1

Exploring the Investigative World of Science

(A) MULTIPLE CHOICE QUESTIONS

1. What is the starting point of scientific investigation?
   (*a*) Memorization (*b*) Observation
   (*c*) Wonder and curiosity (*d*) Drawing conclusions
2. What scientific tool helps us see tiny particles and microorganisms?
   (*a*) Thermometer (*b*) Barometer
   (*c*) Telescope (*d*) Microscope
3. Why is classifying materials in science important?
   (*a*) To waste time (*b*) To make them taste better
   (*c*) To better understand their properties (*d*) To change their colour
4. Which of the following is not a correct step in scientific investigation?
   (*a*) Forming a hypothesis (*b*) Ignoring unexpected results
   (*c*) Conducting experiments (*d*) Making observations
5. Why do we classify materials in science?
   (*a*) To decorate the laboratory (*b*) To reduce their weight
   (*c*) To study their uses and properties better (*d*) To mix them easily
6. Which of the following best explains why we use models in science?
   (*a*) They replace real experiments (*b*) They help understand complex phenomena
   (*c*) They are easier to memorize (*d*) They eliminate the need for observation

(B) FILL IN THE BLANKS

1. A _____ is developed in science to explain why a puri puffs up, based on observation and reasoning.
2. _____ helps in studying tiny living organisms not visible to the naked eye.
3. Classification in science is useful to identify and group materials based on _____.
4. Scientific investigation involve careful _____, measurement and testing of ideas.
5. Tools like weather balloons and satellites helps scientists observe and record _____ conditions.

(C) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. Scientific investigations always lead to the same result, regardless of the method used.
2. Microorganisms can be found in a single drop of pond water.
3. Classification of substances in science helps us better understand their behaviour and usage.
4. A microscope helps us see very small things that are not visible to the naked eye.
5. Scientific questions can be investigated through planning, observing and experimenting.

2

The Invisible Living World – Beyond our Naked Eye

(A) MULTIPLE CHOICE QUESTIONS

1. Which gas is released during yeast fermentation that makes the dough rise?
   (*a*) Oxygen (*b*) Nitrogen
   (*c*) Carbon dioxide (*d*) Hydrogen
2. How does Spirulina support environmental sustainability?
   (*a*) Produces oxygen and grows in less space (*b*) Produces alcohol
   (*c*) Fixes nitrogen in roots (*d*) Breaks down waste in landfills
3. Which microorganism helps in curd formation?
   (*a*) Lactobacillus (*b*) Rhizobium
   (*c*) Spirulina (*d*) Mould
4. What is the function of Rhizobium?
   (*a*) Produces alcohol (*b*) Kills viruses
   (*c*) Forms algae (*d*) Traps nitrogen from the air
5. Rhizobium bacteria live in the root nodules of which plants?
   (*a*) Wheat and rice (*b*) Beans and peas
   (*c*) Mango and banana (*d*) Apple and orange
6. Spirulina is an example of :
   (*a*) Virus (*b*) Protozoa
   (*c*) Microalga (*d*) Fungus
7. Which of the following is unicellular?
   (*a*) Human (*b*) Yeast
   (*c*) Mould (*d*) Tree
8. What is used in bread-making to make it soft and fluffy?
   (*a*) Sugar (*b*) Salt
   (*c*) Yeast (*d*) Vinegar
9. Which of the following statements best explains why curd forms faster in summer than in winter?
   (*a*) More milk is available in summer (*b*) Lactobacillus dies in winter
   (*c*) Warmth in summer speeds up bacterial growth (*d*) Curd requires sunlight to form

10. Why do legumes reduce the need for chemical fertilizers?
(*a*) They require very little water
(*b*) They trap nitrogen from the air through bacteria
(*c*) They have shallow roots (*d*) They grow only in rainy season

11. Which structural feature is absent in bacterial cells?
(*a*) Cell wall (*b*) Cytoplasm (*c*) Nucleus (*d*) DNA

12. What would happen if all decomposer microorganisms disappear from Earth?
(*a*) Food production would increase (*b*) No curd or bread could be made
(*c*) Plants would grow faster (*d*) Waste and dead matter would accumulate

(B) MATCH THE COLUMNS

Column 1	Column 2
(i) Diatoms	(a) unicellular fungus
(ii) Rhizobium	(b) multicellular fungus
(iii) Lactobacillus	(c) Microalgae
(iv) Yeast	(d) curd formation
(v) Mould	(e) nitrogen fixation

(C) FILL IN THE BLANKS

1. _____ is a jelly-like substance found inside cells that contains all the cell organelles.
2. In bread making, yeast helps make the dough rise by producing _____.
3. The process of converting sugar into alcohol using microorganisms is called _____.
4. The _____ in plant cells helps in the process of photosynthesis.
5. Yeast converts sugar into _____ and carbon dioxide gas during the process of fermentation.
6. The _____ egg is the largest known cell in the living world.
7. _____ cells carry messages in our body.
8. _____ help in cleaning water and are used as a biofuel.
9. An electron microscope magnifies a cell _____ times.
10. _____ ferments milk to form curd.

(D) ASSERTION-REASON TYPE QUESTIONS

Directions. *In each of the following questions, a statement of Assertion is given by the corresponding statement of reason. Of the statements, mark the correct answer as:*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
(c) If Assertion is true, but Reason if false.
(d) If Assertion is false, but Reason is true.

1. **Assertion (A):** The lime water test is used to detect the presence of carbon dioxide gas.
Reason (R): Lime water turns red when carbon dioxide is passed through it.
2. **Assertion (A):** Spirulina can be used to fight malnutrition.
Reason (R): Spirulina grows in clean water and is safe to eat.
3. **Assertion (A):** Plant cells do not have a cell wall.
Reason (R): The cell wall provides shape and protection to plant cells.

4. **Assertion (A):** Soil suspension contains many microbes.
   Reason (R): Viruses can infect plant, animal or bacterial cells.
5. **Assertion (A):** Some bacteria are useful for humans.
   Reason (R): Certain bacteria help in nitrogen fixation.

(E) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. Microalgae produce more than half of the earth's oxygen supply.
2. Yeast is a multicellular fungus.
3. Viruses can reproduce only inside the host organism.
4. The basic unit of life is a cell.
5. Yeast is a protozoa.
6. Fungal growth is faster in cold, dry conditions.
7. All microorganisms are harmful and cause diseases.
8. Bread becomes softer and fluffier because yeast releases carbon dioxide gas during dough fermentation.
9. The nucleoid is a membrane-bound structure found only in plant cells.
10. Microorganisms can grow in extreme environments like hot springs, acidic lakes, and deep oceans.

(F) CASE STUDY QUESTIONS

Case Study I:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Riya's grandmother often makes fresh curd at home. She explains to Riya that when a spoonful of curd is added to warm milk and left overnight, it thickens into curd. At school, Riya also learns that not all bacteria are harmful. Some play very important roles in our lives. Rhizobium bacteria live in the root nodules of leguminous plants (like peas and beans) and help in nitrogen fixation, enriching the soil. Some bacteria are used in the production of antibiotics (like Streptomyces used for making streptomycin). Other bacteria help in making vinegar, cheese, and other fermented foods. In industries, bacteria are used to clean oil spills and in sewage treatment.

Questions:

1. Which bacterium is responsible for converting milk into curd?
2. Name one bacterium that helps in nitrogen fixation in plants.
3. Give one industrial use of bacteria other than food production.
4. Why can we say that bacteria are both "friends" and "foes" of humans?

Case Study II:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Ria and Karan are working on a biology project. They observed onion peel under a microscope and noticed clear rectangular structures with a thick boundary and a greenish tinge. Later, they also observed cheek cells, which were irregular in shape and had no green pigment.

Ria asked, "Why do onion cells look different from cheek cells?" Karan replied, "Maybe because plants and animals have different types of cells and functions."

Questions:

1. What gives rigidity to the plant cell but not to the animal cell?
2. Why do plant cells have chloroplasts but animal cells do not?
3. Which cell organelle is present in both plant and animal cells and controls their activities?
4. If chloroplasts were absent in plants, what important life process would not occur?

3

Health – The Ultimate Treasure

(A) MULTIPLE CHOICE QUESTIONS

1. Antibiotics work against _____.
   (*a*) elephantiasis (*b*) virus
   (*c*) bacteria (*d*) parasites
2. What is the main cause of antibiotic resistance?
   (*a*) Overuse of vaccines (*b*) Indiscriminate use of antibiotics
   (*c*) Lack of exercise (*d*) Poor diet
3. Who discovered the first antibiotic, penicillin?
   (*a*) Edward Jenner (*b*) Alexander Fleming
   (*c*) Dr. Kamal Ranadive (*d*) Dr. Maharaj Kishan Bhan
4. Which of the following is not a communicable disease?
   (*a*) Diabetes (*b*) Typhoid
   (*c*) Chickenpox (*d*) Dengue
5. What is the primary definition of health according to the World Health Organization (WHO)?
   (*a*) Absence of disease (*b*) Freedom from stress
   (*c*) Regular exercise and diet
   (*d*) Complete physical, mental, and social well-being
6. Which activity can help prevent dengue?
   (*a*) Eating junk food (*b*) Removing standing water
   (*c*) Increasing screen time (*d*) Skipping meals
7. Which of the following is not a bacterial disease?
   (*a*) Typhoid (*b*) Tuberculosis
   (*c*) Dengue (*d*) Cholera
8. Communicable diseases can spread through:
   (*a*) Air (*b*) Contaminated food and water
   (*c*) Insects (*d*) All of these
9. Which of the following is a non-communicable disease?
   (*a*) Diabetes (*b*) Malaria
   (*c*) Measles (*d*) Ascariasis

10. Who invented the first vaccine?

(*a*) Edward Jenner (*b*) Alexander Fleming

(*c*) Dr. Kamal Ranadive (*d*) Dr. Maharaj Kishan Bhan

(B) MATCH THE COLUMNS

Column 1	Column 2
(i) Common cold	(a) anaemia
(ii) Typhoid	(b) Infects respiratory tract
(iii) Ascariasis	(c) abdominal discomfort
(iv) Malaria	(d) Slow healing
(v) Diabetes	(e) periodic chills

(C) FILL IN THE BLANKS

1. Diseases that spread from one person to another through pathogens are called _____ diseases.
2. The natural ability of our body to fight diseases is known as _____.
3. Vaccines provide _____ immunity by training the immune system.
4. Antibiotics protect us from _____ infections.
5. _____ and _____ are important for managing and curing diseases.
6. Penicillin was discovered by _____.
7. Disease causing organisms are called _____.
8. Edward Jenner discovered the first vaccine against _____.
9. _____ is a communicable disease caused by worms.
10. _____ is also known as break bone fever.

(D) ASSERTION-REASON TYPE QUESTIONS

Directions. *In each of the following questions, a statement of Assertion is given by the corresponding statement of reason. Of the statements, mark the correct answer as:*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) If Assertion is true, but Reason if false.

(d) If Assertion is false, but Reason is true.

1. **Assertion (A):** Non-communicable diseases are increasing in India.

   Reason (R): Lifestyle changes, such as eating processed food and a lack of exercise, contribute to these diseases.

2. **Assertion (A):** Antibiotics can be used whenever we feel unwell.

   Reason (R): Overuse of antibiotics can lead to antibiotic resistance.

3. **Assertion (A):** Diabetes is a non-communicable disease.

   Reason (R): Non-communicable diseases can spread through contact with infected persons.

