
| 1. Clone | 2. Embryo | 3. Oviparous |
| 5. Fission | 6. Sperm | |

10. Reaching the Age of Adolescence

- | | | |
|-----------------|----------------------------|-----------------|
| A. 1. boys only | 2. thyroxine | 3. a girl |
| 4. testosterone | 5. goitre | 6. all of these |
| 7. 23 | 8. balanced diet | |
| B. 1. puberty | 2. glands | 3. drugs |
| 4. Testosterone | 5. insulin | |
| 6. pituitary | 7. Oestrogen, progesterone | |
| 8. males | | |
| C. 1. False | 2. False | 3. True |
| 4. False | 5. True | 6. False |
| 7. True | 8. True | |
- D. 1. The stage of life when the human body becomes capable of reproduction is called puberty. In girls, puberty occurs from the age of 8 years while in boys, puberty occurs at the age of 10 years.
2. Puberty is marked with a change in the development of the brain and its emotional behaviour as well as physical changes. An individual begins to think and decide more

independently. During puberty, it is common for boys and girls to feel uncomfortable and become more sensitive about their physical appearance.

3. The thyroid gland produces a hormone thyroxine that controls the rate at which the body processes and uses energy.
4. The pituitary gland is called the master gland because it controls the growth and functioning of the other endocrine glands.
5. The periodic shedding of the inner uterine wall and discharge of unfertilised egg along with blood is termed as menstruation or period.
6. During puberty, sweat and oil glands become more active. Oil glands secrete oil which makes the skin oily, leading to formation of pimples and acne on the face.
7. The maximum height attained by the boy will be approximately 190 cm.
8. The process of change of a larva or a caterpillar into an adult is called metamorphosis. In frogs, metamorphosis is controlled by the thyroxine hormone produced by the thyroid gland.

Hints for HOTS

1. Direct into blood.
2. It causes too much aggression, high blood pressure, etc.
3. The body is going through a transition and is not fully formed.
4. They have many harmful side effects.

Crossword

Across:

- | | | |
|---------------|---------------|------------|
| 4. Insulin | 5. Adrenaline | 8. Puberty |
| 9. Chromosome | 10. Glands | |

Down:

- | | | |
|--------------|-------------|--------------|
| 1. AIDS | 2. Teenage | 3. Pituitary |
| 6. Endocrine | 7. Hormones | |

11. Force and Pressure

- | | | |
|------------------------|---------------------|-------------------|
| A. 1. newton | 2. frictional force | 3. 100 kilopascal |
| 4. manometer | 5. increases | |
| 6. gravitational force | 7. muscular force | 8. opposite |
| B. 1. non-contact | 2. increases | 3. Magnetic |
| 4. blood pressure | 5. Atmospheric | 6. greater |
| 7. non-contact | 8. all | |

- C. 1. False 2. False 3. True
 4. False 5. False 6. True
 7. True 8. True
- D. 1. Force is defined as a push or pull applied on an object. Force is described by its magnitude and the direction in which it acts. The SI unit of force is Newton and it has the symbol N.
2. Pressure is defined as the force applied per unit area on an object. The SI unit of pressure is Pascal which has the symbol Pa. It is also expressed as N/m^2 .
3. The factors on which the pressure exerted by a force depends are:
- Pressure is directly proportional to force. The larger the force applied, greater is the pressure exerted.
 - Pressure is inversely proportional to the area of contact. The smaller the area of contact, greater is the pressure exerted.
4. The force exerted by the action of muscles of an organism is called muscular force. Muscular force is used in lifting a book lying on a table and kicking a football.
5. When you throw a ball upwards, it comes down towards the Earth due to gravity. The gravity of the Earth pulls down anything that is not held up by some other force.
6. Atmospheric pressure on mountains is lesser than it is in the plains. Mountaineers suffer from nose bleed at high altitudes as the air pressure is lower than the blood pressure in the body. Thus, the blood forces itself out from the nose.
7. Force = 400 N
 Area = 10 m^2
 Thus, pressure exerted = $\frac{\text{Force}}{\text{Area}} = \frac{400}{10} = 40 \text{ N/m}^2$
8. Weight of box = 100 N
 Area of base = $25 \text{ cm}^2 = 25/10000 \text{ m}^2 = 0.0025 \text{ m}^2$
 Thus, pressure exerted = $\frac{\text{Force}}{\text{Area}} = \frac{100}{0.0025} = 40000 \text{ N/m}^2$

Hints for HOTS

- To decrease the pressure exerted on the road.
- The force of gravity is very weak.
- Changes the shape and size of the iron object.

