Worksheet: Solutions

NIOS · Class 12 · Chemistry · 10 questions · 30 marks

Name: _____ Date: _____ Score: _____ / 30

Q1. Calculate the mole fraction of ethanol in a solution containing 46 g of ethanol and 54 g of water. *[2 marks]*

Q2. The vapour pressure of pure water at 298 K is 23.8 mm Hg. Find the vapour pressure of a solution in which the mole fraction of a non-volatile solute is 0.02. *[2 marks]*

Q3. Find the boiling point elevation when 18 g of glucose is dissolved in 500 g of water. Kb = 0.52 K kg/mol. *[2 marks]*

Q4. A 15% by mass aqueous solution of a solute of molar mass 60 has density 1.10 g/mL. Find its molality and molarity. *[3 marks]*

Q5. The Henry's law constant for nitrogen in water at 298 K is 8.68 x 10^4 bar. Find the mole fraction of nitrogen dissolved under a partial pressure of 0.79 bar. *[3 marks]*

Q6. A solution of 2.5 g of a non-volatile solute in 100 g of benzene lowers the freezing point by 1.28 K. Kf for benzene is 5.12 K kg/mol. Find the molar mass of the solute. *[3 marks]*

Q7. A mixture of acetone and carbon disulphide shows a vapour pressure higher than Raoult's law predicts. State the type of deviation and the sign of the enthalpy of mixing. *[3 marks]*

Q8. 0.6 g of acetic acid dissolved in 100 g of benzene lowers the freezing point by 0.256 K. Kf for benzene is 5.12 K kg/mol. Find the van't Hoff factor and state what it indicates. *[4 marks]*

Q9. Find the osmotic pressure at 300 K of a 0.01 M solution of K3PO4, assuming complete dissociation. *[4 marks]*

Q10. Two volatile liquids A and B have pure vapour pressures of 300 and 500 mm Hg. For an equimolar mixture, find the total vapour pressure and the mole fraction of A in the vapour. *[4 marks]*