4. **Assertion (A):** Washing hands regularly and maintaining hygiene can reduce the risk of communicable diseases.

   Reason (R): Vaccination helps in preventing communicable diseases.

5. **Assertion (A):** Eating too much junk food can lead to diseases like obesity and diabetes.

   Reason (R): Junk food is rich in vitamins and minerals needed for growth.

(E) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. Clean surroundings can reduce the spread of communicable diseases.
2. Stress can negatively affect both mental and physical health.
3. Antibiotics are effective against viral infections.
4. Vaccines can cure diseases before a person becomes sick.
5. All diseases are caused by infections.
6. Planting trees and maintaining greenery improves air quality.
7. Communicable diseases spread from one person to another through pathogens.
8. Tuberculosis is caused by a virus and can spread through the air.
9. Washing hands and maintaining hygiene can prevent many communicable diseases.
10. Vaccines help in developing acquired immunity.

(F) CASE STUDY QUESTIONS

Case Study I:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Rahul is a 15-year-old student who spends most of his time playing video games and eating fast food. He rarely exercises and often skips meals. Over time, he starts feeling tired easily and gains excessive weight. During a routine check-up, his doctor informs him that he has high blood sugar and elevated cholesterol levels.

The doctor explains that lifestyle factors such as poor diet, lack of exercise, and excessive screen time have increased Rahul's risk of non-communicable diseases. The doctor advises Rahul to include more fruits, vegetables and whole grains in his diet, exercise daily and reduce screen time.

Questions:

1. Which non-communicable diseases is Rahul at risk of developing?
2. Name two lifestyle changes Rahul can adopt to reduce his risk.
3. Why do non-communicable diseases not spread from one person to another?
4. How does regular exercise help in preventing non-communicable diseases?

Case Study II:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

In a small village called Sundarpur, a few children had been falling sick frequently due to measles, polio, and other preventable diseases. The local health center noticed that many parents were hesitant to get their children vaccinated because they had heard rumors about vaccines causing side effects.

To address this, the health center organized a vaccination awareness camp. The nurse explained to the parents and children how vaccines work: they train the body to fight infections without causing the disease itself. She also shared stories of children who avoided serious illness because they were vaccinated.

Over the next few weeks, the health center arranged vaccination sessions for all children in Sundarpur. Gradually, more parents brought their children and the number of cases of preventable diseases began to decline. The villagers realized that vaccination not only protects individual children but also the entire community by preventing the spread of diseases.

Questions:

1. How do vaccines help the body fight diseases without causing illness?
2. Who invented the first vaccine?
3. Against which disease was this vaccine developed?
4. Explain how vaccinating some children helped protect the entire village.

4

Electricity – Magnetic and Heating Effects

(A) MULTIPLE CHOICE QUESTIONS

1. Heat produced in a heating element on passing current through it depends on:
   (i) Nature of the material of the heating element (ii) Thickness of the wires of the element
   (iii) Colour of the element (iv) Length of the wire of the element
   Choose the combination of correct answers from the four options above.
   (*a*) (i) and (ii) only (*b*) (i), (ii), and (iv) only (*c*) All four are correct (*d*) (ii) and (iii) only
2. The magnetic effect of an electric current generates a magnetic field around the current-carrying coil of a metallic wire:
   (*a*) When the electric current stops flowing through the coil
   (*b*) When the coil becomes hot due to the heating effect of the electric current
   (*c*) When the electric current is flowing through the coil (*d*) When the coil is brought near another magnet
3. Wires made of which of the following materials is more suitable for showing the heating effects of electric current?
   (*a*) Nichrome (*b*) Copper wire (*c*) Aluminium (*d*) Silver
4. Voltaic cell uses _____ electrolyte that is why it is not considered as convenient as a dry cell.
   (*a*) Coloured (*b*) Solid (*c*) Liquid (*d*) paste
5. In a dry cell, the positive terminal is the metallic tip on top of the carbon rod. Which then is the negative terminal of the cell?
   (*a*) Bottom of the carbon rod (*b*) Bottom of the zinc container
   (*c*) The paste of chemicals inside the cell (*d*) Carbon rod just below the metallic tip
6. The strength of the electromagnet depends on:
   (*a*) The nature of the metal used in the coil (*b*) Number of turns in the coil
   (*c*) The strength of the current flowing through the coil (*d*) All of these
7. Which among the following is widely used in mobile phones and laptops?
   (*a*) Lead-acid battery (*b*) Mercury cell (*c*) Lithium-ion cell (*d*) Dry cell
8. Which scientist discovered the magnetic effect of electric current?
   (*a*) Joule (*b*) Faraday (*c*) Edison (*d*) Oersted
9. Which of the following is not a disadvantage of heating effect of current?
   (*a*) Energy loss during transmission (*b*) Overheating in appliances
   (*c*) Safety devices placed in circuits (*d*) None of the above
10. How many poles does an electromagnet have?
    (*a*) One (*b*) Two (*c*) Three (*d*) Four

(B) MATCH THE COLUMNS

Column 1	Column 2
(i) Dry cell	(a) used in computers
(ii) Lithium ion cell	(b) heating element of heater
(iii) Voltaic cell	(c) zinc container
(iv) Nichrome	(d) soft iron core
(v) Electromagnet	(e) chemical reaction

(C) FILL IN THE BLANKS

1. If the direction of the flow of current is reversed, the _____ of an electromagnet interchange their positions.
2. The region around a magnet where its magnetic effect can be felt is said to have a _____.
3. A current carrying coil that behaves like a magnet is called an _____.
4. When we increase the current flowing through the coil (use battery of two or more cells in place of one cell), the magnet becomes _____.
5. Energy loss during _____ of electric current is also a problem related to the heating effect of electric current.
6. The plates of a voltaic cell are called _____.
7. Current flows from the _____ terminal through the circuit to the _____ terminal.
8. The solution used in a voltaic cell is called _____.
9. _____ battery is the most common type of rechargeable battery.
10. A _____ cell generates electricity by chemical reactions.

(D) ASSERTION-REASON TYPE QUESTIONS

Directions. *In each of the following questions, a statement of Assertion is given by the corresponding statement of reason. Of the statements, mark the correct answer as:*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) If Assertion is true, but Reason if false.

(d) If Assertion is false, but Reason is true.

1. **Assertion (A):** When electric current flows through a conductor (like a wire), it produces a magnetic field around it. This phenomenon is known as the magnetic effect of electric current.

   Reason (R): The magnetic field around a current-carrying conductor can be shown by the deflection of a compass brought near the conductor.

2. **Assertion (A):** Electromagnets do not have poles like the North pole and South pole of a bar magnet.

   Reason (R): When we interchange the terminals of the battery in a circuit, the poles of the electromagnet also change positions.

3. **Assertion (A):** A soft iron core is used inside an electromagnet.

   Reason (R): Soft iron retains its magnetism even after the current is switched off.

4. **Assertion (A):** A dry cell is rechargeable.

   Reason (R): The chemical reactions inside a dry cell are irreversible.

5. **Assertion (A):** The filament of an electric bulb is made of tungsten.

   Reason (R): Tungsten has a very high melting point.

(E) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. Pure water can be used as an electrolyte in a Voltaic cell.
2. When we interchange the terminals of the battery in a circuit, the poles of the electromagnet also change positions.
3. Heating effect of electric current can cause energy loss in wires.
4. Electromagnets do not have poles like the North pole and South pole of a bar magnet.
5. A hair dryer is an example of the magnetic effect of electric current.
6. Dry cells use solid electrolytes; therefore they are convenient to carry anywhere.
7. An electric heater is an example of the heating effect of electric current.
8. Nichrome wire has a higher resistance as compared to a copper wire.
9. LED glows only when its positive terminal is connected to the negative terminal of the battery.
10. The zinc container of the dry cell acts as the negative terminal.

(F) CASE STUDY QUESTIONS

Case Study I:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

One day, Rahul visited a junkyard. He saw a huge crane lifting old, heavy cars and iron pieces with ease. Curious, he asked the junkyard dealer how the crane could pick up such heavy iron objects.

He then explained that the crane uses a giant electromagnet. When electric current flows through the coil wound around a large iron core, it becomes magnetized and attracts the cars made of iron and steel. When the current is switched off, the magnetism disappears, and the scrap cars are dropped at another place.

Questions:

1. Which effect of electric current is used in the crane at the junkyard?
2. What happens when the current is switched off in the electromagnet of the crane?
3. Give one advantage of using an electromagnet over a permanent magnet.
4. Fill in the blank: In an electromagnet, the coil is usually wound around a _____ core.

Case Study II:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Aarav loved playing games on his mobile phone. One day, the battery got drained completely, and the phone switched off. Aarav quickly connected the phone to its charger. After some time, the phone switched on again and showed that the battery was charging. Curious, Aarav asked his elder sister how the battery can be used again and again after charging.

His sister explained that the phone uses a rechargeable battery. In such batteries, the chemical reaction that produces electricity can be reversed by passing current through it. This is why rechargeable batteries are also called secondary cells. She also told Aarav that cars and trucks use lead-acid batteries, which are also rechargeable.

Aarav realized that rechargeable batteries are useful because they can be reused many times, unlike dry cells (primary cells), which cannot be recharged once exhausted.

Questions:

1. Which metals are commonly used in mobile phone rechargeable batteries?
2. Why do you think rechargeable batteries are preferred in mobile phones and laptops?
3. What would happen if all devices only used non rechargeable cells or batteries instead of rechargeable batteries?
4. What would batteries of the future be like?

5

Exploring Forces

(A) MULTIPLE CHOICE QUESTIONS

1. A push or pull applied on an object is defined as _____.
   (*a*) Speed (*b*) Pressure
   (*c*) Force (*d*) Friction
2. Example of non-contact force is/are:
   (*a*) Gravitational force (*b*) Electrostatic force
   (*c*) Magnetic force (*d*) All of the above
3. When force acts on an object, it may change _____.
   (*a*) Shape of an object (*b*) State of an object
   (*c*) Speed of an object (*d*) All of the above
4. The force acting between two oppositely charged bodies is _____.
   (*a*) Gravitational force (*b*) Electrostatic force
   (*c*) Magnetic force (*d*) Applied force
5. The force exerted by the earth to pull the object towards itself is called _____.
   (*a*) Electrostatic force (*b*) Gravitational force
   (*c*) Muscular force (*d*) Contact force
6. A spring balance is used for measuring _____.
   (*a*) mass (*b*) weight
   (*c*) pressure (*d*) Speed
7. Leaves fall down on the ground due to _____.
   (*a*) Electrostatic force (*b*) Magnetic force
   (*c*) Gravitational force (*d*) Muscular force
8. The strength of force is expressed by its _____.
   (*a*) weight (*b*) mass
   (*c*) magnitude (*d*) longitudinal force
9. The upward force exerted by a liquid on a body immersed in it is called:
   (*a*) Frictional force (*b*) Gravitational force
   (*c*) Buoyant force (*d*) Viscous force

10. The magnitude of buoyant force depends on:

(*a*) Weight of the object (*b*) density of the liquid

(*c*) Shape of the object (*d*) Mass of the object

(B) MATCH THE COLUMNS

Column 1	Column 2
(i) Buoyant force	(a) force exerted by earth
(ii) Friction	(b) charges
(iii) Muscular force	(c) Upward force by a liquid
(iv) Gravity	(d) opposing force
(v) Electrostatic force	(e) contact force

(C) FILL IN THE BLANKS

1. _____ force is the force resulting due to the action of muscles.
2. Force has _____ as well as direction.
3. _____ and _____ forces are the two kinds of forces.
4. While coming down, the speed of an object _____.
5. Force exerted by magnet is called _____ force.
6. The upward force exerted by a liquid on a body immersed in it is called _____.
7. A spring balance measures the _____ of an object.
8. _____ force is always an attractive force.
9. Charges built when two objects are rubbed together are called _____ charges.
10. The buoyant force depends on the _____ of the liquid.

