Class 12 – Chemistry
Chapter: Solutions

Time: 2 Hours Maximum Marks: 35

Section A – MCQs and Very Short Answer (1 mark each)

1. The unit of molality is:
A. mol L^{-1}
B. mol kg^{-1}
C. g L^{-1}
D. g mol^{-1}

2. Which concentration unit is independent of temperature?
A. Molarity
B. Normality
C. Molality
D. Formality

3. Raoult's law is applicable to:
A. Non-ideal solutions
B. Ideal solutions
C. Electrolytes only
D. Gases only

Assertion–Reason Questions
Choose the correct option:

- (A) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (B) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (C) Assertion is true but Reason is false.
- (D) Assertion is false but Reason is true.

4. Assertion Molarity of a solution decreases with increase in temperature
Reason Volume of solution increases with increase in temperature.

5. Assertion: Aquatic animals are more comfortable in cold water than warm water.
Reason: Solubility of gases in liquids increases with increase in temperature.

6. Assertion: Addition of non-volatile solute lowers vapour pressure of solvent.
Reason: Number of solvent molecules escaping from surface decreases.

7. What is colligative property?

Section B – Short Answer (2 marks each)

8. Write the differences between molarity and molality.
9. Explain hypertonic and hypotonic solutions with examples.
10. Write two examples of solid solutions.
11. State Raoult's Law for volatile liquids.
12. What are the four colligative properties of dilute solutions?
13. Why is molality preferred over molarity in colligative property calculations?

Section C – Short Answer (3 marks each)

14. Explain vapor pressure lowering with diagram. **Or**
Calculate the osmotic pressure in pascals exerted by a solution prepared by dissolving 1.0 g of polymer of molar mass 185,000 in 450 mL of water at 37°C.

15. State Henry's Law and write its mathematical expression.

16. How many mL of 0.1 M HCl are required to react completely with 1 g mixture of Na_2CO_3 and $NaHCO_3$ containing equimolar amounts of both?

17. What is abnormal molar mass? Explain the role of van't Hoff factor. **Or**
Amongst the following compounds, identify which are insoluble, partially soluble and highly soluble in water?
(i) phenol (ii) toluene (iii) formic acid (iv) ethylene glycol (v) chloroform
(vi) pentanol.

Section D – Long Answer (4 marks each)

18. Explain Elevation of boiling point. How Molar mass of a solute is calculated? **Or**

What are minimum and maximum boiling azeotropes? Explain with examples.