

Some Basic Concepts of Chemistry — CBSE Pattern Test 2

Class 11 Chemistry · 90 minutes · 40 marks · Sections A–D with answer key · Narayan Gurukul Academy

Test 2 — CBSE Pattern (90 minutes, 40 marks)

Class 11 Chemistry · Some Basic Concepts of Chemistry · Narayan Gurukul Academy (ClassApna)

General Instructions: (1) This paper has four sections — Section A (1×10), Section B (2×4), Section C (3×4) and Section D (5×2) — total 40 marks. Time allowed: 90 minutes.

(2) All questions are compulsory. No overall choice is given; internal choice, where allowed, is clearly marked.

(3) For MCQ questions choose the single correct option; for VSA answers write a single line.

(4) Take $g = 10 \text{ m/s}^2$. All symbols carry their usual meaning. Use of a calculator is not permitted.

Section A — MCQ & VSA ($10 \times 1 = 10$ marks)

- The law of definite proportions was given by
 - Proust
 - Dalton
 - Gay-Lussac
 - Avogadro
- The molar mass of a substance is the mass of
 - 1 mole of the substance
 - 1 molecule
 - 1 atom
 - 1 dm^3
- The number of molecules in 1 mole of water is
 - 6.022×10^{23}
 - 3.011×10^{23}
 - 1.204×10^{24}
 - 1
- The molecular formula is related to the empirical formula by
 - $n = \text{molecular mass} / \text{empirical formula mass}$
 - $n = \text{empirical formula mass} / \text{molecular mass}$
 - $n = \text{mass} / \text{volume}$
 - $n = 1$
- Molality is defined as the number of moles of solute per
 - kilogram of solvent
 - litre of solution
 - litre of solvent
 - mole of solvent
- In the reaction $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$, the mole ratio of H_2 to NH_3 is
 - 3:2
 - 2:3
 - 1:1
 - 3:1
- Mass percentage is the mass of solute per
 - 100 g of solution

- (B) 100 g of solvent
(C) litre of solution
(D) mole of solution
8. The law of multiple proportions is illustrated by
(A) CO and CO₂
(B) NaCl and KCl
(C) H₂O only
(D) O₂ and O₃ only
9. What is the molar volume of a gas at STP?
10. What is a limiting reagent?

Section B — Short Answer I (4 × 2 = 8 marks)

11. Calculate the number of molecules in 11.2 L of oxygen gas at STP.
12. Calculate the mass of 2.24 L of CO₂ at STP.
13. A compound has empirical formula CH₂O and molar mass 180 g/mol. Find its molecular formula.
14. Calculate the mass of carbon in 1.5 g of glucose (C₆H₁₂O₆).

Section C — Short Answer II (4 × 3 = 12 marks)

15. State and explain the law of definite proportions and the law of multiple proportions with examples.
16. Calculate the mass of CaO formed when 100 g of CaCO₃ decomposes. (CaCO₃ → CaO + CO₂) Explain the stoichiometric calculation.
17. Calculate the mole fraction of ethanol and water in a solution containing 46 g ethanol and 180 g water.
18. Define atomic mass, molecular mass and molar mass with one example each.

Section D — Long Answers (2 × 5 = 10 marks)

19. State the laws of chemical combination. Explain the law of multiple proportions with the example of CO and CO₂, and state Avogadro's law.
20. Define molarity, molality and mole fraction. Calculate the molarity of a solution prepared by dissolving 4 g of NaOH in enough water to make 250 mL of solution.

Answer Key (Marking Scheme)

- Q1 — (A) Proust. Q2 — (A) 1 mole of the substance. Q3 — (A) 6.022×10^{23} . Q4 — (A) $n = \text{molecular mass} / \text{empirical formula mass}$.
- Q5 — (A) kilogram of solvent. Q6 — (A) 3:2. Q7 — (A) 100 g of solution. Q8 — (A) CO and CO₂.
- Q9 — 22.4 L at STP.
- Q10 — The reactant that is completely consumed and decides the amount of product formed.
- Q11 — $0.5 \text{ mol} = 3.011 \times 10^{23}$ molecules.
- Q12 — $0.1 \text{ mol} = 4.4 \text{ g}$.
- Q13 — $n = 180/30 = 6$, so C₆H₁₂O₆.
- Q14 — C fraction = $72/180 = 0.4$; $0.4 \times 1.5 = 0.6 \text{ g}$.
- Q15 — See notes.

Q16 — 1 mol CaCO_3 (100 g) $\rightarrow$ 1 mol CaO (56 g), so 56 g CaO .

Q17 — 1 mol ethanol, 10 mol water; $x(\text{ethanol}) = 0.1$, $x(\text{water}) = 0.9$.

Q18 — See notes.

Q19 — See notes; CO and CO_2 illustrate small whole-number mass ratios of oxygen.

Q20 — $4/40 = 0.1$ mol in 0.25 L = 0.4 M.