(D) ASSERTION-REASON TYPE QUESTIONS

Directions. *In each of the following questions, a statement of Assertion is given by the corresponding statement of reason. Of the statements, mark the correct answer as:*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) If Assertion is true, but Reason if false.

(d) If Assertion is false, but Reason is true.

1. **Assertion (A):** In the game of tug of war, sometimes the rope doesn't seem to move to any side even if strong forces are applied from both sides.

   Reason (R): Equal force applied from opposite sides on any object makes the net applied force zero.
2. **Assertion (A):** A ball rolling on the ground stops after some time.

   Reason (R): Friction, which is a non-contact force, acts between the ball and the ground.
3. **Assertion (A):** When you push a book lying on a table, it moves forward.

   Reason (R): Electrostatic force is a non-contact force.
4. **Assertion (A):** Electrostatic force can act on a charged balloon even if it is not in direct contact with small paper bits.

   Reason (R): Electrostatic force is a contact force.
5. **Assertion (A):** An iron nail sinks in water.

   Reason (R): The weight of the nail is more than the buoyant force acting on it.

(E) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. At least two objects must interact for a force to come into play.
2. Magnitude is the strength of a force.
3. Force cannot change the shape of an object.
4. The unit of force is Newton.
5. A stone sinks in water because the buoyant force on it is more than its weight.
6. Muscular force is always a contact force.
7. Gravitational force is the force of attraction between any two objects in the universe.
8. An astronaut's mass on the Moon is less than his mass on Earth.
9. The SI unit of weight is newton (N).
10. Forces cannot act without contact.

(F) CASE STUDY QUESTIONS

Case Study I:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Riya and her friends visited an amusement park. First, they went on the bumper car ride. Each time their cars collided, they felt a push that made the cars move in different directions. Later, they visited the "Magnetic Wonder" stall, where a strong magnet lifted iron pieces without touching them. In another game, Riya rubbed a balloon on her hair and found that it attracted tiny bits of paper from the table.

When they returned home, Riya dropped her toy accidentally, and it fell straight to the ground. Her younger brother asked, "Why do things always fall down and not up?" Riya explained that the Earth pulls everything towards itself.

Questions:

1. Which non-contact force was shown at the "Magnetic Wonder" stall?
2. When Riya rubbed the balloon on her hair and it attracted paper bits, which force was at work?
3. Identify one example of contact force and one example of non-contact force from the case study.
4. Define force.

Case Study II:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

During the summer holidays, Arjun and his cousins went for a boat ride in a lake. The wooden boat floated easily even though all of them sat inside it. Arjun noticed that when more people stepped into the boat, the boat sank a little deeper into the water but did not sink completely. Later, Arjun threw a stone into the lake. The stone went straight to the bottom, while a plastic bottle, even when filled partly with water, kept floating on the surface.

Curious, Arjun asked his uncle why the boat floated but the stone did not.

Questions:

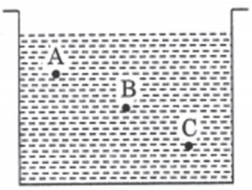
1. What force is responsible for making the boat float on water?
2. Why did the stone sink in water?
3. Why did the empty plastic bottle float on the surface of the lake?
4. Which scientific principle explains the observations Arjun made?

6

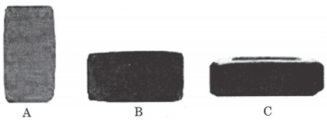
Pressure, Winds, Storms and Cyclones

(A) MULTIPLE CHOICE QUESTIONS

1. SI unit of pressure is:
   (*a*) Newton (*b*) Newton/km (*c*) Pascal (*d*) Kilogram/h
2. In Kerala, Karnataka, and Tamil Nadu, thunderstorms are known as:
   (*a*) Kalboishakhi (*b*) Bordoisila (*c*) Mango showers (*d*) None of the above
3. During lightning, we should protect ourselves by:
   (*a*) Crouching down in a low-lying open area (*b*) Standing near a tall object
   (*c*) Using an umbrella with a metallic rod (*d*) Going into water
4. In a cyclone, the region of the lowest pressure is at the centre, known as:
   (*a*) The eye of the cyclone (*b*) The body of the cyclone
   (*c*) The air of the cyclone (*d*) The pressure of the cyclone
5. When the cyclone reaches land, the source of moist air is cut off, and it gradually:
   (*a*) Increases in strength (*b*) Loses its strength
   (*c*) Becomes lightning (*d*) Thunders and becomes a thunderstorm
6. The pressure which is exerted by air around us is known as:
   (*a*) Force (*b*) atmospheric pressure (*c*) muscular force (*d*) friction
7. Force acting per unit area is called:
   (*a*) non-contact forces (*b*) contact forces (*c*) force (*d*) pressure
8. A container is filled with water as shown in the given figure. Which of the following statements is correct about pressure of water?



   (*a*) Pressure at A > Pressure at B > Pressure at C
   (*b*) Pressure at A = Pressure at B = Pressure at C
   (*c*) Pressure at A < Pressure at B > Pressure at C
   (*d*) Pressure at A < Pressure at B < Pressure at C
9. A brick is kept in three different ways on a table as shown in given figure.



   The pressure exerted by the brick on the table will be:
   (*a*) maximum in position A (*b*) maximum in position C
   (*c*) maximum in position B (*d*) equal in all cases

10. Lightning occurs due to

(*a*) Wind (*b*) Rain (*c*) electric discharge (*d*) earthquake

(B) MATCH THE COLUMNS

Column 1	Column 2
(i) Land and sea breeze	(a) track cyclones
(ii) Amphan cyclone	(b) uneven heating of land and sea
(iii) Weather monitoring satellites	(c) 270 km/h
(iv) Pascal	(d) down the column
(v) Pressure increases	(e) N/m^2

(C) FILL IN THE BLANKS

1. _____ can save buildings from destruction due to lightning.
2. The envelope of air surrounding the Earth is called _____ .
3. A sudden flow of charges taking place, producing a bright flash of light is called _____ .
4. SI unit of pressure is _____ .
5. Overhead water tanks are placed at a height to _____ pressure.
6. _____ breeze blows at night.
7. Weather satellites help in predicting _____.
8. The centre of a cyclone is called the _____, where the wind is calm.
9. The _____ constantly monitors cyclones and thunderstorms in India.
10. _____ are large storms that form over warm ocean waters.

(D) ASSERTION-REASON TYPE QUESTIONS

Directions. *In each of the following questions, a statement of Assertion is given by the corresponding statement of reason. Of the statements, mark the correct answer as:*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) If Assertion is true, but Reason if false.

(d) If Assertion is false, but Reason is true.

1. **Assertion (A):** We feel more comfortable carrying a bag with broad straps as compared to a bag of the same weight with narrow straps.

   Reason (R): Broad straps reduce the pressure exerted by the bag on our shoulders as compared to narrow straps.

2. **Assertion (A):** The base of the dam is kept narrower than the top to keep the dam strong to hold a huge amount of water.

   Reason (R): The water stored in the dam exerts pressure horizontally on the side walls of the dam and vertically on the floor due to the height of the water level. The pressure that acts horizontally is very large near its bottom.

3. **Assertion (A):** Atmospheric pressure can be observed in daily life

   Reason (R): Air is weightless and does not exert pressure.

4. **Assertion (A):** Doors and windows should be kept open during a storm.

   Reason (R): Keeping the doors and windows open helps in increasing the pressure difference between the inside and outside of the house.

5. **Assertion (A):** Land breeze blows from land towards sea during night.

   Reason (R): Sea breeze blows from the sea towards the land during day

(E) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. Pressure does not depend on area of contact.
2. Atmospheric pressure is less at higher altitudes.
3. Thunderstorm in Bihar is known as Kalboishakhi.
4. Cyclones are large storms that form over land.
5. Weather monitoring satellites can track cyclones and predict their path.
6. Positive and negative charges are created in the clouds by weak winds blowing upwards and downwards.
7. Liquids exert pressure only at the bottom.
8. Warm air is lighter than cold air.
9. The base of a dam is made broader to resist high water pressure.
10. Air does not exert pressure.

(F) CASE STUDY QUESTIONS

Case Study I:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Sundar Nagar is a coastal town. One evening, the weather office announced a cyclone warning. Strong winds started blowing, and the sea became very rough. Fishing boats were pulled back to the shore, and people were asked to take shelter in cyclone relief centers.

During the cyclone, trees were uprooted, roofs of some houses flew away, and there was heavy rainfall. Arjun observed that the wind speed was very high, and it caused a difference in air pressure, which led to destruction. His father explained that cyclones occur due to a combination of low-pressure systems, high-speed winds, and moisture from the sea.

After the cyclone passed, the disaster management team distributed food, water, and medicines to the affected people.

Questions:

1. What is the main cause of cyclone formation?
2. Mention one safety measure that people should follow during cyclones.
3. Why do coastal regions experience more cyclones than inland areas?
4. What role do satellites and radars play in cyclone management?

Case Study II:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

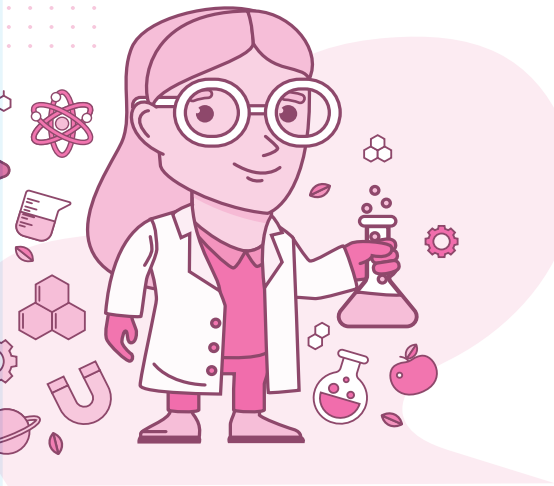
A group of students went on a school trip to the mountains. As they climbed higher, some students felt their ears popping. Their teacher explained that this happens because atmospheric pressure decreases with height, while the pressure inside their ears remains the same for some time.

At the campsite, they tried boiling water to cook rice. They noticed that water boiled much faster but the rice took longer to cook. Their science teacher told them that at higher altitudes, water boils at a lower temperature because of reduced atmospheric pressure.

One student, Ravi, also observed that a packet of chips brought from the plains looked puffed up at the top of the mountain. The teacher explained that the air inside the packet was at higher pressure compared to the outside air at the mountain.

Questions:

1. Why did the students' ears pop while climbing the mountain?
2. Why did the rice take longer to cook even though the water boiled faster at high altitude?
3. Why did the chips packet appear puffed up on the mountain?
4. What happens to atmospheric pressure as we move to higher altitudes?