Crossword

Across:

- | | | |
|---------------|------------------------|-----------|
| 1. Atmosphere | 7. Electrostatic force | 8. Newton |
| 9. Barometer | 10. Gravity | |

Down:

- | | | |
|----------------|-------------|-----------|
| 2. Manometer | 3. Friction | 4. Pascal |
| 5. Suction pad | 6. Pressure | |

12. Friction

- A. 1. ball bearings 2. sliding friction 3. both of these
4. spring balance 5. all of these 6. frictional force
7. powder 8. wear and tear
- B. 1. interlocking 2. nature/smoothness 3. motion
4. reduces 5. less 6. rough
7. kinetic friction 8. Grease, oil
- C. 1. True 2. False 3. True
4. True 5. True 6. False
7. True 8. True
- D. 1. The layer of soap makes the floor slippery and smooth. This reduces the friction between the floor surface and the feet of a person. This makes it difficult to walk on a soapy floor.
2. Sportsmen use shoes with spikes as the spikes dig into the ground and provide interlocking. This allows the sportsmen to get a better grip on the ground and run better.
3. Aeroplanes and ships have streamlined bodies to reduce the frictional drag exerted on them by air and water respectively.
4. The friction between the moving parts of a machine produce heat which can result in wear and tear of machine parts and reduced efficiency. Lubricants decrease the friction between the moving parts. Thus, machines need to be lubricated from time to time.
5. Rolling friction is less than sliding friction. Thus, luggage bags and suitcases are provided with rollers that makes it easier to move them.
- E. 1. Friction between two surfaces is caused by the roughness of surfaces. The surface of an object contains a large number of irregularities on its surface in the form of grooves and ridges. When one surface moves over the other, these grooves and ridges get interlocked which produces friction between the surfaces and slows down the motion.

2. The factors that affect friction are:
 - (a) Friction depends on the nature of the surfaces which are in contact with each other. The friction between two smooth surfaces is less as compared to the friction between two rough surfaces.
 - (b) Friction depends on the force with which two surfaces are pressed together. If the two surfaces of objects are pressed together with a greater force, the irregularities get interlocked more firmly and increase the friction between them.
3. Sliding friction is the friction present between two surfaces that slide over each other. Rolling friction is the friction present when an object rolls over the surface of another object.
4. A spring balance is a simple device used to measure force applied on an object. It has a spring fixed at one end with a hook at the other. When a force is applied to the spring, the spring gets stretched. It makes the pointer of the balance move along a graduated scale. The reading on the scale gives the magnitude of the force.
5. The surface of paper is full of minute irregularities while the surface of glass is smoother. Thus, the friction between the point of a pencil and paper is more than the friction between the pencil and glass. Hence, it is easier to write with a pencil on paper than on glass.

Crossword

Across:

- | | | |
|--------------|------------|----------------|
| 2. Drag | 3. Static | 4. Streamlined |
| 7. Lubricant | 8. Rolling | |

Down:

- | | | |
|-------------|-------------------|------------|
| 1. Friction | 3. Spring balance | 4. Sliding |
| 5. Kinetic | 6. Studs | |

Hints for HOTS

1. Heat is produced due to friction.
2. Friction is generated due to the air coming in contact with the surface of the aircraft.
3. To reduce friction.

