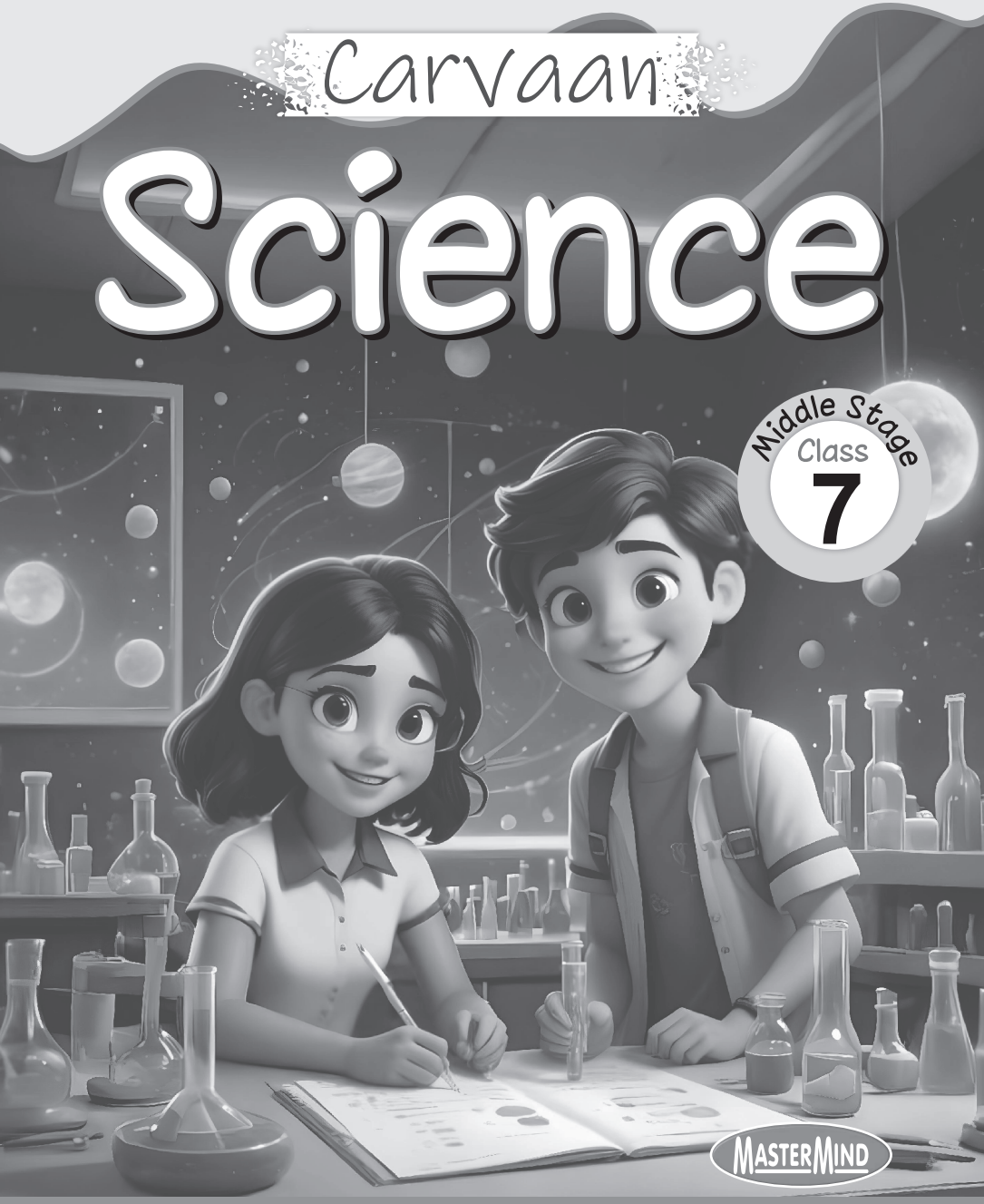
Teacher's Manual

Carvaan

Science



Chapter 1 : Nutrition in Plants

1. (a) (i) (b) (i) (c) (i) (d) (i)

2. (a) Dodder (b) mutual relationship between two organisms

(c) venus, nutritional

3. (a) (iii) (b) (ii) (c) (i) (d) (v) (e) (iv)

4. (a) False (b) True (c) False

5. (a) Autotrophs are organisms that can produce their own food using sunlight or inorganic compounds.

