1.

pH of a 0.1 (M) monobasic acid is found to be 2. Hence osmotic pressure at a given temperature T is-

1. 0.1 RT

2. 0.11RT

3. 1.1RT

4. 0.01RT

2.

Find the mole of K_2SO_4 to be dissolved in 12 moles water to lower its vapor pressure by 10 mm of Hg at a temperature at which vapor pressure of pure water is 50 mm of Hg is

1. 3 mol

2. 0.5 mol

3. 1 mol

4. 2 mol

3.

The relative lowering of vapour caused by dissolving 71.3g of a substance in 1000g of water is 7.13×10^{-3}. The molecular mass of substance is:-

1. 180

2. 18

3. 1.8

4. 360

4.

During osmosis, the flow of water through a semi-permeable membrane is :

1. From solution having higher concentration only

2. From both sides of the semi-permeable membrane with equal flow rates

3. From both sides of the semi-permeable membrane with unequal flow rates

4. From solution having lower concentration only

5.

The Vapour pressure of CCl_4 at 25°C is 143 mm Hg 0.5 g of a non-volatile solute (mol. wt. 65) is dissolved in 100 ml of CCl_4. Find the vapor pressure of the solution.

(Density of $CCl_4 = 1.58 \ g/cm^3$)

1. 141.93 mm

2. 94.39 mm

3. 199.34 mm

4. 143.99 mm

6.

An aqueous solution containing 1 g of urea boils at 100.25°C. The aqueous solution containing 3 g of glucose in the same volume will boil at

1. 100.75°C

2. 100.5°C

3. 100°C

4. 100.25°C

7.

1.00 g of non-electrolyte solute (molar mass 250 g mol^{-1}) was dissolved in 51.2 g of benzene. If the freezing point depression constant, K_f of benzene is 5.12 mol^{-1}, the freezing point of benzene will be lowered by :

1. 0.4 K

2. 0.3 K

3. 0.5 K

4. 0.2 K

8.

Aqueous solutions of 0.004 M Na_2SO_4 and 0.01 M Glucose are isotonic. The degree of dissociation of Na_2SO_4 is

1. 25%

2. 60%

3. 75%

4. 85%

9.

When 20 g of naphthoic acid $(C_{11}H_8O_2)$ is dissolved in 50g of benzene $(K_f = 1.72$ K kg $mol^{-1})$, a freezing point depression of 2K is observed. The van't Hoff factor (i) is–

1. 0.5

2. 1

3. 2

4. 3

10.

Which one of the following electrolytes has the same value of van't Hoff's factor(i) as that of $Al_2(SO_4)_3$ (if all are 100% ionised)?

1. K_2SO_4

2. $K_3[Fe(CN)_6]$

3. $Al(NO_3)_3$

4. $K_4[Fe(CN)_6]$

11.

The osmotic pressure of 5% (mass-volume) solution of cane sugar at 150°C (mol. mass of sugar = 342) is

1. 4 *atm*

2. 5.07 *atm*

3. 3.55 *atm*

4. 2.45 *atm*

12.

A solution containing 3.3 *g* of a substance in 125 *g* of benzene (b.p. 80°C) boils at 80.66°C. If K_b for one litre of benzene is 3.28°C, the molecular weight of the substance shall be

1. 127.20

2. 131.20

3. 137.12

4. 142.72

13.

The Van't Hoff factor for 0.1 M $Ba(NO_3)_2$ solution is 2.74. The degree of dissociation is -

1. 91.3%

2. 87%

3. 100%

4. 74%

14.

Preservation of fruits against bacterial action by adding sugar is an example of

1. Exosmosis

2. Reverse-osmosis

3. Diffusion

4. Capillary action

15.

Which of the following aqueous solutions should have the highest boiling point?

1. 1.0 M NaOH

2. 1.0 M Na_2SO_4

3. 1.0 M NH_4NO_3

4. 1.0 M KNO_3

16.

The unit of ebullioscopic constant is

1. K kg mol^{-1} or K (molality)$^{-1}$

2. mol kg K^{-1} or K^{-1} (molality)

3. kg mol^{-1} K^{-1} or K^{-1} (molality)$^{-1}$

4. K mol kg^{-1} or K (molality)

17.

In comparison to a 0.01 M solution of glucose, the depression in the freezing point of a 0.01 M MgCl$_2$ solution is ....

1. The same

2. About twice

3. About three times

4. About six times

18.

Which of the following statements is false?

1. Two different solutions of sucrose of the same molality prepared in different solvents will have the same depression in freezing point.

2. The osmotic pressure of a solution is given by the equation π = CRT (where C is the molarity of the solution)

3. Decreasing order of osmotic pressure for 0.01 M aqueous solutions of barium chloride, potassium chloride, acetic acid, and sucrose is

   BaCl$_2$ > KCl > CH$_3$COOH > sucrose

4. According to Raoult's law, the vapour pressure exerted by a volatile component of a solution is directly proportional to its mole fraction in the solution.

19.

Which of the following statements is false?

1. Units of atmospheric pressure and osmotic pressure are the same

2. In reverse osmosis, solvent molecules move through a semipermeable membrane from a region of lower concentration of solute to a region of higher concentration

3. The value of molal depression constant depends on nature of solvent

4. Relative lowering of vapour pressure, is a dimensionless quantity

20.

We have three aqueous solutions of NaCl labelled as 'A', 'B' and 'C with concentrations 0.1 M, 0.01 M and 0.001 M, respectively. The value of van't Hoff factor for these solutions will be in the order ....

1. $i_A < i_B < i_C$

2. $i_A > i_B > i_C$

3. $i_A = i_B = i_C$

4. $i_A < i_B > i_C$

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