DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : CHEMISTRY**
DATE : **DPP No. : 3**

Topic :-SOLUTIONS

1. A 5.2 molal aqueous solution of methyl alcohol, CH_3OH, is supplied. What is the mole fraction of methyl alcohol in the solution?
   a) 1.100 b) 0.190 c) 0.086 d) 0.050

2. Equal masses of methane and oxygen are mixed in an empty container at 25°C. The fraction of the total pressure exerted by oxygen is
   a) $\frac{2}{3}$ b) $\frac{1}{3} \times \frac{273}{298}$ c) $\frac{1}{3}$ d) $\frac{1}{2}$

3. Two liquids X and Y form an ideal solution. The mixture has a vapour pressure of 400 mm at 300 K when mixed in the molar ratio of 1:1 and a vapour pressure of 350 mm when mixed in the molar ratio of 1:2 at the same temperature. The vapour pressures of the two pure liquids X and Y respectively are
   a) 250 mm, 550 mm b) 350 mm, 450 mm c) 350 mm, 700 mm d) 550 mm, 250 mm

4. The van't Hoff factor(i) for a dilute aqueous solution of Na_2SO_4 is :
   a) $1 + \alpha$ b) $1 - \alpha$ c) $1 + 2\alpha$ d) $1 - 2\alpha$

5. p_A and p_B are the vapour pressure of pure liquid components A and B respectively of an ideal binary solution. If xA represents the mole fraction of component A, the total pressure of the solution will be :
   a) $p_B + x_A(p_B - p_A)$ b) $p_B + x_A(p_A - p_B)$ c) $p_A + x_A(p_B - p_A)$ d) $p_A + x_A(p_A - p_B)$

6. Formation of a solution from two components can be considered as
   (1) pure solvent → separated solvent molecules, ΔH_1
   (2) pure solute → separated solvent molecules, ΔH_2
   (3) separated solvent and solute molecules → solution, ΔH_3
   Solution so formed will be ideal if
   a) $\Delta H_{soln} = \Delta H_1 - \Delta H_2 - \Delta H_3$ b) $\Delta H_{soln} = \Delta H_3 - \Delta H_1 - \Delta H_2$
   c) $\Delta H_{soln} = \Delta H_1 + \Delta H_2 + \Delta H_3$ d) $\Delta H_{soln} = \Delta H_1 + \Delta H_2 - \Delta H_3$

7. Azeotropic mixture of HCl and water has
   a) 48% HCl b) 22.2% HCl c) 36% HCl d) 20.2% HCl

8. What is the molarity of H_2SO_4 solution that has a density 1.84 g/cc at 35°C and contains 98% solute by weight?
   a) 4.18 M b) 1.84 M c) 8.41 M d) 18.4 M

9. The osmotic pressure of 0.2 molar solution of urea at 27°C (R=0.082 L atm $mol^{-1}K^{-1}$)is
   a) 4.92 atm b) 1 atm c) 0.2 atm d) 27 atm

10. In which ratio of volume 0.4 M HCl and 0.9 M HCl are to be mixed such that the concentration of the resultant solution becomes 0.7 M ?
    a) 4 : 9 b) 2 : 3 c) 3 : 2 d) 1 : 1

11. The empirical formula of a nonelectrolyte is CH_2O. A solution containing 3 g of the compound exerts the same osmotic pressure as that of 0.05 M glucose solution. The molecular formula of the compound is
    a) CH_2O b) $C_2H_4O_2$ c) $C_4H_8O_4$ d) $C_3H_6O_3$

12. Which of the following can be measured by the Ostwald-Walker dynamic method?
    a) Relative lowering of vapour pressure b) Lowering of vapour pressure
    c) Vapour pressure of the solvent d) All of the above

13. On shaking 10 mL of 0.1 molar solution of an organic compound in water with 10 mL of CCl_4 til equilibrium is attained, concentration of the organic compound in water would be $(K = 9)$ in molar units :
    a) 0.01 b) 0.09 c) 0.001 d) 0.009

14. A solution containing 1.8 g of a compound (empirical formula CH_2O) in 40 g of water is observed to freeze at $-0.465°C$. The molecular formula of the compound is
    ($K_f\ of\ water = 1.86\ kg\ K\ mol^{-1}$)
    a) $C_2H_4O_2$ b) $C_3H_6O_3$ c) $C_4H_8O_4$ d) $C_6H_{12}O_6$

15. For dilute solution Raoult's law states that
    a) The relative lowering of vapour pressure is equal to mole fraction of solute
    b) The lowering of vapour pressure is equal to the mole fraction of solute
    c) The vapour pressure of the solution is equal to mole fraction of the solvent
    d) The relative lowering of vapour pressure is proportional to amount of solute in solution

16. For an ideal binary liquid solution with $P_A^0 > P_B^0$ which relation between X_A (mole fraction of A in liquid phase) and Y_A (mole fraction of A in vapour phase) is correct, X_B and Y_B are mole fraction of B in liquid and vapour phase respectively :
    a) $X_A = Y_A$
    b) $X_A > Y_A$
    c) $\frac{X_A}{X_B} < \frac{Y_A}{Y_B}$
    d) X_A,Y_A,X_B and Y_B cannot be corelated

17. The normality of 2.3 M H_2SO_4 solution is
    a) 4.6 N b) 5.6 N c) 6.6 N d) 7.6 N

18. The molecular weight of NaCl determined by studying freezing point depression of its 0.5% aqueous solution is 30. The apparent degree of dissociation of NaCl is
    a) 0.60 b) 0.50 c) 0.30 d) 0.95

19. A 5 molar solution of H_2SO_4 is diluted from 1 L to 10 L. What is the normality of the solution?
    a) 0.25 N b) 1 N c) 2 N d) 7 N

20. 100 mL of water and 50 mL ether mixture is shaken with succinic acid. At equilibrium ether layer contains 0.127 g and water layer contains 1.843 g of succinic acid. The partition coefficient of succinic acid in favour of water is :
    a) 7.26 b) 10 c) 2 d) 4.5