(b) Heterotrophs are organisms that obtain their nutrition by consuming organic substances produced by other organisms.

(c) Photosynthesis is the process by which green plants and some other organisms use sunlight to synthesize foods with the help of chlorophyll.

(d) Photosynthesis is the process that provides us with purified oxygen to breathe in.

(e) Mycorrhiza is a symbiotic association between the roots of a plant and a fungus; VAM stands for Vesicular Arbuscular Mycorrhiza, a type of mycorrhiza.

6. (a) Saprophytes are organisms that obtain their nutrients by decomposing dead organic matter.

(b) Symbiosis is a close and long-term interaction between two different species, often benefiting both.

(c) Parasites are organisms that live on or in another organism (host) and derive nutrients at the expense of the host.

(d) Insectivorous plants are plants that capture and digest insects and other small animals to supplement their nutrient requirements.

7. (a) Nutrition refers to the process by which living organisms obtain and utilize nutrients for growth, maintenance, and repair. There are two main types of nutrition: autotrophic and heterotrophic. Autotrophic nutrition involves the synthesis of organic compounds from inorganic substances, while heterotrophic nutrition involves obtaining pre-formed organic compounds from other organisms.

(b) Autotrophic nutrition in plants involves the process of photosynthesis, where plants use sunlight, carbon dioxide, and water to produce glucose and oxygen. Chlorophyll, present in the chloroplasts, plays a crucial role in this process.

(c) Heterotrophic nutrition in plants involves obtaining organic

compounds from external sources. This can occur through processes like absorption (in fungi), ingestion (in some carnivorous plants), or through mutualistic relationships with mycorrhizal fungi or nitrogen-fixing bacteria.

Chapter 2 : Nutrition in Animals

1. (a) (i) (b) (i) (c) (i)

2. (a) feed on dead matter

(b) the food, either solid or liquid, is consumed as a whole

(c) small intestine

(d) the final part of the digestive system.

(e) the longest part of the digestive system.

3. (a) (ii) (b) (iv) (c) (iii) (d) (v) (e) (i)

4. (a) False (b) True (c) False

5. (a) The parts of the small intestine are the duodenum, jejunum, and ileum.

(b) The parts of the large intestine are the cecum, colon (ascending, transverse, descending, and sigmoid), rectum, and anal canal.

(c) The largest portion of the digestive tract is the small intestine.

(d) The number of incisors, canines, premolars, and molars varies, but typically humans have 8 incisors, 4 canines, 8 premolars, and 12 molars.

6. (a) Teeth are hard structures in the mouth used for biting and chewing food. Humans have different types of teeth, including incisors, canines, premolars, and molars, each serving a specific function in the digestion process.

(b) Digestion in the mouth involves the mechanical breakdown of food by chewing and the chemical breakdown by salivary enzymes, primarily amylase, which begins the digestion of carbohydrates.

(c) Digestion in the small intestine involves the further breakdown of food using pancreatic enzymes and bile. Absorption of nutrients occurs through the walls of the small intestine into the bloodstream.

7. (a) Animals can be classified based on their eating habits into herbivores (eat plants), carnivores (eat other animals), omnivores (eat both plants and animals), and detritivores/decomposers (feed on dead and decaying matter).

(b) Different types of nutrition include autotrophic nutrition (organisms produce their own food, like plants through photosynthesis) and heterotrophic nutrition (organisms obtain food from other sources, like animals feeding on plants or other animals).

(c) The mechanism of nutrition in Amoeba involves phagocytosis, where the organism engulfs food particles using pseudopodia and forms a food vacuole. The food is then broken down by enzymes, and nutrients are absorbed.

(d) The mechanism of nutrition in Homo sapiens involves the ingestion of food, mechanical breakdown by chewing, chemical digestion in the mouth and stomach, further digestion and absorption in the small intestine, and elimination of indigestible waste through the large intestin.

