

Teacher's Name	I	II	III	IV	V
Kiran Sharma	10 EVS	10 MATHS	10 EVS	10 ENG	

1st Monday Unit Test Chemistry 2026

Time : 1 hour.

M. marks: 30

NOTE : ANSWER THE FOLLOWING QUESTIONS

- When and why is molality preferred over molarity in handling solutions in chemistry. (1)
- Which solution has higher concentration, 1 molar or 1 molal solution of the same solute? Give reason. (1)
- Give reasons for the following :
 - Why oxygen mixed with helium is used by deep sea divers ?
 - Aquatic species are more comfortable in cold water than warm water.
 - At higher altitudes, people suffer from anoxia resulting in inability to think. (1+1+1)
- (a) Two liquids A and B on mixing produce a warm solution. Which type of deviation from Raoult's law show ?
 (b) Why does a solution of ethanol and cyclohexane show positive deviation from Raoult's law ? (1+1)
- After removing the outer shell of two eggs in dil. HCl, one is placed in distilled water and the other is placed in a saturated solution of NaCl. What will you observe and why ? (1+1)
- What is de-icing agent ? How does it work ? (1+1)
- Explain why equimolar aqueous solutions of sodium chloride and sodium sulphate are not isotonic? *they produce different total concentrations of dissolved particles*
- What type of azeotropic mixture will be formed by a solution of acetone and chloroform ? Justify it on the basis of strength of intermolecular interactions that develop in the solution. (1/2 + 1/2) *dissociation in different*
- (a) What is the effect of temperature on the solubility of glucose in water? (1)
 (b) Ibrahim collected a 10 mL each of fresh water and ocean water. He observed that one sample labeled 'P' froze at 0°C while the other 'Q' at -1.3°C. Ibrahim forgot which of two, P or 'Q' was ocean water. Help identify which container contains ocean water, giving rationalization for your answer. (1)
 (c) Calculate Van't Hoff factor for an aqueous solution of $K_3[Fe(CN)_6]$ if the degree of dissociation is 0.8. What will be boiling point of this solution if its concentration is 1 molal ? ($K_b = 0.52 \text{ K}\cdot\text{kg/mol}$). (3)
 $i = 1 + 3\alpha = 1 + 3 \times 0.8 = 3.4$
 $\Delta T_b = i K_b m = 3.4 \times 0.52 \times 1 = 1.768$
 $T_b = 100 + 1.768 = 101.768^\circ\text{C}$
- (a) What type of deviation from Raoult's Law is expected when phenol and aniline are mixed with each other? What change in the net volume of the mixture is expected? Graphically represent the deviation.
 (b) The vapour pressure of pure water at a certain temperature is 23.80 mm Hg. If 0.1 mole of a non-volatile non-electrolytic solute is dissolved in 100 g water, calculate the resultant vapour pressure of the solution.

Case Based Questions

CASE : Colligative properties depend upon the number of particles of the solute present in a definite amount of the solvent. The calculation of molecular masses of solutes which do not undergo any association or association in the solution is simple. However if a solute undergoes dissociation or association in the in the solution, number of particles increases in the former case and decreases in the latter case.

$$p_A = p_A^0 \cdot x_A$$

$$= 23.80 \times 0.982$$

$$\frac{5.56}{5.61}$$