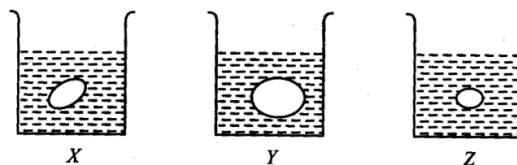


- Among the following substance the lowest vapour pressure is exerted by.
 - Water
 - Alcohol
 - Ether
 - Mercury
- What will be the molarity of 30 mL of 0.5M H_2SO_4 solution diluted to 500 mL
 - 0.3M
 - 0.03M
 - 3M
 - 0.103M
- A solution is obtained by mixing 200 g of 30% and 300 g of 20% solution by weight. What is the percentage of solute in the final solution
 - 50%
 - 28%
 - 64%
 - 24%
- How many Na^+ ions are present in 100 mL of 0.25M of NaCl solution
 - 0.025×10^{23}
 - 1.505×10^{22}
 - 15×10^{22}
 - 2.5×10^{23}
- What will be the mole fraction of ethanol in a sample of spirit containing 85% ethanol by mass
 - 0.69
 - 0.82
 - 0.85
 - 0.60
- The density of a solution prepared by dissolving 120 g of urea (mol. Mass = 60 u) in 1000 g of water is 1.15 g/mL the molarity of this solution is
 - 1.78M
 - 1.02M
 - 2.05M
 - 0.50M
- How much oxygen is dissolved in 100 mL water at 298 K if partial pressure of oxygen is 0.5 atm and $K_H = 1.4 \times 10^{-3} \text{ mol/L/atm}$
 - 22.4mg
 - 22.4g
 - 2.24g
 - 2.24mg
- For an ideal solution with $P_A > P_B$ which of the following is true.
 - $(X_A)_{liquid} = (X_A)_{vapour}$
 - $(X_A)_{liquid} > (X_A)_{vapour}$
 - $(X_A)_{liquid} < (X_A)_{vapour}$
 - $(X_A)_{liquid}$ and $(X_A)_{vapour}$ do not bear any relationship with each other.
- A solution containing 12.5 g of non-electrolyte substance in 185 g of water shows boiling point elevation of 0.80 K. calculate the molar mass of the substance ($K_b = 0.52 \text{ K kg mol}^{-1}$)
 - 53.06 g mol^{-1}
 - 25.3 g mol^{-1}
 - 16.08 g mol^{-1}
 - 43.92 g mol^{-1}
- Equimolal solution in the same solvent have
 - Same elevation in boiling point and same depression in freezing point
 - Different elevation in boiling point and different depression in freezing point
 - Same elevation in boiling point but different depression freezing point
 - Same depression in freezing point but different elevation in boiling point.
- What amount of $CaCl_2$ ($i = 2.47$) is dissolved in 2 litres of water so that its osmotic pressure is 0.5 atm at $27^\circ C$?
 - 3.42g
 - 9.24g
 - 2.834g
 - 1.820g

12. Which of the following statements is false?
 (a) Units of atmospheric pressure and osmotic pressure are the same.
 (b) In reverse osmosis, solvent molecules move through a semipermeable membrane from a region of lower concentration of solute to a region of higher concentration.
 (c) The value of molal depression constant depends on nature of solvent.
 (d) Relative lowering of vapour pressure is a dimensionless quantity.
13. 4 L of 0.02 M aqueous solution of NaCl was diluted by adding one litre of water. The molality of the resultant solution is _____.
 (a) 0.004 (b) 0.008
 (c) 0.012 (d) 0.016
14. The value of Henry's law constant for some gases at 293 K is given below. Arrange the gases in the increasing order of their solubility
 $He : 144.97 \text{ kbar}$, $H_2 : 69.16 \text{ kbar}$
 $N_2 : 76.48 \text{ kbar}$, $O_2 : 34.86 \text{ kbar}$
 (a) $He < N_2 < H_2 < O_2$
 (b) $O_2 < H_2 < N_2 < He$
 (c) $H_2 < N_2 < O_2 < He$
 (d) $He < O_2 < N_2 < H_2$
15. When a gas is bubbled through water at 298 K, a very dilute solution of gas is obtained. Henry's law constant for the gas is 100 kbar. If gas exerts a pressure of 1 bar, the number of moles of gas dissolved in 1 litre of water is
 (a) 0.555 (b) 55.55×10^{-5}
 (c) 55.55×10^{-3} (d) 5.55×10^{-5}
16. Vapour pressure of a pure liquid X is 2 atm at 300K. It is lowered to 1 atm on dissolving 1 g of Y in 20 g of liquid X. If molar mass of X is 200, what is the molar mass of Y.
 (a) 20 (b) 50 (c) 100 (d) 200

17. Given below are few mixtures formed by mixing two components, which of the following binary mixtures will have same composition in liquid and vapour phase.
 (i) Ethanol + Chloroform
 (ii) Nitric acid + water
 (iii) Benzene + Toluene
 (iv) Ethyl chloride + Ethyl bromide
 (a) (i) and (iii) (b) (i) and (ii)
 (c) (i), (ii) and (iii) (d) (iii) and (iv)
18. Grapes placed in three beakers X, Y and Z containing different types of solutions are shown in figures.



