INTERNATIONAL INDIAN SCHOOL BURAIDAH

Worksheet for the Academic Year 2023-24

CLASS: 12 SUBJECT: CHEMISTRY DATE: 14/05/2023

LESSON : CH-1 SOLUTIONS

Q.1 Which of the following solutions shows positive deviation from Raoult's law?
(a) Acetone + Aniline (b) Acetone + Ethanol
(c) Water + Nitric acid (d) Chloroform + Benzene

Q.2 Partial pressure of a solution component is directly proportional to its mole fraction. This is known as
(a) Henry's law (b) Raoult's law
(c) Distribution law (d) Ostawald's dilution law

Q.3 By increasing the temperature, the vapour pressure of substance:
(a) always increases (b) does not depend on temperature
(c) always decreases (d) partially depends on temperature

Q.4 Define the following terms : (a) Molality (b) Molarity

Q.5 Define the term azeotrope?

Q.6 State the condition resulting in reverse osmosis?

Q.7 Differentiate between molarity and molality for a solution.How does a change in temperature influence their values?

Q.8. (a) Define the term osmotic pressure. Describe how the molecular mass of a substance can be determined by a method based on measurement of osmotic pressure?
(b) 100mg of a protein is dissolved in just enough water to make 10.0 ml of solution. If this solution has an osmotic pressure of 13.3mm Hg at 25℃, what is the molar mass of the protein (R= 0.0821 L atm mol-1 K-1 and 760mm Hg= 1atm)

Q.9 What is meant by positive and negative deviations from Raoult's law and how is the sign of ΔH_{mix} related to positive and negative deviations from Raoult's law?

Q.10 A 5% solution (by mass) of cane sugar in water has freezing point of 271 K. Calculate the freezing point of a 5% glucose in water if freezing point of pure water is 273.15 K.

Q.11 Define reverse osmosis, write its one use.

Q.12 Define the following terms :
(i) Mole fraction

(ii) Isotonic solutions
(iii) Van't Hoff factor
(iv) Ideal solution

Q.13 18g of glucose ($C_6H_{12}O_6$) is dissolved in 1 Kg of water in a saucepan. At what temperature will water boil 1.013 bar? [K_b for water = 0.52 K Kg mol^{-1}]

Q.14 (a) State Henry's law and mention its two applications.
(b) Which of the following has higher boiling point and why.
0.1M NaCl or 0.1 M Glucose
(c) On dissolving 19.5 g of CH_2FCOOH in 500 g of water a depression of 10C in freezing point of water is observed. Calculate the Vant Hoff factor. Given K_f =1.86 K Kg mol^{-1}.

Q.15 (a) State Raoult's law for the solutions containing nonvolatile solute. Give its mathematical expression also.
(b) A solution containing 2g of a non-volatile solute in 20g of water boils at 373.52K.Calculate the molecular mass of the solute.(K_b for H_2O =0.52 K Kg mol^{-1})

Q.16 Ethylene glycol (molar mass = 62 g mol^{-1}) is a common automobile antifreeze. Calculate the freezing point of a solution containing 12.4 g of this substance in 100g of water. Would it be advisable to keep this substance in the car radiator during summer if K_b for water = 1.86K kg/ mol and K_b for water = 0.512 K kg/mol

Q.17 Calculate the boiling point of a solution prepared by adding 15.00g of NaCl to 250.0 g of water. (K_b for water = 0.512 K kg mol^{-1},Molar mass of NaCl = 58.44 g mol^{-1}

Q.18 Calculate the freezing point of an aqueous solution containing 10.50g of $MgBr_2$ in 200 g of water. (Molar mass of $MgBr_2$ = 184 g mol^{-1}). K_f for water = 1.86 K kg mol^{-1})