LAKSHYA (JEE)

Solution

DPP - 13

1. Which of the following has been arranged in order of decreasing freezing point?

(A) 0.05 M KNO_3 > 0.04 M $CaCl_2$ > 0.140 M sugar > 0.075 M $CuSO_4$

(B) 0.04 M $BaCl_2$ > 0.140 M sucrose > 0.075 M $CuSO_4$ > 0.05 M KNO_3

(C) 0.075 M $CuSO_4$ > 0.140 M sucrose > 0.04 M $BaCl_2$ > 0.05 M KNO_3

(D) 0.075 M $CuSO_4$ > 0.05 M $NaNO_3$ > 0.140 M sucrose > 0.04 M $BaCl_2$

2. A 0.2 molal aqueous solution of a weak acid (HX) is 20 per cent ionised. The freezing point of this solution is (Given k_f = 1.86° C kg mol^{-1} for water) :

(A) –0.45°C (B) – 0.90°C

(C) –0.31 °C (D) – 0.53°C.

3. A complex of iron and cyanide ions is 100% ionised at 1m (molal). If its elevation in b.p. is 2.08%. (K_b = 0.52° mol^{-1} kg), then the complex is :

(A) $K_3[Fe(CN)_6]$ (B) $Fe(CN)_2$

(C) $K_4[Fe(CN)_6]$ (D) $Fe(CN)_4$

4. For a solution of 0.849 g of mercurous chloride in 50 g of $HgCl_2$(l) the freezing point depression is 1.24°C. K_f for $HgCl_2$ is 34.3. What is the state of mercurous chloride in $HgCl_2$? (Hg – 200, Cl – 35.5)

(A) as Hg_2Cl_2 molecules

(B) as HgCl molecules

(C) as Hg^{2+} and Cl^- ions

(D) as Hg_2^{2+} and Cl^- ions

5. Which will show maximum depression in freezing point when concentration is 0.1 M

(A) NaCl (B) Urea

(C) Glucose (D) K_2SO_4

6. Aqueous solution of barium phosphate which is 100% ionised has $\Delta T_f / K_f$ as 0.05. Hence, given solution is

(A) 0.01 molal (B) 0.02 molal

(C) 0.04 molal (D) 0.05 molal

7. 0.5 molal aqueous solutions of a weak acid (HX) is 20% ionised. If k_f for water is 1.86 K kg mol^{-1}, the lowering in freezing point of the solution is :

(A) – 1.12 K (B) 0.56 K

(C) 1.12 K (D) – 0.56 K

8. The freezing point depression constant for water is – 1.86°C m^{-1}. If 5.00 g Na_2SO_4 is dissolved in 45.0 g H_2O, the freezing point is changed by – 3.82°C. Calculate the van't Hoff factor for Na_2SO_4.

(A) 2.05 (B) 2.63

(C) 3.11 (D) 0.381

9. The van't Hoff factor i for a compound which undergoes dissociation in one solvent and association in other solvent is respectively :

(A) less than one and greater than one.

(B) less than one and less than one.

(C) greater than one and less than one.

(D) greater than one and greater than one.

10. A 0.1 molal aqueous solution of a weak acid is 30% ionized. If K_f for water is 1.86°C/m, the freezing point of the solution will be :

(A) –0.18°C (B) –0.54°C

(C) –0.36°C (D) –0.24°C

11. 0.01 M solution of KCl and $BaCl_2$ are prepared in water. The freezing points of KCl is found to be – 2°C. What is the freezing point of $BaCl_2$ to be completely ionised ?

(A) – 3°C (B) + 3°C

(C) – 2°C (D) – 4°C

12. If α is the degree of dissociation of Na_3PO_4, the vant Hoff's factor (i) used for calculating the moecular mass is :

(A) $1 + \alpha$ (B) $1 - \alpha$

(C) $1 + 3\alpha$ (D) $1 - 2\alpha$.

13. Consider separate solution of 0.500 M C_2H_5OH(aq), 0.100 M $Mg_3(PO_4)_2$(aq), 0.250 M KBr(aq) and 0.125 M Na_3PO_4(aq) at 25°C. Which statement is **true** about these solution, assuming all salts to be strong electrolytes ?

(A) They all have the same osmotic pressure.

(B) 0.100 M $Mg_3(PO_4)_2$(aq) has the highest osmotic pressure.

(C) 0.125 M Na_3PO_4(aq) has the highest osmotic pressure.

(D) 0.500 M C_2H_5OH(aq) has the highest osmotic pressure.

[ANSWERS]

1. (A)
2. (A)
3. (A)
4. (A)
5. (D)
6. (A)
7. (C)
8. (B)
9. (C)
10. (D)
11. (A)
12. (C)
13. (A)

Note - If you have any query/issue
Mail us atsupport@physicswallah.org