ICSE MODEL ASSESSMENT EXAMINATION

SUBJECT: CHEMISTRY (CHAPTER 4: MATTER)

CLASS VI
SESSION 2026-27

TIME: 2 Hours	MAX. MARKS: 80	NO. OF PAGES: 3	SUBJECT CODE: CHE-04

General Instructions: Answers to this paper must be written on the answer booklet provided separately. First 15 minutes are allotted for reading the question paper. Section A is compulsory (40 Marks). Section B contains descriptive questions (40 Marks).

SECTION A (40 MARKS) — COMPULSORY OBJECTIVE QUESTIONS [40 MARKS]

Q1. Fill in the blanks with appropriate words: [10 × 1 = 10 Marks]

a. Anything that occupies space and has mass is defined as _____.
b. The amount of three-dimensional space occupied by an object is called its _____.
c. The force of attraction between molecules of the same kind is called _____ force.
d. The rapid, random, zig-zag motion of suspended particles in a fluid is called _____ motion.
e. The process of a liquid changing into its gaseous state at a fixed temperature is known as _____.
f. Substances like naphthalene and dry ice undergo _____ directly on heating without forming a liquid state.
g. A chemical compound named _____ is added to LPG cylinders to detect gas leakage easily.
h. Molecules are tightly packed and possess fixed positions in the _____ state of matter.
i. Liquids that do not mix with each other and form distinct separate layers are called _____ liquids.
j. The expansion of a substance upon heating is referred to as _____ expansion.

Q2. State whether the following statements are True or False. Correct the false statements: [10 × 1 = 10 Marks]

a. Heat, light, sound, and shadow are examples of matter because they take up space.
b. Liquids have a definite volume but no definite shape.
c. Gases have the least intermolecular space and strongest intermolecular force of attraction.
d. Brownian motion occurs fastest in solids due to high cohesion between molecules.
e. The boiling point of pure water is 100°C, which is equal to its condensation point.
f. Melting of candle wax is a chemical change, while burning of wax vapor is a physical change.
g. Thermal expansion is maximum in gases and minimum in solids.
h. An atom is the smallest particle of matter that can always exist independently in nature.
i. Evaporation takes place only at a specific temperature called the boiling point.
j. During a physical change, no new substance is formed and chemical composition remains unchanged.

Q3. Select the correct option for each of the following (MCQs): [10 × 1 = 10 Marks]

a. Which of the following entity is NOT classified as matter?
   (i) Air (ii) Water vapour
   (iii) Feelings of affection (iv) Wooden block

b. The state of matter possessing maximum fluidity and compressibility is:
   (i) Solid (ii) Liquid
   (iii) Gas (iv) Plasma

c. 's Gravesande's ring-and-ball experiment is used to demonstrate thermal expansion in:
   (i) Solids (ii) Liquids
   (iii) Gases (iv) Solutions

d. The phenomenon by which fragrance of an incense stick spreads across a room is:
   (i) Sublimation (ii) Diffusion
   (iii) Condensation (iv) Fusion

e. Which pair of liquids is completely miscible in each other?
   (i) Water and Oil (ii) Water and Alcohol
   (iii) Kerosene and Water (iv) Petrol and Water

Q3. MCQs (Continued):

f. Which of the following undergoes direct conversion from solid to vapour on heating?
(i) Ice (ii) Ammonium chloride
(iii) Common salt (iv) Candle wax

g. When pure ice melts into water at 0°C:
(i) Heat energy is released (ii) Temperature increases continuously
(iii) State changes without temperature rise (iv) A new chemical is formed

h. The property of mercury utilized in clinical thermometers is:
(i) High density (ii) Uniform expansion on heating
(iii) High volatility (iv) Sublimation property

i. Brownian motion was explained scientifically in 1905 by:
(i) Robert Brown (ii) Acharya Kanada
(iii) Albert Einstein (iv) Antoine Lavoisier

j. Which of the following represents a chemical change?
(i) Boiling of water (ii) Dissolving sugar in water
(iii) Cooking of raw food (iv) Freezing of water into ice