Chapter 3 : Heat

1. (a) (i) (b) (i) (c) (i) (d) (ii)

2. (a) 37°C (b) Radiation (c) 98.6 (d) Mercury

3. (a) (v) (b) (ii) (c) (iii) (d) (iv) (e) (i)

4. (a) True (b) True

5. (a) Heat and temperature are related, but they are distinct concepts. Heat is the total thermal energy in an object, while temperature is the measure of the average kinetic energy of particles in a substance.

(b) Cold is the absence or reduction of heat; it is a subjective perception of low temperature.

(c) Heat is the form of energy transferred between two systems or objects due to a temperature difference.

6. (a) Conduction is the transfer of heat through a material without any movement of the material itself. It occurs through direct contact between particles.

(b) Convection is the transfer of heat through the movement of fluids (liquids or gases) caused by temperature differences. Warmer portions rise, and cooler portions sink, creating a cycle of fluid movement.

(c) Radiation is the transfer of heat in the form of electromagnetic waves, without the need for a medium. It can occur through a vacuum and is responsible for heat transfer from the sun.

7. (a) Heat is a form of energy that causes substances to undergo temperature changes. Its effects include changes in temperature, expansion or contraction of materials, changes in state (solid to liquid to gas), and various chemical reactions.

(b) Thermometers are designed to measure temperature. Types include liquid-in-glass thermometers (mercury or alcohol), bimetallic strip thermometers, gas thermometers, and digital thermometers. They work based on the principle that substances expand or contract with changes in temperature.

(c) Heat transfer modes:

Conduction: Transfer of heat through direct contact between particles.

Convection: Transfer of heat through the movement of fluids.

Radiation: Transfer of heat through electromagnetic waves. Each mode has specific characteristics and applications, and they often occur simultaneously in various heat transfer situations.

Chapter 4 : Acids, Bases and Salts

1. (a) (ii) (b) (i) (c) (i) (d) (iii)

2. (a) Sodium hydroxide (b) Hydrochloric acid (c) Calcium hydroxide (d) orange, red

3. (a) (iii) (b) (iv) (c) (i) (d) (ii) 5. (v)

4. (a) False (b) True (c) False (d) False

5. (a) Antacids are substances that neutralize excess stomach acid to relieve symptoms of indigestion or heartburn.

(b) Acid obtained from: (i) Lemon - Citric acid (ii) Amla - Ascorbic acid (Vitamin C) (iii) Vinegar - Acetic acid (iv) Tomato - Citric acid and malic acid.

(c) Suzi gave Jack calamine lotion because it helps soothe and relieve itching caused by ant bites.

(d) Sulphuric acid is called the "King of chemicals" due to its widespread industrial use and importance in various chemical processes. It is one of the most widely used and produced industrial chemicals.

6. (a) Properties of acids:

Sour taste

Turn blue litmus paper red

React with metals to produce hydrogen gas

Conduct electricity in aqueous solution

(b) Properties of bases:

Bitter taste

Feel slippery or soapy

Turn red litmus paper blue

Conduct electricity in aqueous solution

(c) Natural indicators and colour changes:

Litmus: Turns red in an acidic medium and blue in a basic medium.

Turmeric: Turns red in an acidic medium and yellow in a basic medium.

Red cabbage juice: Turns pink in acidic medium and green in basic medium.

7. (a) Acids are substances that donate protons (H^+ ions) in aqueous solution. Types of acids include:

Strong acids (e.g., hydrochloric acid)

Weak acids (e.g., acetic acid) Properties of acids include the ability to neutralize bases, react with metals to produce hydrogen gas, and conduct electricity.

(b) Bases are substances that accept protons (H^+ ions) in aqueous solution. Types of bases include:

Strong bases (e.g., sodium hydroxide)

Weak bases (e.g., ammonia) Properties of bases include bitterness, slippery feel, ability to neutralize acids, and conductivity in solution.

