

SOLUTION –II PUC

- On dissolving sugar in water at room temperature solution feels cool to touch. Under which of the following cases dissolution of sugar will be most rapid?
a) Sugar crystals in cold water b) Sugar crystals in hot water
c) Powdered sugar in cold water d) Powdered sugar in hot water
- A beaker contains a solution of substance 'A'. Precipitation of substance 'A' takes place when small amount of 'A' is added to the solution. The solution is
a) saturated b) supersaturated c) unsaturated d) concentrated
- Considering the formation, breaking and strength of hydrogen bond, predict which of the following mixtures will show a positive deviation from Raoult's law?
a) Methanol and acetone b) Chloroform and acetone
c) Nitric acid and water d) Phenol and aniline
- Which of the following aqueous solutions should have the highest boiling point?
a) 1.0 M NaOH b) 1.0 M Na₂SO₄ c) 1.0 M NH₄ NO₃ d) 1.0 M KNO₃
- In comparison to a 0.01 M solution of glucose, the depression in freezing point of a 0.001 M MgCl₂ solution is
a) the same b) about twice
c) about three times d) about six times
- At a given temperature, osmotic pressure of a concentrated solution of a substance
a) is higher than the at a dilute solution
b) is lower than that of a dilute solution
c) is same as that of a dilute solution
d) cannot be compared with osmotic pressure of dilute solution
- The value of Henry's constant K_H is
a) greater for gases with higher solubility b) greater for gases with lower solubility
c) constant for all gases d) not related to the solubility of gases
- If two liquids A and B form minimum boiling azeotrope at some specific composition then
a) A – B interactions are stronger than those between A – A or B – B
b) Vapour pressure of solution increases because more number of molecules of liquids A and B can escape from the solution
c) vapour pressure of solution decreases because less number of molecules of only one of the liquids escape from the solution
d) A – B interactions are weaker than those between A – A or B – B
- K_H values for Ar_(g), CO_{2(g)}, HCHO_(g) and CH_{4(g)} are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively. Arrange these gases in the order of their increasing solubility.
a) HCHO < CH₄ < CO₂ < Ar b) HCHO < CO₂ < CH₄ < Ar
c) Ar < CO₂ < CH₄ < HCHO d) Ar < CH₄ < CO₂ < HCHO

10. How many grams of cane sugar are present in 534.2 g of its aqueous solution having molality 0.2?
 a) 3.42 b) 34.2 c) 18 d) 1.8
11. What weight of glucose dissolved in 100 g of water will produce the same lowering of vapour pressure as one gram of urea dissolved in 50 g of water, at the same temperature?
 a) 3 g b) 5 g c) 6 g d) 4 g
12. Lowering of vapor pressure due to a solute in 1 molal aqueous solution at 100° C is
 a) 13.43 torr b) 14.12 torr c) 312 torr d) 352 torr
13. The relative lowering of the vapor pressure of an aqueous solution containing a non-volatile solute is 0.0125. The molality of the solution is
 a) 0.70 b) 0.50 c) 0.80 d) 0.40
14. Mole fraction of A vapours above the solution in mixture of A and B ($x_A = 0.4$) will be (Given: $p_A^0 = 100$ mm Hg and $p_B^0 = 200$ mm Hg)
 a) 0.4 b) 0.8 c) 0.25 d) 2.5
15. 1.0 molal aqueous solution of an electrolyte A_2B_3 is 60% ionized. The boiling point of the solution at 1 atm is ($K_{b(H_2O)} = 0.52$ K kg mol⁻¹)
 a) 274.76 K b) 377 K c) 376.4 K d) 374.76 K
16. The ebullioscopic constant for water if its enthalpy of vaporization is 40.685 kJ mol⁻¹ is
 a) 0.512 K kg mol⁻¹ b) 1.86 K kg mol⁻¹
 c) 5.12 K kg mol⁻¹ d) 3.56 K kg mol⁻¹
17. In which of the following cases osmosis takes place, if the solutions are separated by a semi permeable membrane
 a) 0.1 M NaCl and 0.2 M glucose. b) 0.1 M sucrose and 0.1 M fructose
 c) 0.05 M $K_4[Fe(CN)_6]$ and 0.1 M $CaCl_2$ d) 10^{-3} M $CaCl_2$ and 1.5×10^{-3} M NaCl
18. If the observed and normal osmotic pressures of 1% NaCl solution are 5.7 and 3.0 atm, the degree of dissociation of NaCl is
 a) 0.9 b) 1.0 c) 0.57 d) 0.3
19. If in a solvent, n simple molecules of solute combine to form an associated molecule, x is the degree of association, the van't Hoff factor i is equal to
 a) $\frac{1}{1 - nx}$ b) $\frac{1 - x + nx}{1}$
 c) $\frac{1 - x + x/n}{1}$ d) $\frac{x/n - 1 + x}{1}$
20. A sample of 20 g of a compound (Mol. Wt. = 120) which is a non-electrolyte is dissolved in 10.0 g of ethanol (C_2H_5OH). If the vapor pressure of pure ethanol at the temperature is 0.250 atm. What is the vapor pressure of the solution?
 a) 0.250 atm b) 0.83 atm c) 0.125 atm d) 0.141 atm