Q4. Match the terms in Column A with Column B: [10 × 1 = 10 Marks]

Column A	Column B
1. Intermolecular force	(A) Temperature at which liquid changes into solid
2. Freezing point	(B) Spontaneous intermixing of particles of two substances
3. Solid Carbon Dioxide	(C) Force holding molecules of same kind together
4. Diffusion	(D) Commonly known as Dry Ice
5. Cohesive force	(E) Attraction force existing between molecules of matter
6. Evaporation	(F) Ancient Indian philosophy of five basic elements
7. Panch Tatwa	(G) Slow change of liquid to vapour below its boiling point
8. Molecule	(H) Ultimate particle concept formulated by Acharya Kanada
9. Paramanu (Atom)	(I) Process of solid changing into liquid state on heating
10. Fusion	(J) Smallest particle capable of independent existence

SECTION B (40 MARKS) — DESCRIPTIVE & SHORT ANSWER QUESTIONS [ATTEMPT QUESTIONS AS INSTRUCTED]

Q5. Short Answer Questions: [5 × 2 = 10 Marks]

a. Define **matter**. Name two items from daily life that are matter and two entities that are non-matter.
b. Differentiate between an **atom** and a **molecule** with one suitable example of each.
c. Why do solids possess a definite shape and a definite volume? Explain in terms of molecular packing.
d. What is **cohesive force**? How does it explain why rain falls in rounded droplets rather than a fine mist?
e. Why is LPG compressed inside cylinders for domestic cooking? Mention its major property utilized here.

Q6. Give Scientific Reasons for the following: [5 × 2 = 10 Marks]

a. You can store a liquid in an open container, but you cannot store a gas in an open container.
b. When sugar crystals are dissolved in water, the overall level of water does not rise noticeably.
c. The fragrance of perfume spreads throughout a large room within seconds when sprayed in one corner.
d. A rubber band changes its shape when stretched, yet it is classified as a solid.
e. Naphthalene balls kept inside woollen clothes become smaller in size over time without leaving liquid residue.

Q7. Distinguish between the following pairs: [2 × 3 = 6 Marks]

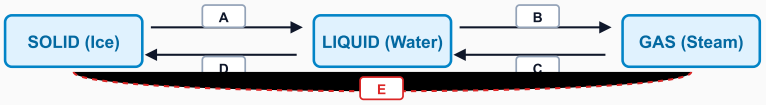
a. **Boiling** and **Evaporation** (Give 3 distinct point-by-point differences).
b. **Physical Change** and **Chemical Change** (Base differences on composition, new substance formation, and reversibility).

Q8. Competency-Based & Diagrammatic Assessment: [2 × 4 = 8 Marks]

Case Study: Interconversion of States of Matter

A student heats ice cubes in a beaker. Ice melts to water at 0°C. On further heating, water boils to form steam at 100°C. Steam collects on a cool metal plate and condenses back to water droplets.

Refer to the Interconversion Scheme below and answer the questions that follow:



a. Identify processes **A, B, C, D** and **E** from the diagram above.

b. State whether the total mass or fundamental chemical composition of water changes during these interconversions. Explain why.

Q9. Activity & Experimental Analysis: [2 × 3 = 6 Marks]

a. **'s Gravesande's Ring-and-Ball Experiment:** Describe observations when a metallic ball is heated and attempted to pass through a metal ring. What conclusion does it prove regarding thermal expansion?

b. **Syringe Compression Test:** Three syringes contain Air, Water, and Sand respectively. When equal force is applied on pistons, what compressibility difference is observed? Explain with molecular reasons.