7

Particulate Nature of Matter

(A) MULTIPLE CHOICE QUESTIONS

1. Which of these is NOT a form of matter?
   (*a*) Solid (*b*) Liquid
   (*c*) Energy (*d*) Gas
2. Which of the following is the basic unit of matter?
   (*a*) Molecule (*b*) Atom
   (*c*) Element (*d*) Compound
3. When sugar dissolves in water, it shows:
   (*a*) Sugar disappears (*b*) Particles are stationary
   (*c*) Matter is continuous (*d*) Matter is made up of particles
4. How many main physical states of matter are there?
   (*a*) Two (*b*) Three
   (*c*) Four (*d*) Five
5. The interparticle space is maximum in:
   (*a*) Solids (*b*) Liquids
   (*c*) Gases (*d*) All are equal
6. The arrangement of particles in solids is:
   (*a*) Loose and irregular (*b*) Tightly packed and fixed
   (*c*) Random and moving freely (*d*) Widely spaced
7. Liquids can flow because:
   (*a*) The particles are tightly packed (*b*) The particles can slide past each other
   (*c*) The particles are far apart (*d*) Liquids have no particles
8. Gases have:
   (*a*) Definite shape and definite volume (*b*) Definite shape but no definite volume
   (*c*) No definite shape and no definite volume (*d*) No volume but definite shape
9. Which of the following is an example of matter that can easily change its shape but not its volume?
   (*a*) Oxygen (*b*) Water
   (*c*) Ice (*d*) Salt

10. What happens when you compress the air inside a syringe by pushing the piston?

(*a*) The area increases (*b*) The particles stop moving

(*c*) The volume increases (*d*) The particles come closer

(B) MATCH THE COLUMNS

Column 1	Column 2
(i) Solid	(a) liquids and gases
(ii) Liquid	(b) no fixed volume
(iii) Gas	(c) definite shape and volume
(iv) Fluid	(d) solid to liquid
(v) Melting	(e) take the shape of container

(C) FILL IN THE BLANKS

1. Particles move the fastest in _____.
2. The three states of matter are _____, _____, and _____
3. The temperature at which a liquid boils and turns into vapour at atmospheric pressure is called its _____ .
4. _____ take the shape of container but have fixed volume.
5. The force of attraction between particles is strongest in _____ and weakest in _____.
6. Liquids have a definite _____ but no definite _____.
7. _____ are the least compressible, while _____ are the most compressible.
8. If we add sugar to water, the volume of the solution first _____, then _____.
9. The full form of SPM is _____.
10. _____ and _____ are considered to be fluids.

(D) ASSERTION-REASON TYPE QUESTIONS

Directions. *In each of the following questions, a statement of Assertion is given by the corresponding statement of reason. Of the statements, mark the correct answer as:*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) If Assertion is true, but Reason if false.

(d) If Assertion is false, but Reason is true.

1. **Assertion (A):** The physical state of a substance depends on the arrangement and movement of its particles.

   Reason (R): Solids have the least interparticle spacing and particles vibrate in fixed positions, while gases have maximum spacing and move freely in all directions.

2. **Assertion (A):** Gases can be compressed easily as compared to solids and liquids.

   Reason (R): The particles in gases are closely packed with very little inter-particle space.

3. **Assertion (A):** Liquids and gases are together known as fluids.

   Reason (R): Fluids have a fixed shape and volume.

4. **Assertion (A):** Increasing the temperature increases the movement of particles.

   Reason (R): The particles of gases have the maximum interparticle spaces.

5. **Assertion (A):** Gases can be compressed easily.

   Reason (R): The molecules of a solid are far apart and have weak intermolecular forces.

(E) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. Air is not matter.
2. Solid, liquids and gases are all composed of particles.
3. In solids, particles vibrate but remain in their fixed position.
4. The spaces between particles are the same in all states of matter.
5. Gases have no fixed shape but have fixed volume.
6. Particles of matter are held together by interparticle forces of attraction.
7. Water is practically incompressible.
8. Particles of a liquid move faster than the particles of a gas.
9. Solids have the strongest interparticle attractions.
10. Heating a solid decreases the vibration of its particles.

(F) CASE STUDY QUESTIONS

Case Study I:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Isha and her friends went on a picnic to a hilltop. They carried food in steel boxes, water in plastic bottles, and cold drinks in sealed cans. On the way, Isha noticed that the steel box did not change its shape even when it was pushed inside the bag. However, the water in the bottle took the shape of the bottle.

When they opened a can of cold drink, a fizzing sound was heard as the gas inside escaped and spread quickly in the air. Later, while boiling water to make tea, they saw that the steam rose up and spread everywhere.

Questions:

1. Why did the water take the shape of the bottle?
2. What caused the fizzing sound when the cold drink can was opened?
3. Why does steam spread quickly in the air?
4. Which state of matter among solids, liquids, and gases is most compressible?

Case Study II:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Rohan was helping his grandmother in the kitchen. She put some ice cubes in a bowl and left them on the table. After some time, Rohan noticed that the ice cubes slowly turned into water.

Later, she placed a pot of water on the stove to prepare tea. As the water heated up, tiny bubbles appeared, and soon the water started forming steam.

Rohan also observed that when the hot steam touched the lid of the pot, tiny drops of water formed again.

Questions:

1. What is the name of the process when ice changes into water?
2. At what temperature does water boil at normal atmospheric pressure?
3. Which process is observed when steam turns into water droplets on the pot lid?
4. Why do bubbles form during boiling of water?

8

Nature of Matter – Elements, Compounds and Mixtures

(A) MULTIPLE CHOICE QUESTIONS

1. Which of the following is an element?
   (*a*) Water (*b*) Carbon
   (*c*) Sugar (*d*) Air
2. What is the smallest unit of an element?
   (*a*) Molecule (*b*) Cell
   (*c*) Atom (*d*) Compound
3. A compound is formed when:
   (*a*) Two solids are mixed (*b*) Two gases are combined physically
   (*c*) Two or more elements combine chemically (*d*) One element changes state
4. Which of the following can be separated by physical methods?
   (*a*) Mixture (*b*) Compound
   (*c*) Element (*d*) Atom
5. Brass is an alloy of:
   (*a*) Copper and iron (*b*) Zinc and lead
   (*c*) Copper and zinc (*d*) Iron and carbon
6. Which of the following is NOT a characteristic of a compound?
   (*a*) Has a fixed composition (*b*) Can be separated by simple physical methods
   (*c*) Properties are different from the elements that form it
   (*d*) Formed by chemical reaction
7. Graphene aerogel is used to clen oil spills because it is:
   (*a*) A liquid (*b*) Highly reactive
   (*c*) A compound of carbon (*d*) Highly porous and absorbent
8. What kind of substance is pure and has identical properties throughout?
   (*a*) Mixture (*b*) Element
   (*c*) Non-uniform mixture (*d*) Suspension
9. A solution of salt in water is an example of:
   (*a*) Compound (*b*) Element
   (*c*) Uniform mixture (*d*) Non-uniform mixture

10. Which of the following cannot be broken down by chemical means?

(*a*) Water (*b*) Iron

(*c*) Salt (*d*) Baking soda

(B) MATCH THE COLUMNS

Column 1	Column 2
(i) Silicon	(a) Mixture
(ii) Sodium chloride	(b) Alloy
(iii) Air	(c) Compound
(iv) Oxygen	(d) Metalloid
(v) Steel	(e) Element

(C) FILL IN THE BLANKS

1. The smallest unit of an element that retains its properties is called an _____.
2. _____ can be separated by physical methods such as filtration or evaporation.
3. The simplest form of matter that cannot be broken down by chemical _____.
4. Two or more elements chemically combined form a _____.
5. Compound has _____ properties than the elements that form it.
6. Silicon is an example of a _____.
7. The total number of elements known at present is _____.
8. _____ and _____ are liquid elements.
9. The gas that makes a burning splinter burn more brightly is _____.
10. Soda water is a mixture of _____ and _____.

(D) ASSERTION-REASON TYPE QUESTIONS

Directions. *In each of the following questions, a statement of Assertion is given by the corresponding statement of reason. Of the statements, mark the correct answer as:*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) If Assertion is true, but Reason if false.

(d) If Assertion is false, but Reason is true.

1. **Assertion (A):** Water is a compound.
   Reason (R): The elements hydrogen and oxygen can be separated from water using a physical method.
2. **Assertion (A):** The properties of a compound are the same as the properties of its constituent elements.
   Reason (R): In compounds, elements are chemically combined.
3. **Assertion (A):** An element is a pure substance made up of only one kind of atom.
   Reason (R): Elements cannot be broken down into simpler substances by chemical methods.
4. **Assertion (A):** Graphene is useful in cleaning oil spills.
   Reason (R): Graphene is made from carbon.
5. **Assertion (A):** Elements and compounds are the building blocks of matter.
   Reason (R): Electricity is also matter.

(E) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. Air is a mixture of gases.
2. Iron and sulphur mixture shows the properties of both iron and sulphur.
3. Elements can be broken down into simpler substances by chemical means.
4. Alloys like brass and bronze are examples of solid mixtures.
5. Carbon dioxide gas is colourless and has a rotten egg like odour.
6. Hydrogen gas burns with a pop sound.
7. Sugar dissolved in water is a homogeneous mixture.
8. Milk is a pure substance.
9. The properties of a compound are the same as those of its constituent elements.
10. Compounds always have a fixed chemical composition.

(F) CASE STUDY QUESTIONS

Case Study I:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Anita went to a jewellery shop with her mother. She saw ornaments made of gold and silver. The jeweller explained that both are elements because they are made of only one kind of atom.

Anita also noticed some ornaments marked as "22K gold." The jeweller told her that pure gold is too soft to make durable jewellery, so it is mixed with small amounts of copper or silver to make it stronger. Thus, 22K gold is not a pure element but a mixture.

Questions:

1. Why is gold considered an element?
2. Why is 22K gold not a pure element?
3. Give one example of another element used in jewellery.
4. Why are alloys preferred over pure elements in making ornaments?

Case Study II:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Ravi went on a summer camp with his friends. After playing in the hot sun, they felt extremely thirsty. Their teacher gave them bottles of water (H_2O) and reminded them that water is not just any liquid, but a compound made of hydrogen and oxygen combined in a fixed ratio. Ravi was surprised to learn that hydrogen by itself is a flammable gas and oxygen supports burning, but when they combine, they form water—a safe, life-giving liquid. The teacher explained that this unique compound is essential for drinking, cooking, farming, electricity production, and even for survival of all living beings. Ravi understood that without this single compound, life on Earth would not exist.

Questions:

1. Why is water considered a compound and not an element?
2. Which two elements combine to form water, and in what ratio?
3. How are the properties of water different from hydrogen and oxygen?
4. Why is water called a life-giving compound?