21. The vapor pressure in mm of Hg of an ideal solution of A and B at 25^o C is given by $p_{AB} = 33x + 94$, whereas that of an ideal solution of A and C at 25^o C is given by $p_{AC} = 81x + 46$; x being mole fraction of A in the solution. The vapour pressure of solution containing 2 mol A, 3 mol B and 4 mol of C will be
 a) 80 b) 90 c) 100 d) 70
22. The vapour pressure of a solution of a non-volatile electrolyte B in a solvent A is 95% of the vapour pressure of the solvent at the same temperature. If the molecular weight of the solvent is 0.3 times the molecular weight of solute, the weight ratio of the solvent and solute are
 a) 0.15 b) 5.7 c) 0.2 d) 4.0
23. Equimolal solutions of A and B show depression in freezing point in the ratio 2:1. If A remains in its normal state in solution, then B will be in which state
 a) normal b) dissociated c) associated d) hydrolysis
24. 20 g of a binary electrolyte AB (Mol. Wt. = 100) are dissolved in 500 g of water ($K_f = 1.86$). The freezing point of the solution is -0.74^o C. The degree of ionization of the electrolyte is
 a) 50% b) 75% c) 10% d) 0%
25. A solution containing 28 g phosphorous in 315 g CS₂ (b.p. = 46.3^o C) boils at 47.9^o C ($K_{b(CS_2)} = 2.34$). What will be molecular formula of phosphorus? (Assuming complete association.)
 a) P₄ b) P₈ c) P₂ d) none
26. An aqueous solution of a solute which neither associates nor dissociates has a freezing point depression of X^oC. An equimolal solution of a second salt has a freezing point depression of 3X^oC. Assuming 100% dissociation of salt, the second solution could be a salt of formula
 a) AB₃ b) AB₂ c) A₃B d) A₂B₃
27. When mercuric iodide is added to the aqueous solution of potassium iodide, the
 a) freezing point is raised b) freezing point is lowered
 c) freezing point does not change d) cannot predict
28. The weight of urea dissolved in 100 mL solution which produce an osmotic pressure of 20.4 atm at 25^o C, will be
 a) 5 g b) 4 g c) 3 g d) 6 g
29. If the van't Hoff factor of a 0.005 M aqueous solution of KCl is 1.95, then the degree of dissociation of KCl is
 a) 0.95 b) 0.97c c) 0.94 d) 0.96
30. If solute undergoes dimerization and trimerization, the minimum values of the van't Hoff factors are
 a) 0.50 and 1.50 b) 1.50 and 1.33 c) 0.50 and 0.33 d) 0.25 and 0.67

31. The values of observed and calculated molecular mass of $\text{Ca}(\text{NO}_3)_2$ are 65.4 and 164 respectively. What is the degree of ionization of the salt?
 a) 0.25 b) 0.30 c) 0.60 d) 0.75
32. A compound X undergoes tetramerization in a given organic solvent. The van't Hoff factor is
 a) 4.0 b) 0.25 c) 0.125 d) 2.0
33. The values of observed and calculated formula mass of silver nitrate are 92.64 and 170 respectively. The degree of dissociation of silver nitrate is
 a) 60% b) 83.5% c) 46.7% d) 60.23%
34. Osmotic pressure of blood is 7.65 atm at 310 K. An aqueous solution of glucose that will be isotonic with blood is (w/V).
 a) 5.41% b) 3.54% c) 4.53% d) 53.4%
35. 20 g of a binary electrolyte (Mol. Wt. = 100) is dissolved in 500 g of water. The freezing point of the solution is -0.74°C , $k_f = 1.86\text{ K m}^{-1}$. The degree of ionization of the electrolyte is
 a) 50% b) 75% c) 100% d) 0
36. 1.0 molal aqueous solution of an electrolyte X_3Y_2 is 25% ionized. The boiling point of the solution is (K_b for $\text{H}_2\text{O} = 0.52\text{ K kg mol}^{-1}$)
 a) 375.5 K b) 374.04 K c) 377.12 K d) 373.25 K
37. NaCl is added to 1 L water to such an extent that $\Delta t_f/K_f$ becomes equal to 1/500. The weight of NaCl added is
 a) 5.85 g b) 0.585 g c) 0.0585 g d) 58.5 g
38. The vapour pressure of a solvent decreased by 10 mm Hg when a non-volatile solute was added to the solvent. The mole fraction of solute in solution is 0.2, what would be mole fraction of the solvent if decrease in vapor pressure is 20 mm of Hg.
 a) 0.8 b) 0.6 c) 0.4 d) 0.2
39. The degree of dissociation of $\text{Ca}(\text{NO}_3)_2$ in dilute aqueous solution containing 7 g of the salt per 100 g of water at 100°C is 70%. If the vapor pressure of water at 100°C is 760 mm Hg. The vapour pressure of the solution is
 a) 746.3 mm Hg b) 1492.6 mm Hg
 c) 373.2 mm Hg d) 74.63 mm Hg
40. The vapour pressures of ethanol and methanol are 42.0 mm Hg and 88.5 mm Hg respectively. An ideal solution is formed at the same temperature by mixing 46.0 g of ethanol with 16.0 of methanol. The mole fraction of methanol in the vapour is
 a) 9.467 b) 0.502 c) 0.513 d) 0.556
41. Which of the following azeotropic solutions has the boiling point less than boiling points of the constituents A and B?
 a) CHCl_3 and CH_3COCH_3 b) $\text{CHCl}_3 + \text{C}_6\text{H}_6$
 c) $\text{CH}_3\text{CH}_2\text{OH}$ and CH_3COCH_3 d) $\text{CH}_3\text{COCH}_3 + \text{C}_6\text{H}_5\text{NH}_2$