Q10. Long Answer & Structural Analysis: [2 × 5 = 10 Marks]

a. **Molecular Arrangement:** Draw three neat structural diagrams showing arrangement of molecules in (i) Solid, (ii) Liquid, and (iii) Gas. Compare the three states regarding packing density, intermolecular space, and forces.

b. **Burning of a Candle — Dual Change Analysis:** (i) Identify which part represents a *physical change* and why. (ii) Identify which part represents a *chemical change* and list products formed. (iii) Why is it impossible to recover candle wax from CO_2 and H_2O vapour?

Q11. Higher Order Thinking Skills (HOTS) & Assertion-Reason: [10 Marks]

1. **Assertion (A):** The colour of a substance is a physical property of matter.
   Reason (R): Colour can be observed without changing the basic chemical composition of matter.
   Options: (a) Both A & R true, R is correct explanation. (b) Both A & R true, R is NOT correct explanation. (c) A is true, R is false. (d) A is false, R is true.
2. Electricity and shadow do not occupy space and do not have mass. Can they be categorized as matter? Explain the scientific rationale behind your answer.
3. A glass beaker is filled to the brim with water. When a small stone is dropped into it, water overflows. What two fundamental properties of matter are demonstrated by this activity?

***** END OF QUESTION PAPER *****

Q1. Fill in the blanks Solutions: [10 Marks]

a. **Matter** [1 Mark]
b. **Volume** [1 Mark]
c. **Cohesive** (or Cohesion) [1 Mark]
d. **Brownian** [1 Mark]
e. **Boiling** (or Vaporisation) [1 Mark]
f. **Sublimation** [1 Mark]
g. **Ethyl mercaptan** (or Ethanethiol) [1 Mark]
h. **Solid** [1 Mark]
i. **Immiscible** [1 Mark]
j. **Thermal** [1 Mark]

Q2. True / False with Corrections Solutions: [10 Marks]

a. **False.** *Correction:* Heat, light, sound, and shadow are forms of energy/phenomena and non-matter because they do not have mass or occupy space. [1 Mark]
b. **True.** [1 Mark]
c. **False.** *Correction:* Gases have maximum intermolecular space and weakest intermolecular force of attraction. [1 Mark]
d. **False.** *Correction:* Brownian motion occurs fastest in gases/liquids and is negligible in solids. [1 Mark]
e. **True.** [1 Mark]
f. **False.** *Correction:* Melting of candle wax is a physical change, while burning of wax vapor is a chemical change. [1 Mark]
g. **True.** [1 Mark]
h. **False.** *Correction:* A molecule is the smallest particle that can exist independently; an atom may or may not exist independently. [1 Mark]
i. **False.** *Correction:* Evaporation takes place at any temperature below the boiling point. [1 Mark]
j. **True.** [1 Mark]

Q3. Multiple Choice Questions Solutions: [10 Marks]

a. **(iii) Feelings of affection** [1 Mark]
b. **(iii) Gas** [1 Mark]
c. **(i) Solids** [1 Mark]
d. **(ii) Diffusion** [1 Mark]
e. **(ii) Water and Alcohol** [1 Mark]
f. **(ii) Ammonium chloride** [1 Mark]
g. **(iii) State changes without temperature rise** [1 Mark]
h. **(ii) Uniform expansion on heating** [1 Mark]
i. **(iii) Albert Einstein** [1 Mark]
j. **(iii) Cooking of raw food** [1 Mark]

Q4. Matching Column Solutions: [10 Marks]

[1 Mark for each correct pair]

1. **Intermolecular force** → (E) Attraction force existing between molecules of matter
2. **Freezing point** → (A) Temperature at which liquid changes into solid
3. **Solid Carbon Dioxide** → (D) Commonly known as Dry Ice
4. **Diffusion** → (B) Spontaneous intermixing of particles of two substances
5. **Cohesive force** → (C) Force holding molecules of same kind together
6. **Evaporation** → (G) Slow change of liquid to vapour below its boiling point
7. **Panch Tatwa** → (F) Ancient Indian philosophy of five basic elements
8. **Molecule** → (J) Smallest particle capable of independent existence
9. **Paramanu (Atom)** → (H) Ultimate particle concept formulated by Acharya Kanada
10. **Fusion** → (I) Process of solid changing into liquid state on heating

