SOLUTION

(Q1 – Q10) Given below are four options against each question. Choose the option which you consider the most appropriate as your answer.

Q1   Which of the solutions is an example of non- ideal solution?

    (a) n- hexane + n – heptanes   (b) benzene and toluene

    (c) bromoethane + chloroethane   (d) none of these

Q2 Which of the following are the example of colligative properties?

    (a) relative lowering of vapour pressure   (b) elevation of boiling point

    (c) depression of freezing point   (d) all of these

Q3 The number of moles of NaCl in 5 litres of of 2 M solution is:

    (a) 1   (b) 3

    (c) 10   (d) 27

Q4   Which of the solutions is an example of non- ideal solution?

    (a) n- hexane + n – heptanes   (b) benzene and toluene

    (c) bromoethane + chloroethane   (d) none of these

Q5 Which of the following are the example of colligative properties?

    (a) relative lowering of vapour pressure   (b) elevation of boiling point

    (c) depression of freezing point   (d) all of these

Q6 Which has the highest freezing point ?

    (a) 1 M glucose   (b) 1 M NaCl

    (c) 1 M $CaCl_2$ (d) 1 M AlF_3

Q7 A10 % solution of urea is isotonic with 20% solution of 'x' at same temperature .

    Molecular weight of 'x' will be;

    (a) 120 g mol^{-1} (b) 60 g mol^{-1}
    (c)   80 g mol^{-1} (d) none of these.

Q8 Measurement of which colligative property is preferred for determination of molar mass ?

    (a) relative lowering of vapour pressure   (b) osmotic pressure

    (c) elevation of boiling point   (d) depression of freezing point

Q9 Colligative properties depend upon :

    (a) no. of particles   (b) nature of particle

    (c) both of these   (d) none of these

Q10 If solute undergo association, what will be the possible values of 'i' ?

    (a) less than 1   (b) greater than 1

    (c) equal to 1   (d) can't be predicted

Short Answer type Questions

Q11 Define ideal solution. Give any two examples.

Q12 How is vapour pressure of solvent affected when a non- volatile solute is added to it ?

Q13 Find the boiling point of a solution containing 0.50 g of glucose ($C_6H_{12}O_6$) dissolved in.80.2 g of water. [Given K_b for water is 0.52 K kg mol^{-1}].

Q14 1.00 g of a non- electrolyte solution dissolved in 50 g of benzene lowered the freezing point of benzene by 0.40 K. The freezing point depression constant of benzene is 5.12 K kg mol^{-1}. Find the molar mass of the solute.

Q15 Explain abnormal molar mass giving example of potassium chloride and acetic acid.

Long Aanswer type Questions

Q16 (a) Explain why a solution of chloroform and acetone shows negative deviation from Raoult's law.

    (b) Phenol associates in benzene to certain extent to form a dimer. A solution containing 20 g of phenol in 1.0 kg of benzene has its freezing point lowered by 0.69 K. Calculate the fraction of phenol that has dimerised. [Given K_f for benzene is 5.1 Km^{-1}.

Q17 (a) Define the following terms:

    (i) Azeotropes   (ii) Osmotic pressure

    (j) Calculate the molarity of 9.8% (w/w) solution of H_2SO_4, if the density of the solution is 1.02 g m L^{-1}. (molar mass of sulphuric acid is 98 g mol^{-1}).

Q18 2 g of benzoic acid (C_6H_5COOH) dissolved in 25 g of benzene shows a depression in Freezing point equal to 1.62 K. Molal depression constant of benzene is 4.9 K kg mol^{-1}. What is the percentage association of acid, if it forms dimmer in solution?

Q19 With the help of a neat diagram describe reverse osmosis. How can water be purified by this process? Explain its importance in the context of gulf countries.

Q20 Explain the positive and negative deviation from ideal behaviour with the help of a neat diagram.