DELHI PUBLIC SCHOOL JAMMU

ASSIGNMENT CLASS: 12TH

SUBJECT: CHEMISTRY

UNIT: SOLUTIONS AND SOLID STATE

Q1. Calculate the depression in the freezing point of water when 10 gm of $CH_3CH_2CHClCOOH$ is added to 250 gm of water. $K_a = 1.4 \times 10^{-3}$ and $K_f = 1.86$ K kg mol^{-1}.

Q2. 100 gm of liquid A (molar mass 140 gm mol^{-1}) was dissolved in 1000 gm of liquid B (molar mass 180 gm mol^{-1}). The vapour pressure of pure liquid B was found to be 500 torr. Calculate the vapour pressure of pure liquid A and its vapour pressure in the solution if the total vapour pressure of the solution is 475 torr.

Q3. Determine the amount of $CaCl_2$ (i = 2.47) dissolved in 2.5 litre of water such that its osmotic pressure is 0.75 atm at 27°C.

Q4. Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 in 2 litre of water at 25°C assuming that it is completely dissociated.

Q5. A solution containing 30 gm of a non-volatile solute exactly in 90 gm water has a vapour pressure of 2.8kPa at 298 K. Further 18 gm water is then added to the solution, the new vapour pressure becomes 2.9 kPa at 298 K. Calculate:
(i) molar mass of the solute (ii) vapour pressure of water at 298 K.

Q6. Ferric oxide crystallizes in hcp array of oxide ions with two out of every three octahedral voids occupied by ferric ions. What will be the formula of ferric oxide?

Q7. In a cubic close packed structure of mixed oxides, the oxide ions are in ccp arrangement. One eighth of tetrahedral voids are occupied by divalent ions 'A^{2+}' while one half of the octahedral voids are occupied by trivalent ions 'B^{3+}'. What is the formula of oxide?

Q8. A metallic element exists as body -centred cubic lattice .Each edge of the unit cell is 288 pm. The density of the metal is 7.2 gm cm^{-3} . How many atoms and unit cells are there in 100g of the metal?

Q9. Calculate the number of unit cells present in 1gm of gold. (Gold has fcc lattice)

Q10. What are schottky and Frenkel defects? Discuss.