SECTION B SOLUTIONS — DESCRIPTIVE ANSWERS

Q5. Short Answer Solutions: [10 Marks]

a. **Matter Definition:** Anything that has mass, occupies space, and can be perceived by senses. [1 M] *Examples:* Book, Water. *Non-matter:* Heat, Love. [1 M]

b. **Atom vs Molecule:** Atom is basic unit of element that may/may not exist independently (e.g., H). Molecule is group of bound atoms existing independently (e.g., H_2O). [2 M]

c. **Solid Shape & Volume:** Molecules are tightly packed with strong cohesive forces and negligible spaces. Molecules cannot change positions, giving fixed shape & volume. [2 M]

d. **Cohesive Force & Raindrops:** Cohesive force is attraction between identical molecules. Raindrops form spherical shapes to minimize surface area as water molecules pull inward. [2 M]

e. **LPG Compression:** Compressed into liquid because gases have very large intermolecular spaces and high compressibility, allowing large volumes in compact cylinders. [2 M]

Q6. Scientific Reasons Solutions: [10 Marks]

a. Liquids have definite volume and moderate cohesive force. Gas molecules have negligible attraction and high kinetic energy, escaping open containers. [2 M]

b. Sugar molecules occupy empty *intermolecular spaces* present between liquid water molecules without increasing overall liquid volume. [2 M]

c. Gaseous perfume molecules possess high kinetic energy and move rapidly, diffusing spontaneously into air spaces. [2 M]

d. Rubber band is solid because it regains original shape when deforming force is removed, and structural particles remain tightly bound. [2 M]

e. Naphthalene undergoes *sublimation*, changing directly from solid to gas phase without passing through liquid state. [2 M]

Q7. Differences Solutions: [6 Marks]

a. **Boiling vs Evaporation:** Boiling occurs at fixed boiling point (fast bulk process). Evaporation occurs at any temperature below boiling point (slow surface process causing cooling). [3 M]

b. **Physical vs Chemical Change:** Physical change forms no new substance and is reversible. Chemical change forms new substances and is irreversible. [3 M]

Q8. Diagrammatic & Case Study Solutions: [8 Marks]

a. **Process Identification:** A = Melting, B = Boiling, C = Condensation, D = Freezing, E = Sublimation. [5 M]

b. **Composition Analysis:** No change in mass or chemical composition (H_2O). It is a physical interconversion driven by thermal energy altering intermolecular space. [3 M]

Q9. Experimental Analysis Solutions: [6 Marks]

a. **'s Gravesande's Experiment:** Cold ball passes through ring. When heated, ball expands and cannot pass. Proves solids expand on heating and contract on cooling. [3 M]

b. **Syringe Compression Test:** Air syringe compresses easily; water compresses slightly; sand does not compress. Gases have large spaces, while solids have negligible space. [3 M]

Q10. Long Answer Solutions: [10 Marks]

a. **Molecular States:** Solid (tight grid, strong force, negligible space), Liquid (loosely packed, moderate force & space), Gas (random distant dots, negligible force, large space). [5 M]

b. **Burning Candle:** (i) Melting wax is physical (reversible). (ii) Burning wax vapour is chemical (forms CO_2, H_2O vapour, heat). (iii) Cannot recover wax as bonds broke into new products. [5 M]

Q11. HOTS & Assertion-Reason Solutions: [10 Marks]

1. **Option (a):** Both A and R are true and R is correct explanation of A. [3 M]
2. Electricity and shadow are non-matter as they have no mass and occupy no space (electricity is energy, shadow is light obstruction). [3 M]
3. Demonstrates: (i) Matter occupies space (displaces water). (ii) Two objects cannot occupy the same space simultaneously. [4 M]

END OF ANSWER KEY & EVALUATION SCHEME