13. Sound

- A. 1. guitar 2. vacuum 3. 20000 Hz
4. vocal chords 5. auditory nerves 6. pitch
7. loudness
- B. 1. wind 2. music 3. voice box/larynx
4. Hertz 5. time period 6. solids, gases
7. infrasonic
- C. 1. False 2. True 3. False
4. True 5. True 6. False
7. False
- D. 1. The speed of sound in a medium depends on its density and temperature. Sound travels fastest through solids and slowest through gases. The speed of sound increases with rise in temperature and decreases with fall in temperature of a medium.
2. The sound which human ears can hear is called audible sound and the sound which human ears cannot hear is called inaudible sound.
3. Four major sources of noise pollution are:
(a) Sounds of vehicles like trains, buses and cars.
(b) Televisions and music systems with high volume and blaring loudspeakers.
(c) Noise of machines from factories and industries.
(d) Sound from kitchen appliances, washing machines, coolers, and air conditioners.
4. Hearing impairment refers to the partial or total loss of hearing in a person due to exposure to loud and painful noise for a long duration of time.
5. Sound waves travel in form of compressions and rarefactions. The vibrating object vibrates the particles of the air that surround it. These particles push other particles adjacent to them and cause them to vibrate. This process continues and gives rise to sound waves. When these sound waves reach your ears, you hear the sound.
6. Music is a sound produced by a series of vibrations, following each other regularly at equal intervals, without any sudden change in amplitude or loudness. It produces a pleasant and rhythmic effect on one's ear.
- Noise is a sound which is produced by a series of vibrations following each other, irregularly and rapidly at unequal

intervals, with sudden change in amplitude or loudness. It produces an unpleasant effect on one's ear.

Yes, music can become noise if it is played at a very loud volume.

7. In humans, the sound is produced by the voice box or the larynx. It is located at the upper end of the wind pipe or trachea. Two vocal cords are stretched across the voice box in such a way that it leaves a narrow slit between them for the passage of air. When one speaks, the air from the lungs moves up through the windpipe to the voice box. As the air passes through the slit between the vocal cords, it causes them to vibrate. The vibrations of vocal cords produce sound.

Crossword

Across:

- | | | |
|----------------|----------------|----------|
| 3. Compression | 5. Infrasonics | 8. Radio |
| 9. Timbre | 10. Frequency | |

Down:

- | | | |
|------------|--------------|-----------|
| 1. Cochlea | 2. Amplitude | 4. Larynx |
| 6. Stirrup | 7. Pitch | |

Hints for HOTS

1. The speed of sound is less than that of light.
2. An oscillation has a regular time period whereas a vibration may or may not.

14. Chemical Effects of Electric Current

- | | | |
|-------------------------|-------------------|--------------------|
| A. 1. hydrochloric acid | 2. electric cable | 3. zinc |
| 4. cathode | 5. anode | 6. chemical change |
| B. 1. insulator | 2. nucleus | 3. electrolyte |
| 4. conductor | 5. ions | 6. cathode |
| C. 1. True | 2. True | 3. True |
| 4. True | 5. True | 6. False |
- D. 1. The decomposition of a chemical compound into its constituents due to passage of electric current through it is called electrolysis.
2. Electrefining is an application of electrolysis that is used for obtaining pure metal from impure metal.
3. Pure water is a non-electrolyte. When impurities (like salts) are dissolved in water, their atoms break up into charged

particles. These particles carry electric current from one part of the liquid to another. Thus, impure water becomes a conductor of electricity.

4. When electric current is passed through acidified water, electrolysis of water occurs. Water molecules dissociate into hydrogen and oxygen ions. These ions combine to form hydrogen and oxygen molecules.
5. Atoms of all elements are electrically neutral. But when electrolytes are melted or dissolved in water, their atoms lose or gain charges to become charged particles. Atoms that carry a net electric charge on them are called ions. These ions facilitate the flow of electric current in an electrolyte. Non-electrolytes do not possess charged particles and do not conduct electric current.
6. Electrical conductivity refers to the ability of a substance to allow electric current to flow through it. Liquids generally do not conduct electricity but some liquids are conductors of electric current, e.g. lemon juice, hydrochloric acid and common salt solution.