(c) Indicators are substances that change colour to indicate the acidity or basicity of a solution. Types of indicators include natural indicators (e.g., litmus, turmeric, red cabbage juice) and synthetic indicators (e.g., phenolphthalein, methyl orange).

(d) Salts are formed through a chemical reaction called neutralization, where an acid reacts with a base to produce a salt and water. The hydrogen ions from the acid combine with hydroxide ions from the base to form water, and the remaining ions combine to form the salt. The general reaction is: Acid + Base → Salt + Water.

Chapter 5 : Physical and Chemical Changes

1. (a) (ii) (b) (iii) (c) (iii)

2. (a) original 2. calcium hydroxide (c) solid

3. (a) (iii) (b) (i) (c) (iv) (d) (ii) (e) (v)

4. (a) True (b) False

5. (a) Physical change is a change in the physical properties of a substance without changing its chemical composition.

(b) Chemical change is a change in which one or more substances are transformed into new substances with different chemical compositions.

6. (a) Differences between physical and chemical changes:

Physical changes do not alter the chemical composition, while chemical changes result in the formation of new substances.

Physical changes are reversible, whereas chemical changes are often irreversible.

Physical changes involve a change in the state of matter or

appearance, while chemical changes involve a change in the fundamental structure of the substance.

7. (a) (i) Rusting and its prevention: Rusting is the corrosion of iron or steel due to the reaction with oxygen and water. Prevention methods include applying a protective coating (e.g., paint or oil), galvanization (coating with a layer of zinc), and using corrosion-resistant alloys.

(ii) Physical change and its properties: Physical changes involve alterations in the physical state or appearance of a substance without changing its chemical composition. Properties include:

Reversibility: Physical changes can often be reversed.

No new substance formation: The chemical composition remains unchanged.

Change in state or appearance: Examples include melting, freezing, boiling, cutting, and grinding.

Absence of energy change: No new energy is usually absorbed or released during physical changes**.**

Chapter 6 : Respiration in Organism

1. (a) (i) (b) (iii) (c) (i) (d) (i)

2. (a) Combustion (b) 21% , 6.5% (c) ATP (d) Aerobic (e) tracheal system

3. (a) (i) (b) (iii) (c) (iv) (d) (ii) (e) (v)

4. (a) False (b) False (c) False (d) False (e) True

5. (a) The diaphragm forms the floor of the chest cavity.

(b) Respiratory organs:

Ant: Spiracles

Fish: Gills

Frog: Lungs and skin

Penguin: Lungs and air sacs

(c) Respiration is required for the release of energy from nutrients through metabolic processes such as cellular respiration.

6. (a) Aerobic respiration requires oxygen and produces more energy (ATP).

Anaerobic respiration occurs in the absence of oxygen and produces less energy.

(b) External breathing involves the exchange of gases (oxygen and carbon dioxide) between the organism and its environment.

Internal breathing involves the exchange of gases between the blood and body tissues.

(c) Respiration is a biological process that releases energy from organic molecules.

Combustion is a chemical process where a substance reacts with oxygen, producing heat and light.

7. (a) Respiration: Respiration is a metabolic process that involves the breakdown of organic molecules to release energy.

Stages:

Breathing (Ventilation): Inhaling oxygen and exhaling carbon dioxide.

External Respiration: Exchange of gases (O_2 and CO_2) between lungs and blood.

Transport of Gases: Oxygen transported to tissues, and carbon dioxide to lungs.

Internal Respiration: Exchange of gases between blood and tissues.

Cellular Respiration: Within cells, breakdown of glucose to release energy (ATP).

(b) Plant Respiration: Process of releasing energy from organic molecules in plant cells.

Stages:

Glycolysis: In the cytoplasm, breakdown of glucose into pyruvate.

Krebs Cycle: In mitochondria, further breakdown of pyruvate.

Electron Transport Chain: In mitochondria, generates ATP.

Importance: Provides energy for plant growth, metabolism, and nutrient transport.

(c) Human Respiration: Involves breathing, external and internal respiration, and cellular respiration.

Breathing: Inhaling oxygen and exhaling carbon dioxide.