9

The Amazing World of Solutes, Solvents and Solutions

(A) MULTIPLE CHOICE QUESTIONS

1. A solution that contains the maximum amount of solute that can be dissolved at a given temperature is called:
   (*a*) Dilute solution (*b*) Unsaturated solution
   (*c*) Supersaturated solution (*d*) Saturated solution
2. Which of the following is an example of a solid solution?
   (*a*) Sugar dissolved in water (*b*) Salt dissolved in water
   (*c*) Gold dissolved in copper (*d*) Carbon dioxide dissolved in water
3. A solution is a:
   (*a*) Pure substance (*b*) Homogeneous mixture
   (*c*) Heterogeneous mixture (*d*) Compound
4. The SI unit of density is:
   (*a*) Kg (*b*) m^3
   (*c*) kg/m^3 (*d*) g/cm
5. An iron nail sinks in water because:
   (*a*) It is heavier than water (*b*) It has less mass
   (*c*) Its density is more than water (*d*) Water repels it
6. Which of the following increases the solubility of solids in water?
   (*a*) Decreasing temperature (*b*) Increasing temperature
   (*c*) Reducing pressure (*d*) Adding oil
7. In a salt solution, salt acts as the:
   (*a*) Solute (*b*) Solvent
   (*c*) Solution (*d*) Saturated part
8. Which of the following is an example of a gaseous solution?
   (*a*) Salt in water (*b*) Sugar in tea
   (*c*) Carbon dioxide in soda water (*d*) Air
9. The solubility of gases in liquids generally:
   (*a*) Increases with increase in temperature (*b*) Decreases with increase in temperature
   (*c*) Remains constant with temperature (*d*) Does not depend on temperature

10. Fishes are able to survive in water because:

(*a*) They breathe water
(*b*) They breathe oxygen dissolved in water
(*c*) They breathe carbon dioxide in water
(*d*) They don't need oxygen

(B) MATCH THE COLUMNS

Column 1	Column 2
(i) Measuring Cylinder	(a) Universal solvent
(ii) Meniscus	(b) measures mass
(iii) Digital weighing balance	(c) No units
(iv) Relative density	(d) measures volume
(v) Water	(e) curved surface of a liquid

(C) FILL IN THE BLANKS

1. The substance that dissolves the solute is called the _____.
2. The amount of solute dissolved in a given amount of solvent is called the _____ of the solution.
3. _____ is the curved surface formed by a liquid inside the measuring cylinder.
4. The SI unit of mass is _____.
5. _____ is the maximum amount of solute that can be dissolved at a given temperature in 100 ml of a solution.
6. The space occupies by an object is called its _____.
7. Solubility of most solids in water _____ with increase in temperature.
8. The solubility of gases in water _____ when temperature increases.
9. Density is defined as _____ per unit volume.
10. The density of water is the highest at _____.

(D) ASSERTION-REASON TYPE QUESTIONS

Directions. *In each of the following questions, a statement of Assertion is given by the corresponding statement of reason. Of the statements, mark the correct answer as:*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
(c) If Assertion is true, but Reason if false.
(d) If Assertion is false, but Reason is true.

1. **Assertion (A):** Materials become more compact as we move towards the centre of the Earth.
   Reason (R): Pressure and temperature increase as we go deeper into the Earth.
2. **Assertion (A):** A wooden log floats on water.
   Reason (R): The density of wood is greater than the density of water.
3. **Assertion (A):** Ice is lighter than water.
   Reason (R): Water is heaviest at 4°C.
4. **Assertion (A):** Solubility of gases in liquids increases with an increase in temperature.
   Reason (R): More oxygen can dissolve in cold water.
5. **Assertion (A):** A saturated solution can dissolve unlimited solute.
   Reason (R): Solubility increases with increase in temperature.

(E) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. Water is often called the universal solvent.
2. A solution is a homogeneous mixture.
3. A solution cannot contain more than one solute.
4. The solubility of gases in liquids increases with an increase in temperature.
5. A saturated solution can dissolve more solute at the same temperature.
6. An object will float in water if its density is less than water.
7. Density of ice is greater than the density of Water.
8. The SI unit of density is g/cm^3.
9. The curved surface of water inside a measuring cylinder is called its meniscus.
10. Mass can be measured using a spring balance.

(F) CASE STUDY QUESTIONS

Case Study I:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Anjali was enjoying a glass of lemonade on a hot summer afternoon. She dropped a few ice cubes into her glass and noticed that the ice floated on top instead of sinking. Later, she read that in winters, when lakes freeze, the layer of ice floats on the surface. This ice layer acts like a blanket, preventing the water below from freezing completely. As a result, fish and other aquatic organisms survive even in extremely cold regions.

Questions:

1. Why does ice float on water instead of sinking?
2. How does floating ice help aquatic animals in cold regions?
3. At what temperature is the density of water maximum?
4. Can you think of another real-life example where the density difference helps in floating?

Case Study II:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

On a Sunday evening, Aarav opened a chilled bottle of soft drink. The moment he twisted the cap, a "fizz" sound came out and bubbles started rising to the top. Aarav wondered what caused this. He came to know that when the bottle is tightly sealed, the gas remains dissolved. As soon as you open the cap, the pressure is released and the gas escapes in the form of bubbles."

Aarav also noticed that when the drink was cold, it held more fizz, but when it became warm, the gas escaped quickly. This is why cold drinks are served chilled—so that they taste fizzy and refreshing.

He also learned that this principle is important in nature. For example, oxygen dissolved in water allows fish and aquatic organisms to survive. If the water becomes too warm, less oxygen dissolves, which can harm aquatic life.

Questions:

1. Which gas is dissolved in soft drinks?
2. Why are soft drinks served chilled?
3. What happens to the solubility of gases in liquids when temperature increases?
4. What could happen to fish in a pond if the water becomes too warm?

10

Light – Mirrors and Lenses

(A) MULTIPLE CHOICE QUESTIONS

1. A convex mirror is generally used as:
   (*a*) Shaving mirror
   (*b*) Car rear-view mirror
   (*c*) Dentist's mirror
   (*d*) Torch reflector
2. A concave mirror is also called a:
   (*a*) Diverging mirror
   (*b*) Converging mirror
   (*c*) Plane mirror
   (*d*) Cylindrical mirror
3. A convex lens is also called a:
   (*a*) Diverging lens
   (*b*) Converging lens
   (*c*) Plane lens
   (*d*) Cylindrical lens
4. The type of lens used in a magnifying glass is:
   (*a*) Concave lens
   (*b*) Convex lens
   (*c*) Plane glass
   (*d*) Cylindrical lens
5. According to the first law of reflection:
   (*a*) Angle of incidence = 90°
   (*b*) Incident ray, reflected ray and normal all lie in the same plane
   (*c*) Angle of incidence = Angle of refraction
   (*d*) None of these
6. The second law of reflection states that:
   (*a*) Angle of incidence = Angle of reflection
   (*b*) Light always bends towards the normal
   (*c*) Light always travels in a straight line
   (*d*) The incident ray is always perpendicular to the mirror
7. If a ray of light strikes a plane mirror at an angle of 30° with the normal, the angle of reflection will be:
   (*a*) 30°
   (*b*) 60°
   (*c*) 90°
   (*d*) 0°
8. A ray of light falls normally (perpendicular) on a plane mirror. The angle of reflection will be:
   (*a*) 0°
   (*b*) 45°
   (*c*) 90°
   (*d*) 180°

9. An erect and enlarged image can be formed by:
   (*a*) Only a convex mirror (*b*) Only a concave mirror
   (*c*) Only a plane mirror (*d*) Both convex and concave mirrors
10. Which device uses a concave mirror to produce a parallel beam of light?
   (*a*) Magnifying glass (*b*) Lamp
   (*c*) Torch (*d*) Microscope

(B) MATCH THE COLUMNS

Column 1	**Column 2**
(i) Concave mirror	(a) rear view mirror
(ii) Convex mirror	(b) same sized image
(iii) Plane mirror	(c) magnifying lens
(iv) Concave lens	(d) dentist's mirror
(v) Convex lens	(e) diverging lens

(C) FILL IN THE BLANKS

1. The angle of incidence is always equal to the angle of _____.
2. The angle between the incident ray and the normal is called the angle of _____.
3. When a ray of light falls normally (perpendicularly) on a mirror, it is reflected back along the same _____.
4. A _____ lens is used in magnifying glasses.
5. A convex mirror is used as a _____ mirror in vehicles.
6. The image formed by a plane mirror is always _____ and _____ inverted.
7. A concave mirror is also called a _____ mirror.
8. _____ occurs in all types of mirrors.
9. The path along which light travels is called a _____ of light.
10. The incident ray, the reflected ray and the _____ all lie in the same plane.

(D) ASSERTION-REASON TYPE QUESTIONS

Directions. *In each of the following questions, a statement of Assertion is given by the corresponding statement of reason. Of the statements, mark the correct answer as:*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) If Assertion is true, but Reason if false.

(d) If Assertion is false, but Reason is true.

1. **Assertion (A):** A plane mirror always forms an image that is of the same size as the object.
   Reason (R): In a plane mirror, the angle of incidence is always greater than the angle of reflection.
2. **Assertion (A):** Convex mirrors are used as rear view mirrors.
   Reason (R): Convex mirrors form an erect and diminished image.
3. **Assertion (A):** The laws of reflection are applicable only for plane mirrors.
   Reason (R): The angle of incidence is always equal to the angle of reflection.
4. **Assertion (A):** When a light ray falls perpendicularly on a plane mirror, it retraces its path.
   Reason (R): The angle of incidence in this case is 0°, so the angle of reflection is also 0°.

5. **Assertion (A):** A concave mirror can form both real and virtual images.
   Reason (R): A convex mirror always forms a virtual image.

(E) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. Lenses help in the reflection of light.
2. A concave mirror is also known as a converging mirror.
3. For a ray of light that falls perpendicularly on a mirror, the angle of incidence is 90°.
4. The angle of incidence is not equal to the angle of reflection.
5. A concave mirror is used as a dentist's mirror.
6. A convex lens is also called a converging lens.
7. Our eye has a convex lens inside it.
8. A lens which is thicker at the edges is a convex lens.
9. A convex lens is used in vehicles for rear-view.
10. The angle between the normal and the reflected ray is called the angle of reflection.

(F) CASE STUDY QUESTIONS

Case Study I:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Mehak was travelling in her father's car. She noticed that the driver could see the vehicles behind without turning back, using the rear-view mirror.

Later that day, Mehak visited the barber shop with her brother. She saw the barber using a concave mirror while shaving.

At home, Mehak looked into the bathroom mirror, which was a plane mirror, and saw her image. She noticed that all the three mirrors were different. She realised how different types of mirrors are used in our everyday life based on their image-forming properties.

Questions:

1. Which type of mirror is used in vehicles as a rear-view mirror and why?
2. Which type of mirror does a barber use while shaving and why?
3. Which mirror provides a wider field of view but a diminished image?
4. State one similarity between the image formed by a plane mirror and a convex mirror.

Case Study II:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

During a school visit to a renewable energy park, students saw a large dish-like structure used for heating. Their guide explained that it was a solar furnace. The furnace used a reflector to concentrate sunlight.

The reflector collects the sun's rays and reflects them to a single point called the focus. At the focus, the energy of sunlight becomes very high, producing extreme heat. This heat can be used for cooking, melting metals, or generating steam for power.

Questions:

1. Which type of mirror is used in a solar furnace?
2. What happens to parallel rays of sunlight after striking the reflector?
3. Name the point where the reflected rays meet after reflection from a concave mirror.
4. State one advantage of using solar furnaces.