Crossword

Across:

- | | | |
|-----------------|-------------|--------------|
| 2. Insulator | 4. Zinc | 6. Conductor |
| 8. Electrolysis | 9. Chlorine | |

Down:

- | | | |
|----------------|------------|----------|
| 1. Electrolyte | 2. Ions | 3. Anode |
| 5. Nucleus | 7. Cathode | |

Hints for HOTS

1. Sugar solution does not contain any ions.
2. Distilled water is a non-electrolyte whereas rain water is an electrolyte.
3. Water is a conductor of electricity.

15. Some Natural Phenomena

- | | | |
|----------------------------|-------------------------------------|------------------|
| A. 1. solid iron | 2. avoid contact with running water | |
| 3. repel each other | 4. lightning conductor | |
| 5. all of these | 6. tsunami | 7. Richter scale |
| B. 1. electroscope | 2. discharging | 3. heavy table |
| 4. timber, mud | 5. seismograph | |
| 6. Charles Francis Richter | 7. fault zones | |

- C. 1. False 2. True 3. False
4. False 5. False 6. False
7. True
- D. 1. A comb becomes charged due to rubbing with hair. Due to charging, it is able to attract small pieces of paper towards itself.
2. Atoms of elements contain negatively charged electrons and positively charged protons. Since, the number of electrons and protons in an atom is equal, an atom is electrically neutral.
3. (a) Thunder – The loud sound waves due to high pressure created during lightning is called thunder.
- (b) Earthquake – An earthquake is the sudden, rapid shaking or rolling of the Earth that produces vibrations inside the Earth.
- (c) Seismograph – The vibrations produced by earthquakes are detected, recorded and measured by an instrument called seismograph.
- (d) Electric discharge – The loss of charge of a charged body when it is kept in contact with an uncharged body is called electric discharge.
4. The place of origin of an earthquake inside the Earth is called its focus. The point on the surface of the Earth, vertically above the focus, is called the epicentre of the earthquake.
5. Earthing is the discharge of the charge contained in an object into Earth. This is done by connecting the body of the object with a conductor, like a copper plate, and burying the plate under the Earth. Earthing prevents the danger of electrical shock due to leakage of electric current in circuits.
6. People living in seismic zones must build their houses earthquake resistant. In a seismic zone, the material used for buildings should be light-weight such as mud and timber so that even if the structure falls, the damage may not be too much.
7. A lightning conductor is a device used to protect a building from damage by lightning during a thunderstorm. When lightning strikes, the lightning conductor provides an easy path for the charge to pass through the ground and thus, protects the building.

Crossword

Across:

- | | | |
|--------------|--------------|------------|
| 2. Epicentre | 6. Tectonic | 7. Thunder |
| 9. Amber | 10. Earthing | |

Down:

- | | | |
|-----------------|---------------|----------------|
| 1. Lightning | 3. Earthquake | 4. Seismograph |
| 5. Electroscope | 8. Seismic | |

Hints for HOTS

1. They are at a greater height and nearer to the clouds.
2. The amount of charge flowing inside the Earth is too small as compared to the mass of the Earth.

16. Light

- A. 1. incident ray 2. hypermetropia 3. raise right hand
4. dispersion 5. iris 6. 11
- B. 1. 6 2. expands 3. reflection
4. irregular 5. multiple reflection of light
6. optic nerves
- C. 1. True 2. False 3. True
4. True 5. False 6. False
- D. 1. The iris regulates the amount of light entering the eye by controlling the size of the pupil. When light is very bright, the iris contracts the pupil to allow less light to enter the eye. In dim light, the iris expands the pupil to allow more light to enter the eye.
2. Refraction of light is the phenomenon of light rays bending from their straight path as they travel from one transparent medium to another. Refraction of light produces many interesting phenomena. A pencil, half dipped in a glass of water, appears bent inside water. A coin placed at the bottom of a container, filled with water, appears raised above the bottom of the container. The twinkling of stars is an example of refraction of light occurring in nature.
3. Multiple reflection of light is the reflection of light, back and forth several times, between two or more mirrors kept at an angle to each other. Multiple reflections give rise to multiple images. Depending on the angle between the two mirrors, the number of images formed are different.