External Respiration: Exchange of gases between lungs and blood.

Internal Respiration: Exchange of gases between blood and tissues.

Cellular Respiration: Within cells, the breakdown of glucose to release energy.

Chapter 7 : Transportation in Animals and Plants

1. (a) (iii) (b) (i) (c) (iii) (d) (ii) (e) (i)

2. (a) Urinary bladder (b) Arteries (c) Lubb-dubb (d) the number of heartbeats per minute (e) William Harvey

3. (a) (v) (b) (i) (c) (iii) (d) (iv) (e) (ii)

4. (a) False (b) True (c) True

5. (a) Heart is covered by 3 layers endocardium, myocardium and pericardium.

(b) Blood pressure is high in arteries as compared to that in veins.

(c) Urine contains water, salt, uric acid, creatinine and other waste from the body.

(d) Sometimes kidneys become diseased and thus cease functioning, this results in waste products accumulation in the body. Kidney failure is basically dealt by dialysis.

6. (a) Transportation essential in living beings to supply oxygen nutrients and hormones to cells and to remove waste products like carbon dioxide and toxins.

(b) It is a conical and muscular organ. It is located in the chest. It is of size 12x19 cm. It is a four chambered organ - containing 2 auricles and 2 ventricles. Heart is covered by 3 layers endocardium, myocardium and pericardium.

(c) Pair of kidneys are present in the abdomen one on either side. They are basically bean shaped and weigh about 150 gm each. Kidneys help in excretion of waste in form of "urine". Urine is 95% water, 2.5% urea, and 2.5% comprises of other waste products.
Functional unit of kidney is - NEPHRON. Nephron aids in the separation of waste from blood. They are funnel shaped and are present in millions in number in each kidney.

7. (a) A system that helps in transport or movement of digested food, waste products, enzymes, hormones, etc. from one region of the body to another is called *circulatory system*.

Components of circulatory system

They include Heart, blood vessels and blood.

(i) Heart : It is a conical and muscular organ. It is located in the chest. It is of size 12x19 cm. It is a four chambered organ - containing 2 auricles and 2 ventricles. Heart is covered by 3 layers endocardium, myocardium and pericardium.

(ii) Blood Vessels : Three types of blood vessels are :

(a) Arteries : These are those blood vessels which carry oxygenated blood to different body regions from heart.

(b) Veins : These are those blood vessels which carry deoxygenated blood from different body regions to the heart.

(c) Capillaries : Branches of artery form capillaries and the capillaries, in turn, rejoin to form a vein.

(iii) Blood : An average human adult has 5 liter of blood.

It is a connective tissue with following 2 components :

(i) Plasma, (ii) Blood cells

(b) Removal of waste products is essential for proper body functioning. Excretion is the process responsible for removal of waste out of our body.

Excretion in human beings - by Excretory System : Although residual gases are removed by lungs and skin also excretes urea (in smaller quantity) and salts to some extent but excretory system is the major system responsible for excretion in human beings. Urinary or excretory system comprises of :

(i) Kidneys : Pair of kidneys are present in the abdomen one on either side. They are basically bean shaped and weigh about 150 gm each. Kidneys help in excretion of waste in form of "urine". Urine is 95% water, 2.5% urea, and 2.5% comprises of other waste products.

(ii) Ureter : Urine from kidney passes through ureter to urinary bladder.

(iii) Urinary bladder : Urinary bladder serves as storage organ where urine is stored till it is expelled out.

(iv) Urethra : It is the organ that helps in expelling out urine at regular time interval.

Kidney Failure : Sometimes kidneys become diseased and thus cease functioning, this results in waste products accumulation in the body. This waste product in toxic by nature thus harms the body and ultimately results in patients death. Kidney failure is basically dealt by dialysis.

(c) Movement of substances or transportation in plants is facilitated by vascular bundles - xylem and phloem and by the process of transpiration

1. Vascular Bundles

(i) Xylem

- It is responsible for mineral and water transport.
- It is made up of bundles of pipes that are, in turn, made up of cells.
- It is present in stem, roots and leaves.