- If Beaker X contains water, Y and Z contains
 (a) Y – hypotonic solution, Z – hypertonic solution
 (b) Y – hypertonic solution, Z – hypotonic solution
 (c) Y and Z – isotonic solutions
 (d) Y and Z – hypotonic solution
19. Which of the following statements is correct about diffusion and osmosis?
 (i) In osmosis a semipermeable membrane is used while diffusion is without membrane
 (ii) In osmosis movement of molecules occurs in one direction while in diffusion, movement occurs in all directions.
 (iii) In osmosis only the solvent moves while in diffusion both solute and solvent move.
 (a) (i) and (ii) (b) (i) only
 (c) (ii) and (iii) (d) (i), (ii) and (iii)

20. Which of the following statement is not correct?
 (a) Osmotic pressure (π) of a solution is given by the relation $\pi = MRT$ where M is the molarity of the solution.
 (b) The correct order of osmotic pressure for 0.2 M aqueous solution of each solute is $\text{CaCl}_2 > \text{NaCl} > \text{CH}_3\text{COOH} > \text{glucose}$
 (c) Two solution of sucrose of same molality prepared in different solvent will have same elevation in boiling point.
 (d) Relative lowering in vapour pressure of a solution containing non volatile solute is directly proportional to mole fraction of solute is Raoult's law.
21. pH of 0.1(M) BOH (weak base) is found to be 12. The solution at temperature T K will display an osmotic pressure equal to
 (a) 0.01 RT (b) 0.01(RT)²
 (c) 0.11 RT (d) 1.1 RT
22. A 0.004M solution of Na_2SO_4 is isotonic with a 0.01M solution of glucose at same temperature. The apparent degree of dissociation of Na_2SO_4 is
 (a) 25% (b) 50% (c) 75% (d) 85%
23. A compound MX_2 has observed and normal molar masses 65.6 and 164 respectively. Calculate the apparent degree of ionization of MX_2 -
 (a) 75 % (b) 85 %
 (c) 65 % (d) 25 %
24. Total vapour pressure of mixture of 1 mol A ($p_A^0 = 150$ torr) and 2 mol B ($p_B^0 = 240$ torr) is 200 torr. In this case -
 (a) There is positive deviation from Raoult's law
 (b) There is negative deviation from Raoult's law
 (c) There is no deviation from Raoult's law
 (d) Molecular masses of A and B are also required for calculating the deviation
25. A 5 % solution of cane sugar (mol. mass = 342) is isotonic with 1 % solution of a substance X. The molecular mass of X is -
 (a) 34.2 (b) 171.2
 (c) 68.4 (d) 136.8
26. Which one of the following aqueous solutions will exhibit highest boiling point ?
 (a) 0.01 M Na_2SO_4 (b) 0.01 M KNO_3
 (c) 0.015 M urea (d) 0.015 M glucose
27. On mixing, heptane and octane form an ideal solution. At 373 K, the vapour pressures of the two liquid components (heptane and octane) are 105 kPa and 45 kPa respectively. Vapour pressure of the solution obtained by mixing 25.0 g of heptane and 35 g of octane will be (molar mass of heptane = 100 g mol^{-1} and of octane = 114 g mol^{-1})
 (a) 72.0 kPa (b) 36.1 kPa
 (c) 96.2 kPa (d) 144.5 kPa
28. K_f for water is 1.86 K kg mol^{-1} . If your automobile radiator holds 1.0 kg of water, how many grams of ethylene glycol ($\text{C}_2\text{H}_6\text{O}_2$) must you add to get the freezing point of the solution lowered to -2.8°C ?
 (a) 72 g (b) 93 g
 (c) 39 g (d) 27 g
29. Persons are medically considered to have lead poisoning if they have a concentration greater than 10 micrograms of lead per decilitre of blood. Concentration in parts per billion is :
 (a) 1000 (b) 100 (c) 10 (d) 1
30. Given at 350 K $p_A^0 = 300$ torr and $p_B^0 = 800$ torr, the composition of the mixture having a normal boiling point of 350 K is :
 (a) $X_A = 0.08$ (b) $X_A = 0.06$
 (c) $X_A = 0.04$ (d) $X_A = 0.02$