PRACTICE PAPER CHEMISTRY
UNIT- II (SOLUTIONS)

Subject: Chemistry **Class: XII**
TIME: 1: Hour **Max. Marks: 20**

Note: There are **09** questions in this question paper with internal choice. Q. No. 1-2 consist of multiple-choice questions carrying 1 mark each. Q. No. 3-4 consist of Assertion and Reason questions carrying 1 mark each. Q. No. 5-6 consist of very short answer questions carrying 2 marks each. Q. No. 7 consists of short answer questions carrying 3 marks each. Q. No. 8 consists of case- based questions carrying 4 (1+1+1+1) marks. Q. No. 9 consists of long answer questions carrying 5 marks each.

S.No.	Questions	Marks
1.	Arrange the following aqueous solutions in the order of their increasing boiling points. (i) 10^{-4} M NaCl (ii) 10^{-4} M Urea (iii) 10^{-3} M $MgCl_2$ (iv) 10^{-2} M NaCl (a) (i) < (ii) < (iv) < (iii) (b) (ii) < (i) = (iii) < (iv) (c) (ii) < (i) < (iii) < (iv) (d) (iv) < (iii) < (i) = (ii)	1
2.	What are the conditions for an ideal solution which obeys Raoult's law over the entire range of concentration? (a) $\Delta_{mix}H = 0$, $\Delta_{mix}V = 0$, $P_{total} = P_A^0 x_A + P_B^0 x_B$ (b) $\Delta_{mix}H$= +ve, $\Delta_{mix}V = 0$, $P_{total} = P_A^0 x_A + P_B^0 x_B$ (c) $\Delta_{mix}H = 0$, $\Delta_{mix}V$ = +ve, $P_{total} = P_A^0 x_A + P_B^0 x_B$ (d) $\Delta_{mix}H = 0$, $\Delta_{mix}V = 0$, $P_{total} = P_B^0 x_B$	1
	In the following questions one mark each (Q. No. 3-4) a statement of **Assertion (A)** followed by a statement of **Reason (R)** is given. Choose the correct answer out of the following choices. (i) A and R both are correct statements and R is the correct explanation for A. (ii) A and R both are correct statements and R is not correct explanation for A. (iii) A is correct statement but R is wrong statement. (iv) A is wrong statement but R is correct statement.	
3.	**Assertion (A):** Isotonic solutions must have the same molar concentrations. **Reason (R):** Solutions which have the same osmotic pressure at the same temperature are known as isotonic solutions.	1
4.	**Assertion (A):** An increase in surface area increases the rate of evaporation. **Reason (R):** Stronger the inter-molecular attractive forces, faster is the rate of evaporation at a given temperature.	1
5.	State Henry's law and mention two of its important applications. OR State Raoult's law for the solution containing volatile components. What is the similarity between Raoult's law and Henry's law.	2
6.	Give reasons for the following: (i) Elevation in boiling point of 1 m KCl solution is nearly double than that of 1 m sugar solution. (ii) Aquatic animals are more comfortable in cold water than in warm water.	2

7.	(i) What is osmotic pressure and how is it related with the molecular mass of the non-volatile solution? (ii) Write two advantages of osmotic pressure method over boiling point elevation method for determining molecular masses. OR (i) Define reverse osmosis. (ii) What happens when a peeled egg is placed in a 10% aqueous solution of NaCl? (iii) Why do mechanics suggest to add coolant in car radiators instead of pure water?	3
8.	**Case study-based questions** Read the passage given below and answer the following questions: Boiling point elevation describes the phenomenon that boiling point of a liquid (a solvent) will be higher when another compound is added, which means a solution has higher boiling point than a pure solvent. This happens whenever a non-volatile solute such as salt is added to pure solvent such as water. For example, the addition of 3g of a substance to 100 g CCl_4 (M = 154 g mol^{-1}) raises the boiling point of CCl_4 by 0.60^0C, K_b (CCl_4) is 5.03 K kg mol^{-1}. Given: K_f (CCl_4) = 31.8 K kg mol^{-1} and density (ρ) of solution = 1.64 g cm^{-3}. The following questions are multiple choice questions. Choose the most appropriate answer. (i) The molality of solution is (a) 0.12 mol kg^{-1} (b) 0.21 mol kg^{-1} (c) 0.01 mol kg^{-1} (d) 2.10 mol kg^{-1} (ii) The freezing point depression of the solution is (a) 2.196 K (b) 3.816 K (c)3.00 K (d) 4.126 K (iii) What will be the molar mass (g mol^{-1}) of substance? (a) 350 (b) 150 (c) 300 (d) 250 (iv) For the given solution, the relative lowering of vapour pressure is (a) 0.01814 (b) 0.02210 (c)1.0210 (d) 1.512 OR At 298 K, the osmotic pressure of solution is (a) 4.002 atm (b) 4.669 atm (c)5.105 atm (d) 3.253 atm	4
9.	(i) What mass of NaCl must be dissolved in 65.0 g of water to lower the freezing point of water by $7.50\ ^0$C? The freezing point depression constant (K_f) for water is $1.86\ ^0$C/m. Assume Van't Hoff factor for NaCl is 1.87. (Molar mass of NaCl = 58.5 g mol^{-1}) (ii) An aqueous solution containing 12.48 g of $BaCl_2$ in 1.0 Kg of water boils at 373.0832 K. Calculate the degree of dissociation of $BaCl_2$. [Given K_b for water = 0.52 K kg mol^{-1}; Molar mass of $BaCl_2$ = 208.34 g mol^{-1}] OR (i) Calculation the freezing point of an aqueous solution containing 10.50 g of $MgBr_2$ in 200 g of water. (Molar mass of $MgBr_2$ = 1.84 g mol^{-1}, K_f for water = 1.86 K kg mol^{-1}) (ii) 3.9 g of benzoic acid dissolved in 49 g of benzene shows a depression in freezing point of 1.62 K. Calculate the Van't Hoff factor and predict the nature of solute (associated or dissociated). [Given: Molar mass of benzoic acid = 122 g mol^{-1}, K_f for benzene = 4.9 K kg mol^{-1}]	5