4. Three characteristics of image formed by a plane mirror are:
 - (a) The image formed by a plane mirror is a virtual image.
 - (b) The distance of the image behind the mirror is equal to the distance of the object in front of it.
 - (c) The image formed by a plane mirror is laterally inverted.
5. During regular reflection, light rays are reflected from a smooth and polished surface as a parallel beam of light. During irregular reflection, light rays are reflected from irregular and dull surfaces in different directions.
6. The ability of eye lens to adjust its thickness, so as to see nearby as well as faraway objects clearly, is called the power of accommodation.
7. Reflection of light is the phenomenon of light rays, travelling through a medium, bouncing back in the same medium after striking on a smooth polished surface.
The two laws of reflection are:
 - (a) The incident ray, the reflected ray and the normal at the point of incidence lie in the same plane.
 - (b) The angle of incidence is equal to the angle of reflection.
8. The phenomenon of splitting of white light into its constituent colours, on passing through a transparent medium, is called dispersion of light. The colours in the spectrum of white light from bottom to top are – Violet, Indigo, Blue, Green, Yellow, Orange, Red.
9. The inability of human eye to see objects comfortably and clearly is called a defect of vision. The two common defects of human eye are myopia and hypermetropia.

Hints for HOTS

1. We will not be able to see things around us.
2. The high intensity beam of light can damage our eyes.
3. We will not be able to identify colours and will not be able to respond to change in lighting conditions.

Crossword

Across:

- | | | |
|------------|--------------|---------------|
| 3. Virtual | 4. Periscope | 6. Refraction |
| 9. Iris | 10. Retina | |

Down:

- | | | |
|---------------|-------------|------------|
| 1. Reflection | 2. Myopia | 5. Braille |
| 7. Rainbow | 8. Cataract | |

17. Stars and the Solar System

- A. 1. blue-green 2. Pole star 3. Cassiopeia
4. Venus 5. comet 6. asteroids
7. Alpha Centauri
- B. 1. Pole star 2. full 3. Ursa Major
4. east, west 5. Jupiter 6. Hailey's comet
7. natural satellite 8. Milky Way
- C. 1. True 2. False 3. False
4. True 5. True 6. False
7. True 8. False
- D. 1. (a) A planet is a large celestial body that revolves around the Sun in a closed elliptical path. A star is a huge sphere of hot glowing gases held together by its own gravity. Planets are much smaller in size than stars and do not emit their own light.
(b) A meteor is a meteoroid that enters the Earth's surface and appears as a bright streak of light in the night sky as it burns and falls down towards the Earth's surface. A meteorite is the remains of a meteor that does not burn up completely while falling towards the Earth and reach the Earth's surface as a piece of rock.
2. A light year is defined as the distance travelled by light in one year. It is equal to 9.46×10^{12} km. It is very difficult to represent the large distances between the various celestial bodies in terms of metre or kilometre. Such large distances are measured in terms of light year.
3. Almost three-fourth of the surface of Earth is covered with water. When seen from outer space, the Earth appears blue-green due to the reflection of sunlight from water and landmasses on its surface. Thus, Earth is called the blue planet.
4. Venus is called the morning star or the evening star as it appears like a bright object in the sky just before sunrise or just after sunset.
5. A planet is a large celestial body that revolves around the Sun in a closed elliptical path. The planets have specific positions in the solar system and are held in place due to the gravitational pull of the Sun. Each planet moves around the Sun in a definite path called an orbit.

The planets that are closer to the Sun are called inner planets. They have a solid surface and are composed mainly of rocks. Mercury, Venus, Earth, and Mars are the inner planets. The planets that are farther from the Sun are called outer planets. They are large spinning bodies of gases with no solid surface. Jupiter, Saturn, Uranus, and Neptune are the outer planets.