(ii) Phloem

- It is responsible for transport of food throughout plant body.
- Transportation of food material through plant body is called *translocation*.
- Phloem is present in leaves, roots and stems.

2. Transpiration : It is the process of removal of water vapour from the plant body through the stomata of leaves. The evaporation of water from leaves generates a suction pull which can pull water to great heights in the tall trees. Transpiration also helps the plant to cool.

Chapter 8 : Reproduction in Plants

1. (a) (i) (b) (i) (c) (ii) (d) (iii) (e) (i)

2. (a) Rhizome (b) Colocasia, Gladiolus (c) the transfer of the pollen from anther to stigma (d) the fusion of male and female gametes

3. (a) (ii) (b) (i) (c) (iii) (d) (iv) (e) (v)

4. (a) False (b) False (c) True (d) True

5. (a) Asexual reproduction: A form of reproduction where offspring are produced from a single parent without the involvement of gametes.

(b) Fruit: A mature ovary of a flowering plant, usually containing seeds.

(c) Mode of reproduction in mosses: Mosses reproduce through spores.

6. (a) Binary fission: A form of asexual reproduction in which a single parent cell divides into two identical daughter cells.

(b) Different parts of a flower:

Sepals, petals, stamens (anther and filament), and carpels (stigma, style, and ovary).

(c) Significance of cross-pollination:

Increases genetic diversity.

Ensures adaptation to changing environments.

Reduces the risk of genetic disorders.

7. (a) (i) Asexual reproduction: Asexual reproduction involves the production of offspring without the involvement of gametes.

Methods include binary fission, budding, fragmentation, and spore formation.

(ii) Vegetative propagation: A form of asexual reproduction using

plant parts like stems, roots, and leaves.

Methods include runners, tubers, bulbs, and grafting.

(b) Involves the formation of gametes (sperm and egg) through meiosis.

Fusion of gametes (fertilization) leads to the formation of a zygote.

Zygote develops into a new individual through mitotic divisions.

(c) Advantages and disadvantages of sexual and asexual reproduction:

Sexual reproduction:

Advantages: Genetic diversity, adaptation, evolution.

Disadvantages: Time-consuming, energy-intensive.

Asexual reproduction:

Advantages: Quick and efficient, no need for a mate.

Disadvantages: Lack of genetic diversity, vulnerability to environmental changes.

(d) Agents of pollination:

Wind, insects, birds, mammals, and water.

(e) "Fruit and seed dispersal by wind, animals, and water":

Wind dispersal: Seeds carried by the wind (e.g., dandelion).

Animal dispersal: Seeds transported by animals (e.g., burrs attached to fur).

Water dispersal: Seeds dispersed by water currents (e.g., coconuts floating).

Chapter 9 : Motion and Time

1. (a) (i) (b) (i) (c) (i)

2. (a) quartz crystals (b) Galileo Galilei (c) metre per second

3. (a) (v) (b) (iv) (c) (i) (d) (ii) (e) (iii)

4. (i) True (ii) True (iii) False

5. (a) Define time: Time is a measure of the duration between events, often expressed in seconds, minutes, hours, days, etc.

(b) Define speed: Speed is the rate at which an object covers distance, calculated as the distance traveled per unit of time.

6. (a) A sundial is a timekeeping device that uses the position of the sun's shadow to indicate the time.

It consists of a flat plate with a rod (gnomon) that casts a shadow on the dial's marked surface.

The position of the shadow corresponds to the time of day.

(b) Non-uniform motion: Motion in which an object covers unequal distances in equal intervals of time.

Uniform motion: Motion in which an object covers equal distances in equal intervals of time.

7. (a) Different time periods and their measuring instruments:

Year: Measured by Earth's revolution around the sun (365 days).

Month: Measured by the lunar phases (approximately 29.5 days).

Day: Measured by Earth's rotation on its axis (24 hours).

Instruments include calendars, clocks, and astronomical observations.

(b) Motion and speed:

Motion: Change in position of an object with respect to its surroundings.

Speed: Rate of motion, calculated as distance divided by time.

Speed = Distance/Time.