11

Keeping Time with the Skies

(A) MULTIPLE CHOICE QUESTIONS

1. What do they call the Moon when it's more than half lit but not full?
   (*a*) Crescent (*b*) Gibbous
   (*c*) Quarter (*d*) Eclipse Moon
2. What is the sequence of phases starting from New Moon?
   (*a*) New Moon - Full Moon - Waxing Crescent - First Quarter
   (*b*) New Moon - Waxing Crescent - First Quarter - Full Moon
   (*c*) Full Moon - Waning Gibbous - New Moon
   (*d*) First Quarter - Full Moon - New Moon
3. What causes the phases of the Moon?
   (*a*) The Earth's rotation (*b*) The Moon's rotation
   (*c*) The Moon's orbit around the Earth (*d*) The Sun's movement
4. How long does one complete cycle of Moon phases take?
   (*a*) 7 days (*b*) 15 days
   (*c*) 29.5 days (*d*) 365 days
5. What is the phase when the entire face of the Moon is visible from Earth?
   (*a*) First Quarter (*b*) New Moon
   (*c*) Full Moon (*d*) Waning Crescent
6. A lunar year consists of about:
   (*a*) 300 days (*b*) 365 days
   (*c*) 354 days (*d*) 400 days
7. The Gregorian calendar is aligned with:
   (*a*) lunar months (*b*) solar year
   (*c*) sidereal month (*d*) moon's orbit
8. The Indian National Calendar starts on:
   (*a*) 1st January (*b*) 15th August
   (*c*) 22nd March (*d*) 21st December
9. Which of the following is an ISRO satellite that studies the sun?
   (*a*) Mangalyaan (*b*) Chandrayaan
   (*c*) Cartosat (*d*) Aditya L1

10. Which festival is celebrated on New Moon?

(*a*) Diwali (*b*) Dussehra

(*c*) Holi (*d*) Buddh Purnima

(B) MATCH THE COLUMNS

Column 1	Column 2
(i) New moon	(a) Entire face visible
(ii) Full moon	(b) More than half visible but decreasing
(iii) Waxing cresent	(c) Not visible from Earth
(iv) Waning gibbous	(d) Earth between Sun and Moon
(v) Lunar eclipse	(e) Thin visible part growing

(C) FILL IN THE BLANKS

1. The changing shapes of the Moon that we see from Earth are called _____.
2. The phase when the Moon is not visible from Earth is called _____
3. A full cycle of the Moon's phases takes about _____ days.
4. Festivals like Makar Sakranti follow the _____ calendar.
5. _____ is a student-built satellite launched by ISRO.
6. _____ calendars are based on both lunar months and solar years.
7. The _____ calendar is the most widely used calendar in the world today.
8. In the _____ calendar, an extra month (Adhik Maas) is added to keep festivals aligned with seasons.
9. A lunar eclipse can only occur on a _____ moon night.
10. The phase after the full moon when the visible part starts decreasing is called the _____ moon.

(D) ASSERTION-REASON TYPE QUESTIONS

Directions. *In each of the following questions, a statement of Assertion is given by the corresponding statement of reason. Of the statements, mark the correct answer as:*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) If Assertion is true, but Reason if false.

(d) If Assertion is false, but Reason is true.

1. **Assertion (A):** The Full Moon rises at sunset and sets at sunrise.
   Reason (R): The Full Moon is directly opposite the Sun in the sky.
2. **Assertion (A):** The Moon appears to change shape daily.
   Reason (R): The Earth casts different shadows on the Moon each night.
3. **Assertion (A):** Lunar year is longer than solar year.
   Reason (R): A lunar month has nearly 29.5 days.
4. **Assertion (A):** The Gregorian calendar is a solar calendar.
   Reason (R): Holi falls on the full moon of Phalgun.
5. **Assertion (A):** Artificial satellites orbit around 800 km above the earth's surface.
   Reason (R): The ISRO mission AstroSat helps in weather forecasting.

(E) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. A lunar eclipse occurs when the Moon comes between the Earth and the Sun.
2. We can sometimes see the Moon during the daytime.
3. The Moon always shows the same side to the Earth.
4. During the waning phase, the bright part of the moon grows larger.
5. In the Gregorian calendar, all months have the same number of days.
6. The Hindu calendar (Panchang) is purely solar in nature.
7. The solar calendar considers the time taken by Earth to complete one revolution around the Sun.
8. In a lunar year, there are about 354 days.
9. The shadow is the longest when the sun is at the highest point in the sky.
10. Luni-solar calendars combine elements from both the solar and the lunar calendars.

(F) CASE STUDY QUESTIONS

Case Study I:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Seema and her friends went on a camping trip in the hills. On the first night, they noticed only a thin crescent of the Moon shining in the sky.

Three days later, the group stayed awake late and saw exactly half of the Moon lit up. On the last night of their trip, the Moon appeared fully bright and round. The children were excited because the Full Moon helped light up the campsite without using torches.

Through their trip, the children realized how the moon keeps changing its shape. This was useful to travelers, farmers and even people who follow festivals that depend on the lunar calendar.

Questions:

1. Which phase of the Moon did the children observe on the first night?
2. How many days after the New Moon does the First Quarter usually occur?
3. Which two factors cause the phases of the Moon?
4. Name two festivals which depend on the phases of the Moon.

Case Study II:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Arjun, a farmer in Rajasthan, depends heavily on seasons for growing his crops. He follows the solar calendar, which is based on the Earth's revolution around the Sun. This calendar helps him know the exact months of summer, monsoon and winter.

When Arjun prepares for sowing wheat in November, he checks the solar calendar to mark the change of seasons. Unlike the lunar calendar, which can shift with the Moon's phases, the solar calendar always keeps the seasons fixed with months. That's why many agricultural communities use it to decide the right time for farming.

Questions:

1. Which is the most widely used solar calendar?
2. How many days are there in a solar year?
3. How often does a leap year occur in the solar calendar?
4. Is 2026 a leap year?

12

How Nature Works in Harmony

(A) MULTIPLE CHOICE QUESTIONS

1. Which of the following is an abiotic component of a habitat?
   (*a*) Birds (*b*) Water
   (*c*) Insects (*d*) Trees
2. What is the primary role of decomposers in an ecosystem?
   (*a*) Producing food through photosynthesis
   (*b*) Preying on top carnivores
   (*c*) Consuming only plants
   (*d*) Breaking down dead matter to recycle nutrients
3. In a food chain, which trophic level is occupied by herbivores?
   (*a*) First (*b*) Second
   (*c*) Third (*d*) Fourth
4. What is a likely consequence of overfishing in a pond ecosystem?
   (*a*) Increase in dragonfly population (*b*) Increase in fish population
   (*c*) Decrease in plant seed production (*d*) Increase in water quality
5. The interdependence of many food chains in an ecosystem helps in:
   (*a*) Reducing biodiversity
   (*b*) Increasing stability of the ecosystem
   (*c*) Eliminating decomposers
   (*d*) Making only one species survive
6. Which of the following is a man-made ecosystem?
   (*a*) Forest (*b*) Pond
   (*c*) Grassland (*d*) Agricultural field
7. What does a food web represent?
   (*a*) A single food chain (*b*) Producers in an ecosystem
   (*c*) Network of food chains (*d*) Role of decomposers
8. Identify the correct sequence from smallest to largest.
   (*a*) Ecosystem - Community -Population (*b*) Population - Community - Ecosystem
   (*c*) Community - Population - Ecosystem (*d*) Population - Ecosystem - Community

9. Which of the following represents the correct order in a food chain?
   (*a*) Carnivore → Producer → Herbivore
   (*b*) Producer → Herbivore → Carnivore
   (*c*) Herbivore → Producer → Carnivore
   (*d*) Carnivore → Herbivore → Producer
10. Which statement is true about ecosystems?
   (*a*) Ecosystems include only living organisms.
   (*b*) Ecosystems include only non-living components.
   (*c*) Ecosystems include both living and non-living components.
   (*d*) Ecosystems include only producers and consumers.

(B) MATCH THE COLUMNS

Column 1	Column 2
(i) Mutualism	(a) ticks on dogs
(ii) Parasitism	(b) honeybees and flowers
(iii) Commensalism	(c) green plants
(iv) Saprotrophs	(d) orchids on trees
(v) Autotrophs	(e) fungi on dead leaves

(C) FILL IN THE BLANKS

1. Mangrove forests in _____ protect the coastal areas from storms and floods.
2. The relationship where one organism benefits and the other is not affected is called _____.
3. Several interconnected food chains form a _____.
4. An organism that eats both plants and animals is called an _____.
5. The non-living factors of an ecosystem, like sunlight, air, water and soil, are called _____ components.
6. Bacteria and fungi are examples of _____, which recycle nutrients back into the soil.
7. A pond is an example of a _____ ecosystem.
8. Growing the same crop repeatedly on the same land is called _____.
9. _____ areas help in conserving nature for future generations.
10. Decomposers are also called _____.

(D) ASSERTION-REASON TYPE QUESTIONS

Directions. *In each of the following questions, a statement of Assertion is given by the corresponding statement of reason. Of the statements, mark the correct answer as:*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
(c) If Assertion is true, but Reason if false.
(d) If Assertion is false, but Reason is true.

1. **Assertion (A):** Green plants are called producers in a food chain.
   Reason (R): They prepare food using sunlight through photosynthesis.
2. **Assertion (A):** Decomposers are not essential for the ecosystem.
   Reason (R): They recycle nutrients back into the soil.
3. **Assertion (A):** The removal of frogs from a food chain can increase the grasshopper population.
   Reason (R): Frogs are natural prey of grasshoppers.
4. **Assertion (A):** Use of synthetic fertilizers helped to improve the food production.

Reason (R): Overuse of synthetic chemicals in agriculture is unsustainable.

5. **Assertion (A):** Ecosystems function with both living and non-living components.
   Reason (R): Abiotic factors like sunlight, water and soil are not part of the ecosystem.

(E) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. All ecosystems can function without decomposers.
2. Herbivores occupy the top trophic level in a food chain.
3. Monoculture refers to growing the same crop repeatedly on the same land.
4. Fox is a carnivore.
5. Mutualism means that both the organisms benefit equally.
6. Water, air, sand and sunlight are the abiotic components of an ecosystem.
7. Decomposers like fungi and bacteria are not part of the ecosystem.
8. The sun is the ultimate source of energy for most ecosystems on Earth.
9. A frog eating an insect is an example of a secondary consumer.
10. Corbett National Park is located in Assam.

(F) CASE STUDY QUESTIONS

Case Study I:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

The Sundarbans, spread across India and Bangladesh, is the largest mangrove forest in the world. It is home to the famous Royal Bengal Tiger, spotted deer, crocodiles, snakes and many species of fish and birds. The mangrove trees protect the land from cyclones and floods, while their roots provide shelter for fish and crabs.

In this ecosystem, the food chain begins with mangrove plants and algae (producers). Fish, deer and crabs act as primary consumers, while tigers, crocodiles, and birds of prey are top carnivores. Decomposers like fungi and bacteria recycle nutrients back into the soil and water.

When human activities like deforestation, overfishing, and pollution disturb the Sundarbans, the balance of the ecosystem gets threatened. For example, if fish are overfished, birds and crocodiles lose food, disturbing the food web. If mangroves are cut, soil erosion increases and cyclones cause more damage. Protecting every component — plants, animals and abiotic factors — is necessary to maintain ecological balance in the Sundarbans.

Questions:

1. Which trees form the base of the Sundarbans ecosystem?
2. How do mangroves protect the coastal region?
3. What may happen if fish are overfished in the Sundarbans?
4. Why is it important to protect every component of the ecosystem?

Case Study II:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

In a large grassland, many plants grow naturally and provide food for herbivores like rabbits, deer and grasshoppers. These animals are eaten by predators such as snakes, foxes and hawks. At the top of the chain, lions and eagles act as apex predators.

But in reality, animals eat more than one type of food. For example, a snake may eat both frogs and rabbits, while hawks may feed on snakes or rabbits. These interconnected chains form a food web, which makes the grassland ecosystem more stable.

If one species, like rabbits, decreases drastically due to disease, predators like foxes may shift to other prey, such as deer or grasshoppers, showing how a food web balances energy flow in an ecosystem.