6. A galaxy is a system of millions or billions of stars, together with gas and dust, held together by gravitational attraction. The galaxy to which our Sun and Earth belong is called the Milky Way. It appears as a broad band of faint light stretching across the sky. This band is formed by millions of stars that belong to the galaxy.
7. The Pole star is a star of medium brightness. It appears stationary when viewed from the Earth as it lies directly along the axis of rotation of Earth. To locate the Pole star using the Ursa Major constellation, identify the two brightest stars near the spoon end of the constellation. Extend an imaginary line through these two stars towards the north direction. This line points towards the Pole Star.

Crossword

Across:

- | | | |
|-----------|------------------|--------------|
| 2. Orbit | 6. Constellation | 7. Satellite |
| 8. Sirius | 9. Jupiter | |

Down:

- | | | |
|--------------|--------------|----------|
| 1. Orion | 3. Asteroids | 4. Venus |
| 5. Meteorite | 10. Planet | |

Hints for HOTS

1. The bright light of the Sun hides them.
2. There is no atmosphere or water on Moon.
3. The amount of sunlight reflected by it changes each day.

18. Pollution of Air and Water

- | | | |
|---|-----------------------|-------------------|
| A. 1. potable water | 2. chlorine | 3. carbon dioxide |
| 4. 1985 | 5. pollutant | 6. marble cancer |
| 7. all of these | 8. volcanic eruptions | |
| B. 1. CO ₂ , SO ₂ | 2. fog, smoke | |
| 3. volcanoes, forest fires | | 4. global warming |
| 5. CNG, PNG | 6. CFCs | 7. oxygen, salts |

- C. 1. False 2. True 3. False
 4. False 5. False 6. False
 7. False
- D. 1. The unwanted substances in air that harm living things and the environment are called air pollutants. Some common air pollutants are: carbon dioxide, carbon monoxide, sulphur dioxide, suspended particulate matter and chlorofluorocarbons.
2. The atmosphere contains many acidic gases such as sulphur dioxide and nitrogen dioxide. These gases dissolve in the water vapour present in air to form acids. Acid rain is the rainfall that contains dissolved acids in it.
 The various harmful effects of acid rain are:
 (a) It increases the rate of corrosion of metallic objects.
 (b) It increases acidity of the soil, damages crops and forests.
 (c) It causes decay of building materials and damages historical monuments.
3. The greenhouse effect is the natural process by which the Earth's atmosphere traps solar radiations due to the presence of gases such as carbon dioxide, water vapour and methane. When sunlight enters the Earth's atmosphere, much of its heat remains trapped in the atmosphere by the greenhouse gases, causing our environment to heat up. Without the natural greenhouse effect, the Earth's surface would have been too cold to sustain life.
4. Smog is the misty haze produced when smoke combines with water droplets present in the air. Some adverse effects of smog are:
 (a) It hampers visibility and deteriorates the environment.
 (b) It disrupts traffic including movement of trains and aeroplanes.
 (c) It can inflame nasal passages and disrupt normal functioning of lungs causing shortness of breath, wheezing and coughing.
5. Some harmful effects of water pollution are:
 (a) Agricultural runoffs lead to loss of fertility of soil and decreased crop yields.
 (b) Contaminated water becomes unfit for human consumption.
 (c) Harmful microorganisms present in polluted water lead to waterborne diseases.

6. The various methods of purifying water at home are:
 - (a) boiling.
 - (b) chemical treatment.
 - (c) water filters.
7. Global warming is the unnatural increase in Earth's average temperature due to increased levels of greenhouse gases in the atmosphere. Global warming disturbs all ecosystems on the Earth. Some adverse effects of global warming are:
 - (a) Rise in the temperature of atmosphere may melt the enormous amounts of ice lying at the poles of the Earth. The huge amount of water produced by the melting of polar ice caps will raise the water level in seas and oceans and flood the low lying coastal areas.
 - (b) Global warming may prevent condensation of water vapour, present in clouds, into water which results in reduced precipitation. This may produce drought situations which can turn large areas of Earth into deserts.