(c) Distance-time graphs:

A graphical representation of an object's motion over time.

Slope represents speed; a steeper slope indicates higher speed.

A horizontal line indicates the object is at rest.

(d) Distance traveled calculation:

Distance = Speed × Time

Given a uniform speed of 50 km/hr and time of 2.5 hours:

Distance = 50 km/hr × 2.5 hr = 125 km

Chapter 10 : Electric Current and Its Effect

1. (a) (ii) (b) (i) (c) (i)

2. (a) magnet (b) magnetic (c) magnetic (d) fuse (e) magnetic

3. (a) (ii) (b) (v) (c) (iii) (d) (iv) (e) (i)

4. (a) True (b) True (c) False

5. (a) Electric current: The flow of electric charge in a conductor, typically measured in amperes (A).

(b) Battery: A device that stores and provides electrical energy through chemical reactions.

(c) Room heater and electric current effect: The room heater is based on the heating effect of electric current.

6. (a) Galvanometer: Measures small currents and is connected in parallel.

Ammeter: Measures larger currents and is connected in series.

(b) Current vs. Potential difference:

Current: Flow of electric charge; measured in amperes (A).

Potential difference: Voltage; the energy per unit charge; measured in volts (V).

(c) The heating effect is proportional to the square of the current (I^2), resistance (R), and time (t) in a conductor.

Formula: Heat (Q) = I^2Rt.

7. (a) Electric circuit: A closed path that allows the flow of electric current.

Components:

Source (e.g., battery)

Conductors (e.g., wires)

Load (e.g., resistor)

Control devices (e.g., switch)

Connectors (e.g., junctions)

(b) Heating effect: Production of heat in a conductor.

Magnetic effect: Generation of a magnetic field around a current-carrying conductor.

Chemical effect: Electrolysis and chemical changes in conductive solutions.

(c) Notes on:

(i) Fuse: A safety device that breaks the circuit in case of excessive current, preventing damage to appliances. It contains a thin wire that melts during overcurrent.

(ii) Electric doorbell: It consists of an electromagnet, a spring-loaded hammer, and a contact. When the button is pressed, the electromagnet attracts the hammer, causing it to strike the bell and produce sound.

Chapter 11 : Light

1. (a) (i) (b) (ii) (c) (iv) (d) (i)

2. (a) Real (b) white light is a combination of colour (c) different colour of the spectrum. (d) laterally inverted

3. (a) (iv) (b) (i) (c) (v) (d) (ii) (e) (iii)

4. (a) False (b) True (c) False (d) True

5. (a) Real image: An image formed when actual light rays converge at a point, can be captured on a screen.

(b) Concave mirror: A mirror with an inward-curved reflecting surface. One use is in makeup mirrors.

(c) Dispersion of light: The splitting of white light into its constituent colours as it passes through a prism or another refracting medium.

6. (a) Refraction and medium density:

Refraction occurs when light passes from one medium to another of different density, causing a change in its speed and direction.

(b) Prism and its use:

A prism is a transparent optical element with flat, polished surfaces that refract light.

Use: To disperse light into its spectrum, as in rainbows.

(c) Mirror: Reflects light to form an image.

Lens: Refracts light to form an image.

(d) Colours in a CD under sunlight:

Due to the dispersion of light, the CD's surface acts like a prism, separating sunlight into its constituent colours.

7. (a) Reflection and refraction:

Reflection: Bouncing back of light when it encounters a surface.

Refraction: Bending of light when it passes from one medium to another.

Significance: Formation of images, lenses, and optical instruments.

(b) Spherical mirrors and applications:

Concave mirror: Converging mirror, used in makeup mirrors, torchlights.

Convex mirror: Diverging mirror, used in vehicle side mirrors.

(c) Real vs. Virtual image:

Real image: Formed by the actual convergence of light rays, can be captured on a screen.

Virtual image: Appears to diverge from a point behind the mirror, cannot be captured on a screen.

(d) Notes on:

(i) Converging Lens: Also called a convex lens, converges light rays to a focal point. Used in magnifying glasses, cameras.