Questions:

1. Give one example of a simple food chain from the grassland.
2. Why is a food web more stable than a single food chain?
3. What might happen if rabbits suddenly decrease in number?
4. Which organisms recycle nutrients in this ecosystem?

13

Our Home – Earth, a Unique Life Sustaining Planet

(A) MULTIPLE CHOICE QUESTIONS

1. Which is the hottest planet in the solar system?
   (*a*) Mercury (*b*) Venus
   (*c*) Mars (*d*) Jupiter
2. Which feature of Earth protects it from harmful cosmic rays and solar wind?
   (*a*) Ozone layer (*b*) Liquid water
   (*c*) Magnetic field (*d*) Geosphere
3. What is a major cause of the triple planetary crisis?
   (*a*) Earth's circular orbit (*b*) Burning fossil fuels
   (*c*) Vegetative propagation (*d*) Presence of ozone
4. What makes the Earth unique for supporting life?
   (*a*) appropriate distance from the Sun. (*b*) presence of liquid water.
   (*c*) strongest magnetic field in the solar system. (*d*) all of the above
5. Habitable zone is also called :
   (*a*) Water zone (*b*) Blue zone
   (*c*) Goldilocks zone (*d*) None of the above
6. The protective blanket of gases that supports life on Earth is called:
   (*a*) Lithosphere (*b*) Hydrosphere
   (*c*) Atmosphere (*d*) Biosphere
7. Which factor protects life on Earth from harmful UV rays of the Sun?
   (*a*) Oxygen layer (*b*) Ozone layer (*c*) Carbon dioxide (*d*) Nitrogen
8. Which of the following is an example of asexual reproduction?
   (*a*) Budding in Hydra (*b*) Binary fission in Amoeba
   (*c*) Vegetative propagation in plants (*d*) All of the above
9. The male gamete in animals is called:
   (*a*) Sperm (*b*) Ovum (*c*) Embryo (*d*) Zygote
10. Melting of polar ice caps is a direct result of:
    (*a*) Air pollution (*b*) Global warming
    (*c*) Soil erosion (*d*) Ozone formation

(B) MATCH THE COLUMNS

Column 1	Column 2
(i) Biosphere	(a) water
(ii) Hydrosphere	(b) CFC's
(iii) Earth	(c) gaseous planet
(iv) Ozone layer	(d) Living beings
(v) Uranus	(e) rocky planet

(C) FILL IN THE BLANKS

1. Earth is called a unique planet because it has _____ water.
2. The _____ layer protects life on Earth from harmful ultraviolet rays.
3. In sexual reproduction, male and female _____ fuse to form a zygote.
4. _____ is the process of transfer of pollen from one flower to another.
5. High energy particles coming from space are called _____ rays.
6. The solid part of the earth including rocks, soil and minerals is called _____.
7. _____ ensures the continuity of life on earth.
8. Gametes carry _____ of the parent's genetic material.
9. After fertilization in plants, the zygote develops into a _____.
10. Climate change, _____ loss and _____ are known as the triple planetary crisis.

(D) ASSERTION-REASON TYPE QUESTIONS

Directions. *In each of the following questions, a statement of Assertion is given by the corresponding statement of reason. Of the statements, mark the correct answer as:*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) If Assertion is true, but Reason if false.

(d) If Assertion is false, but Reason is true.

1. **Assertion (A):** Asexual reproduction leads to variation in offspring.
   Reason (R): Gametes from two parents combine to form a zygote with mixed genetic material.
2. **Assertion (A):** Earth is the only planet in the solar system known to support life.
   Reason (R): Earth's position in the habitable zone allows liquid water to exist.
3. **Assertion (A):** The green-house effect helps in maintaining a suitable temperature on the Earth.
   Reason (R): The Earth has the right size to hold an atmosphere.
4. **Assertion (A):** In sexual reproduction, offspring show variation.
   Reason (R): Sexual reproduction involves fusion of gametes from two parents.
5. **Assertion (A):** Presence of an atmosphere and liquid water are necessary for supporting life.
   Reason (R): The Goldilocks zone is the uninhabitable zone around a star.

(E) STATE TRUE/FALSE TO THE FOLLOWING STATEMENT

1. Climate change is caused by human activities like burning fossil fuels.
2. The greenhouse effect helps maintain Earth's temperature suitable for life.
3. Vegetative propagation is an example of asexual reproduction in plants.

4. Earth has a weak magnetic field.
5. The lithosphere covers about 70 % of the earth's surface.
6. Pollen grains are the male gametes in plants.
7. The fusion of a sperm and an egg leads to the formation of an embryo.
8. The earth looks green from space.
9. Venus has a thick atmosphere that traps heat.
10. The ozone layer protects us from infrared rays of the Sun.

(F) CASE STUDY QUESTIONS

Case Study I:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

Kanika's school organized an awareness campaign on "Save the Ozone Layer." During the campaign, she learned that the ozone layer is a thin shield in the stratosphere that protects life on Earth by blocking harmful ultraviolet (UV) rays from the Sun. Scientists have discovered holes in the ozone layer, especially over Antarctica.

The main cause of ozone depletion is the excessive release of chlorofluorocarbons (CFCs) from refrigerators, air conditioners, and aerosol sprays. When CFCs reach the stratosphere, they break down ozone molecules, thinning the layer. As a result, more UV rays reach the Earth's surface, causing skin cancer, cataracts, reduced crop yield, and harm to marine life.

To reduce ozone depletion, the Montreal Protocol (1987) was signed by many countries to control and phase out CFCs and other harmful chemicals. Today, eco-friendly alternatives are being used in refrigerators and sprays.

Questions:

1. What is the role of the ozone layer in protecting life on Earth?
2. Name two sources of CFCs that damage the ozone layer.
3. Which international agreement was signed to protect the ozone layer?
4. Suggest one eco-friendly practice you can adopt to reduce ozone depletion.

Case Study II:

Answer the questions on the basis of your understanding of the following passage and related studied concepts:

During a science exhibition, Aarav and his friends presented a model showing why Earth is called a unique planet. They explained that life exists on Earth because of certain favorable conditions.

Earth is at the right distance from the Sun, where temperature is suitable for liquid water to exist. The atmosphere contains gases that are essential for breathing, photosynthesis, and maintaining balance in nature. The ozone layer in the stratosphere protects living beings from harmful ultraviolet (UV) rays.

Additionally, the presence of water supports life processes, while the gravitational force of Earth helps hold the atmosphere and water bodies in place. These combined conditions make Earth the only known planet to support life in the Solar System.

Questions:

1. Why is Earth called a unique planet?
2. What is the name given to the zone where water exists as a liquid?
3. Name two gases in the atmosphere that are important for living beings.
4. Which force of Earth helps in holding the atmosphere around it?

ANSWERS

Chapter 1. Exploring the Investigative World of Science

(A) Multiple Choice Questions:

1. (c) **2.** (d) **3.** (c) **4.** (b) **5.** (c) **6.** (b)

(B) Fill in the blanks:

1. hypothesis **2.** microscope **3.** properties **4.** observation **5.** atmospheric

(C) State True/false to the following statement:

1. False **2.** True **3.** True **4.** True **5.** True

Chapter 2. The Invisible Living World- Beyond our Naked Eye

(A) Multiple Choice Questions:

1. (a) **2.** (c) **3.** (c) **4.** (a) **5.** (c) **6.** (c) **7.** (c) **8.** (c) **9.** (a)
10. (c) **11.** (c) **12.** (d)

(B) Match the Columns:

(i) - (c), (ii) - (e), (iii) - (d), (iv) - (a), (v) - (b)

(C) Fill in the blanks:

1. Cytoplasm **2.** carbon dioxide **3.** Fermentation **4.** Chloroplast **5.** Alcohol
6. Ostrich **7.** Nerve **8.** Microalgae **9.** 10,00,000 **10.** lactobacillus

(D) Assertion-Reason Type questions:

1. (c) **2.** (a) **3.** (d) **4.** (b) **5.** (a)

(E) State True/false to the following statement:

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

(F) Case Study Questions:

Case Study I:

1. Lactobacillus **2.** Rhizobium **3.** Cleaning oil spills / Sewage treatment

4. They are "friends" because they help in digestion, nitrogen fixation, food processing, and making medicines. They are "foes" because some bacteria cause diseases like tuberculosis, cholera, and typhoid.

Case Study II:

1. Cell wall

2. Plant cells have chloroplasts to perform photosynthesis, while animals obtain food from external sources, so they don't need chloroplasts.

3. The nucleus is present in both and controls all cell activities.

4. Without chloroplasts, photosynthesis would not occur, and plants could not prepare their own food.

Chapter 3. Health - The Ultimate Treasure

(A) Multiple Choice Questions:

1. (c) **2.** (b) **3.** (b) **4.** (a) **5.** (d) **6.** (b) **7.** (c) **8.** (d) **9.** (a) **10.** (a)

(B) Match the Columns:

(i) - (b), (ii) - (c), (iii) - (a), (iv) - (e), (v) - (d)

(C) Fill in the blanks:

1. Communicable **2.** Immunity **3.** acquired **4.** bacterial **5.** diagnosis, treatment
6. Alexander Fleming **7.** Pathogens **8.** Small pox **9.** Ascariasis **10.** Dengue

(D) Assertion-Reason Type questions:

1. (a) **2.** (d) **3.** (c) **4.** (b) **5.** (c)

(E) State True/false to the following statement:

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

(F) Case Study Questions:

Case Study I:

1. Diabetes, heart disease, obesity
2. Eat a balanced diet with fruits and vegetables, exercise daily, reduce screen time, avoid junk food
3. Because they are caused by lifestyle, genetic, or environmental factors, not by pathogens
4. It strengthens the heart, improves metabolism, helps maintain a healthy weight, and reduces the risk of obesity, diabetes, and heart disease

Case Study II:

1. Vaccines train the immune system to recognize and fight harmful germs. They provide immunity without causing the actual disease.
2. Edward Jenner **3.** Small pox **4.** Vaccinating many children reduced the spread of disease.

Chapter 4. Electricity – Magnetic and Heating Effects

(A) Multiple Choice Questions:

1. (b) **2.** (c) **3.** (a) **4.** (c) **5.** (b) **6.** (d) **7.** (c) **8.** (d) **9.** (c) **10.** (b)

(B) Match the Columns:

(i) - (c), (ii) - (a), (iii) - (e), (iv) - (b), (v) - (d)

(C) Fill in the blanks:

1. poles **2.** magnetic field **3.** electromagnet **4.** stronger **5.** transmission
6. electrodes **7.** positive, negative **8.** electrolyte **9.** lithium-ion **10.** voltaic

(D) Assertion-Reason Type questions:

1. (a) **2.** (d) **3.** (c) **4.** (d) **5.** (a)

(E) State True/false to the following statement:

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

(F) Case Study Questions:

Case Study I:

1. Magnetic effect of current
2. The electromagnet loses its magnetism and drops the cars.
3. Electromagnets can be switched on and off as needed / Their strength can be controlled.
4. Soft iron

Case Study II:

1. Lithium and cobalt
2. Because they can be reused many times, are compact, and provide high energy storage in a small size.
3. Huge amounts of waste cells would be generated, increasing cost and causing environmental problems.
4. Future batteries would be solid state batteries.