Hints for HOTS

1. It is a cleaner and non-polluting fuel.
2. No, as it may contain microbes that are invisible to the naked human eye.
3. Acid rain destroys crop produce and makes soil infertile.

Crossword

Across:

- | | | |
|------------|--------------|--------------|
| 2. Potable | 4. Pollutant | 5. Oil slick |
| 8. Boiling | 9. Glacier | |

Down:

- | | | |
|---------|--------------|----------|
| 1. GAP | 2. Pollution | 3. Ozone |
| 6. Smog | 7. Chlorine | |

Model Test Paper

Section – A (Physics)

- | | | |
|---------------------|---------------------|------------------|
| A. 1. concave | 2. 10000 Pa | 3. manometer |
| 4. area of contact | 5. cochlea | 6. Richter scale |
| 7. neutron | 8. Mars | |
| B. 1. Electrostatic | 2. Rolling friction | 3. larynx |
| 4. seismologist | 5. Sirius | |
| C. 1. True | 2. False | 3. True |
| 4. False | 5. True | |

- D. 1. Sound needs a material medium like air to travel. There is no air in space. Thus, astronauts use radio sets to communicate with each other through radio waves.
2. A lightning conductor is a device used to protect a building from damage by lightning during a thunderstorm. When lightning strikes, the lightning conductor provides an easy path for the charge to pass through the ground and thus, protects the building.
3. Here, angle between mirrors = 60°
Thus, number of images formed, $n = \frac{360^\circ}{60^\circ} - 1 = 6 - 1 = 5$
4. Comets are small chunks of ice and dust that move around the Sun in elliptical orbits. These are characterised by a small head and a long tail. A meteor is a small piece of rock that is pulled towards the Earth due to its gravity and appears as a bright streak of light in the night sky.
- F. (a) ciliary muscles (b) cornea (c) pupil
(d) lens (e) sclera (f) retina
(g) blind spot (h) optic nerve

Section – B (Chemistry)

- A. 1. cellulose 2. teflon 3. hydrogen
4. magnesium 5. brass 6. kerosene
7. luminous flame 8. electrolyte
- B. 1. bakelite 2. Potassium 3. electrolyte
4. potassium permanganate 5. cathode
- C. 1. True 2. False 3. False
4. True 5. True
- D.(a) Residual gases (b) LPG (c) Petrol
(d) Kerosene (e) Diesel (f) Lubricating oil
(g) Fuel oil (h) Residual oil
- E. 1. A polymer is a large molecule made up of many small molecules, called monomers, combined together chemically. An example of a polymer is polyester.
2. Some uses of electroplating are:
- (a) Iron objects are electroplated with a layer of zinc to prevent rusting.
- (b) Electroplating is used for chrome plating bathroom fittings and other objects for decoration.
- (c) Silver jewellery is electroplated with a layer of gold to enhance its appearance.

baby. A male cell has one X and one Y sex chromosome while a female cell has two X sex chromosomes. Thus, a baby whose cells have both X chromosomes will be a female while a baby whose cells have one X and one Y chromosome will be a boy.

- F. (a) lysosome (b) endoplasmic reticulum
(c) centrosome (d) golgi apparatus
(e) cytoplasm (f) nucleolus
(g) nucleus (h) mitochondria
-

Test Your Knowledge

Across:

- | | | |
|--------------|-------------|---------------|
| 2. Acid rain | 5. Sonority | 6. Seismogram |
| 9. Mercury | 10. Vacuole | 11. Barometer |
| 14. Yeast | 16. Gibbous | 17. Explosion |
| 18. Polymer | | |

Down:

- | | | |
|-------------|----------------|--------------|
| 1. Uranus | 3. Extinct | 4. Frequency |
| 5. Static | 7. Electrolyte | 8. Gametes |
| 11. Braille | 12. Manure | 13. Nylon |
| 15. Lignite | | |