(ii) Diverging Lens: Also called a concave lens, diverges light rays. Used in correcting nearsightedness.

Chapter 12 Forests: Our Lifeline

1. (a) (i) (b) (i) (c) (ii) (d) (i)

2. (a) Deforestation (b) where living organisms exist. (c) meat-eaters (d) air, water

3. (a) (v) (b) (iii) (c) (ii) (d) (i) (e) (iv)

4. (a) False (b) True

5. (a) Biosphere reserves: Protected areas that aim to conserve biodiversity while promoting sustainable development.

(b) National parks: Protected areas designated for the conservation of wildlife, landscapes, and ecosystems, with limited human activities.

(c) Sanctuaries: Protected areas where specific activities may be allowed to facilitate the conservation of wildlife.

(d) Water table: The level at which the ground is saturated with water, representing the upper boundary of the groundwater.

(e) Soil erosion: The process by which soil is transported from one place to another by wind, water, or other natural agents.

6. (a) Oxygen production, carbon dioxide absorption.

Habitat for diverse species.

Regulation of climate and water cycles.

(b) Food chain example:

Grass → Rabbit → Fox → Eagle

(c) Food web example:

Interconnected feeding relationships involving multiple organisms in an ecosystem, such as a forest ecosystem with various plant and animal species.

7. (a) Description of forests:

Large ecosystems dominated by trees and other vegetation.

Provide habitat, oxygen, wood, and numerous ecosystem services.

Classified into tropical, temperate, and boreal forests based on climate.

(b) Food web and food chain:

Food Chain: Linear sequence of organisms, each serving as a source of food for the next. Example: Grass → Deer → Lion.

Food Web: Complex network of interconnected food chains, reflecting multiple feeding relationships in an ecosystem.

(c) Measures to conserve forests:

Sustainable logging practices.

Reforestation and afforestation.

Protected areas and wildlife reserves.

Community-based conservation initiatives.

Strict implementation of anti-deforestation laws.

(d) Impacts of deforestation:

Loss of biodiversity and habitat destruction.

Disruption of water cycles and increased risk of floods.

Climate change due to reduced carbon sequestration.

Soil erosion and degradation.

Adverse effects on local communities dependent on forests for resources.

Chapter 13 : Wastewater Story

1. (a) (ii) (b) (ii) (c) (i) (d) (i)

2. (a) sewage (b) Biological oxygen demand (c) excessive growth of algae (d) biological treatment

3. (a) (iv) (b) (iii) (c) (ii) (d) (i)

4. (a) False (b) True (c) False

5. (a) BOD (Biological Oxygen Demand): A measure of the amount of dissolved oxygen needed by microorganisms to decompose organic matter in water.

(b) Components of sewage:

Solid matter (organic and inorganic)

Dissolved and suspended impurities

Nutrients (nitrogen, phosphorus)

Pathogens (bacteria, viruses)

(c) Waterborne diseases: Diseases caused by the consumption of contaminated water, typically due to the presence of pathogenic microorganisms.

6. (a) Sources of wastewater:

Domestic sewage (household)

Industrial effluents

Agricultural runoff

(b) Steps to reduce sewage generation:

Water conservation practices

Efficient use of water in industries and households

Treatment and reuse of wastewater

(c) Eutrophication:

The process by which excessive nutrients (often from sewage or fertilizers) in water bodies lead to an overgrowth of algae, depleting oxygen levels and harming aquatic life.

7. (a) Process of treatment of wastewater:

Preliminary Treatment: Removal of large objects and grit.

Primary Treatment: Separation of suspended solids by sedimentation.

Secondary Treatment: Biological treatment by microorganisms to break down organic matter.

Tertiary Treatment: Advanced processes to remove remaining impurities.

Disinfection: Killing or removal of pathogens.

Sludge Treatment: Processing and disposal of sludge.

(b) Importance of ensuring no blockage in drain pipes:

Prevents backups and overflows.

Ensures efficient flow and transport of wastewater.

Reduces the risk of contamination and the spread of waterborne diseases.

Maintains the functionality of the sewage system.