Chapter 5. Exploring Forces

(A) Multiple Choice Questions:

1. (c) **2.** (d) **3.** (d) **4.** (b) **5.** (b) **6.** (b) **7.** (c) **8.** (c) **9.** (c) **10.** (b)

(B) Match the Columns:

(i) - (c), (ii) - (d), (iii) - (e), (iv) - (a), (v) - (b)

(C) Fill in the blanks:

1. Muscular **2.** Magnitude **3.** Contact, non-contact **4.** increases **5.** Magnetic
6. buoyant force **7.** weight **8.** Gravitational **9.** static **10.** density

(D) Assertion-Reason Type questions:

1. (a) **2.** (c) **3.** (b) **4.** (c) **5.** (a)

(E) State True/false to the following statement:

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

(F) Case Study Questions:

Case Study I:

1. Magnetic force **2.** Electrostatic force

3. Contact force - Friction between cars and floor.

Non-contact force - Magnetic force (magnet lifting iron)/ Electrostatic force (balloon attracting paper)/ Gravitational force (toy falling).

4. Force is a push or pull acting on an object.

Case Study II:

1. Buoyant force **2.** The buoyant force on the stone is less than its weight.

3. The buoyant force on it was greater than or equal to its weight.

4. Archimedes' Principle

Chapter 6. Pressure, Winds, Storms and Cyclones

(A) Multiple Choice Questions:

1. (c) **2.** (c) **3.** (a) **4.** (a) **5.** (b) **6.** (b) **7.** (d) **8.** (d) **9.** (a) **10.** (c)

(B) Match the Columns:

(i) - (b), (ii) - (c), (iii) - (a), (iv) - (e), (v) - (d)

(C) Fill in the blanks:

1. Lightning conductor **2.** Atmosphere **3.** Lightning **4.** pascal **5.** increase
6. Land **7.** cyclones **8.** eye
9. Indian Meteorological Department **10.** cyclones

(D) Assertion-Reason Type questions:

1. (a) **2.** (d) **3.** (c) **4.** (c) **5.** (b)

(E) State True/false to the following statement:

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

(F) Case Study Questions:

Case Study I:

1. Development of low-pressure areas over warm seas, leading to high-speed winds and moisture circulation.

2. Take shelter in cyclone relief centers / Avoid going near the sea.

3. Because cyclones form over warm seas where evaporation and low-pressure systems are common.

4. They help in early detection and tracking of cyclones, allowing timely warnings and evacuation.

Case Study II:

1. Because the outside atmospheric pressure decreased, creating a pressure difference with the air inside their ears.
2. At low pressure, water boils at a lower temperature, so cooking takes longer.
3. Because the air inside the packet was at higher pressure than the lower atmospheric pressure outside.
4. It decreases

Chapter 7. Particulate Nature of Matter

(A) Multiple Choice Questions:

1. (c) **2.** (b) **3.** (d) **4.** (b) **5.** (c) **6.** (b) **7.** (b) **8.** (c) **9.** (b) **10.** (d)

(B) Match the Columns:

(i) - (c), (ii) - (e), (iii) - (b), (iv) - (a), (v) - (d)

(C) Fill in the blanks:

1. Gases **2.** Solid, Liquid, Gas **3.** boiling point **4.** Liquid **5.** solids, gases
6. volume, shape **7.** Solids, gases **8.** increases, decreases
9. Suspended Particulate Matter **10.** liquids, gases

(D) Assertion-Reason Type questions:

1. (a) **2.** (c) **3.** (c) **4.** (b) **5.** (d)

(E) State True/false to the following statement:

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

(F) Case Study Questions:

Case Study I:

1. Because liquids have a fixed volume but no fixed shape; they take the shape of the container.
2. Because gases are under pressure in the can and escape when opened.
3. Because gas particles have very weak intermolecular forces and move randomly in all directions.
4. Gases

Case Study II:

1. Melting **2.** 100°C **3.** Condensation
4. Because water turns into water vapor (gas) and escapes as bubbles.

Chapter 8. Nature of Matter - Elements, Compounds and Mixtures

(A) Multiple Choice Questions:

1. (b) **2.** (c) **3.** (c) **4.** (a) **5.** (c) **6.** (b) **7.** (d) **8.** (b) **9.** (d) **10.** (b)

(B) Match the Columns:

(i) - (d), (ii) - (c), (iii) - (a), (iv) - (e), (v) - (b)

(C) Fill in the blanks:

1. Atom **2.** Mixtures **3.** Element **4.** Compound **5.** Different
6. Metalloid **7.** 118 **8.** Mercury, bromine **9.** oxygen **10.** gas, liquid

(D) Assertion-Reason Type questions:

1. (c) **2.** (d) **3.** (a) **4.** (b) **5.** (c)

(E) State True/false to the following statement:

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

(F) Case Study Questions:

Case Study I:

1. Because it is made of only one kind of atom. **2.** Because it is a mixture of gold with other metals.

3. Silver or Platinum

4. Alloys are stronger, harder, and more durable than pure elements.

Case Study II:

1. Because it is formed by the chemical combination of hydrogen and oxygen in a fixed ratio.

2. Hydrogen and oxygen combine in a 2:1 ratio.

3. Hydrogen is flammable and oxygen supports burning, but water is a safe liquid with very different properties.

4. Because it is essential for drinking, cooking, farming, electricity production, and survival of living beings.

Chapter 9. The Amazing World of Solutes, Solvents and Solutions

(A) Multiple Choice Questions:

1. (d) **2.** (c) **3.** (b) **4.** (c) **5.** (c) **6.** (b) **7.** (a) **8.** (d) **9.** (b) **10.** (b)

(B) Match the Columns:

(i) - (d), (ii) - (e), (iii) - (b), (iv) - (c), (v) - (a)

(C) Fill in the blanks:

1. Solvent **2.** Concentration **3.** Meniscus **4.** Kilogram **5.** Solubility

6. Volume **7.** Increases **8.** Decreases **9.** Mass **10.** 4°C

(D) Assertion-Reason Type questions:

1. (a) **2.** (c) **3.** (b) **4.** (d) **5.** (d)

(E) State True/false to the following statement:

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

(F) Case Study Questions:

Case Study I:

1. Because ice has less density than water. **2.** By preventing the water below from freezing completely.

3. 4°C **4.** Oil floating on water because oil is less dense than water.

Case Study II:

1. Carbon dioxide (CO_2).

2. Cold temperature increases the solubility of gases, so the drink remains fizzy for longer.

3. It decreases

4. Less oxygen dissolves, which can make it hard for fish to survive.

Chapter 10. Light - Mirrors and Lenses

(A) Multiple Choice Questions:

1. (b) **2.** (b) **3.** (b) **4.** (b) **5.** (b) **6.** (a) **7.** (a) **8.** (a) **9.** (b) **10.** (c)

(B) Match the Columns:

(i) - (d), (ii) - (a), (iii) - (b), (iv) - (e), (v) - (c)

(C) Fill in the blanks:

1. reflection **2.** incidence **3.** path **4.** convex **5.** rear-view

6. erect, laterally **7.** converging **8.** lateral inversion **9.** ray **10.** normal

(D) Assertion-Reason Type questions:

1. (c) **2.** (a) **3.** (d) **4.** (a) **5.** (b)

(E) State True/false to the following statement:

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

(F) Case Study Questions:

Case Study I:

1. Convex mirror is used in vehicles as a rear-view mirror because it provides a wider field of view, allowing the driver to see more traffic behind.
2. A barber prefers a concave mirror while shaving because it gives a magnified and erect image when the face is close to the mirror, making shaving easier.
3. A convex mirror
4. Both a plane mirror and a convex mirror form virtual and erect images (though the sizes differ).

Case Study II:

1. Concave mirror
2. After striking a concave reflector, parallel rays of sunlight converge (meet) at the focus.
3. Focus
4. One advantage of using solar furnaces is that they use renewable solar energy, which is free, eco-friendly, and non-polluting.

Chapter 11. Keeping Time with the Skies

(A) Multiple Choice Questions:

1. (b) **2.** (b) **3.** (c) **4.** (c) **5.** (c) **6.** (c) **7.** (b) **8.** (c) **9.** (d) **10.** (a)

(B) Match the Columns:

(i) - (c), (ii) - (a), (iii) - (e), (iv) - (b), (v) - (d)

(C) Fill in the blanks:

1. phases **2.** new moon **3.** 29.5 **4.** Solar sidereal **5.** AzaadiSat
6. Luni-solar **7.** Gregorian **8.** Luni-solar **9.** Full **10.** Waning

(D) Assertion-Reason Type questions:

1. (a) **2.** (c) **3.** (d) **4.** (b) **5.** (c)

(E) State True/false to the following statement:

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

(F) Case Study Questions:

Case Study I:

1. Waxing Crescent phase. **2.** About 7 days after the New Moon.
3. The Moon's revolution around Earth and the changing positions of the Sun, Earth, and Moon.
4. Eid, Diwali

Case Study II:

1. Gregorian Calendar **2.** 365 days **3.** Every 4 years **4.** No

Chapter 12. How Nature Works in Harmony

(A) Multiple Choice Questions:

1. (b) **2.** (d) **3.** (b) **4.** (a) **5.** (b) **6.** (d) **7.** (c) **8.** (b) **9.** (b) **10.** (c)

(B) Match the Columns:

(i) - (b), (ii) - (a), (iii) - (d), (iv) - (e), (v) - (c)

(C) Fill in the blanks:

1. Sundarbans **2.** Commensalism **3.** Food web **4.** Omnivore **5.** Abiotic
6. Decomposers **7.** Aquatic **8.** Monoculture **9.** Protected **10.** Saprotrophs

(D) Assertion-Reason Type questions:

1. (a) **2.** (d) **3.** (c) **4.** (b) **5.** (c)

(E) State True/false to the following statement:

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

(F) Case Study Questions:

Case Study I:

1. Mangrove trees
2. They protect the land from cyclones and floods and prevent soil erosion.
3. Birds and crocodiles may lose food, disturbing the food web.
4. Because each component is interdependent, and imbalance can collapse the whole ecosystem.

Case Study II:

1. Grass → Grasshopper → Frog → Snake → Hawk
2. Because organisms have multiple food sources, so if one decreases, they can depend on others.
3. Predators like foxes may shift to other prey, e.g., grasshoppers or deer.
4. Decomposers like fungi and bacteria.

Chapter 13. Our Home- Earth, a Unique Life Sustaining Planet

(A) Multiple Choice Questions:

1. (b) **2.** (c) **3.** (b) **4.** (d) **5.** (c) **6.** (c) **7.** (b) **8.** (d) **9.** (a) **10.** (b)

(B) Match the Columns:

(i) - (d), (ii) - (a), (iii) - (e), (iv) - (b), (v) - (c)

(C) Fill in the blanks:

1. Liquid **2.** Ozone **3.** Gametes **4.** pollination **5.** cosmic
6. geosphere **7.** reproduction **8.** half **9.** seed **10.** biodiversity, pollution

(D) Assertion-Reason Type questions:

1. (d) **2.** (a) **3.** (b) **4.** (a) **5.** (c)

(E) State True/false to the following statement:

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

(F) Case Study Questions:

Case Study I:

1. It blocks harmful ultraviolet (UV) rays from the Sun.
2. Refrigerators, air conditioners, and aerosol sprays.
3. Montreal Protocol (1987).
4. Use eco-friendly appliances/sprays, avoid products containing CFCs.

Case Study II:

1. Because it has suitable conditions like air, water, and temperature to support life.
2. Goldilocks Zone **3.** Oxygen and carbon dioxide **4.** Gravitational force