



CHEMISTRY

BOOKS - MTG WBJEE CHEMISTRY (HINGLISH)

PHYSICAL CHEMISTRY OF SOLUTIONS

**Wb Jee Workout Single Option Correct Type 1
Mark**

1. Which one of the following is not a property of hydrophilic sols ?

A. High concentration of dispersed phase can be easily attained.

B. Coagulation is reversible.

C. Viscosity and surface tension are about the same as for water.

D. None of water.

Answer: C

2. Three Faradays of electricity are passed through molten Al_2O_3 , aqueous solution of $CuSO_4$ and molten NaCl taken in different electrolytic cells. The amount of Al, Cu and Na deposited at the cathodes will be in the ratio of

A. 1 mole : 2 mole : 3 mole

B. 3 mole : 2 mole : 1 mole

C. 1 mole : 1.5 mole : 3 mole

D. 1.5 mole : 2 mole : 3 mole

Answer: C



View Text Solution

3. The number of Faradays required to deposit 1 g equivalent of aluminium (At. Wt. = 27) from a solution of aluminium chloride will be

A. 1

B. 2

C. 3

D. 4

Answer: A



View Text Solution

4. The ability of an ion to bring about coagulation of a given colloid depends upon

A. the size of the ion

B. the sign of the charge alone

C. the magnitude of the charge

D. both magnitude and charge

Answer: D



View Text Solution

5. As_2S_3 sol is

A. positive colloid

B. negative colloid

C. neutral colloid

D. none of these

Answer: B



View Text Solution

6. The resistance of 0.5 N solution of an electrolyte in a conductivity cell was found to be 25 ohm. Calculate the equivalent conductivity of the solution if the electrodes in the cell are 1.6 cm apart and have an area of 3.2 cm^2 ?

A. $10Scm^2eq^{-1}$

B. $15cm^2eq^{-1}$

C. $20Scm^2eq^{-1}$

D. $40Scm^2e$

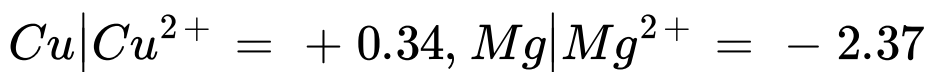
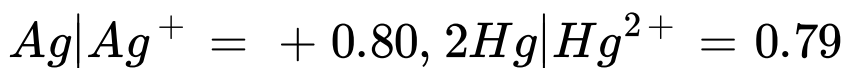
Answer: D



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7. An aqueous solution containing one mole per litre of $Cu(NO_3)_2$, $AgNO_3$, $Hg(NO_3)_2$ and $Mg(NO_3)_2$ is being electrolysed using

inert electrodes. The values of the standard electrode potentials in volts (reduction potentials) are



With increasing voltage, the sequence of deposition of metals on cathode will be

A. Ag,Hg,Cu,Mg

B. Mg,Cu,Hg,Ag

C. Ag,Hg,Cu

D. Cu,Hg,Ag

Answer: C



View Text Solution

8. The dialysis of colloidal solution depends upon

A. nature of the membrane used

B. difference in the temperature of the two liquids

C. nature of particles present in the solution

D. all of these

Answer: D



View Text Solution

9. The increase in the value of molar conductivity of acetic acid with dilution is due to

- A. decrease in interionic forces
- B. increase in degree of ionisation
- C. increase in self ionisation of water
- D. none of these

Answer: B



View Text Solution

10. In a mixture of A and B, components show -
ve deviations when

A. $\Delta V_{mix} > 0, \Delta S_{mix} > 0$

B. A-B interactions are weaker than A-A and B-B interactions

C. $\Delta V_{mix} = 0, \Delta S_{mix} > 0$

D. A-B interactions are stronger than A-A and B-B interactions

Answer: D



View Text Solution

11. Perptization is a process of

A. reducing the impurities of the electrolytes

B. purification of colloids

C. dispersing precipitate into colloidal sols

D. movement of colloidal particles in the electrical field.

Answer: C



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12. A liquid which markedly scatters a beam of light (visible in a dark room) but leaves no residue when passed through a filter paper is best described as

- A. a suspension
- B. a true solution
- C. lyophobic sol
- D. lyophilic sol.

Answer: C



View Text Solution

13. How many Faradays are required to generate one gram atom of magnesium from $MgCl_2$?

A. 1

B. 2

C. 3

D. 4

Answer: B



View Text Solution

14. In an experiment addition of 4.0 mL of 0.005 M $BaCl_2$ to 16.0 mL of arsenious sulphide sol just causes complete coagulation in 2 hrs. The flocculating value of the effertive ion is

A. Cl^- 1.0

B. Cl^- , 2.0

C. Ba^{2+} , 1.0

D. Ba^{2+} , 0.5

Answer: C



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15. Which of the following is a hydrophilic colloidal sol?

A. Gold sol

B. Clay particles

C. Starch sol

D. Silver iodide sol

Answer: C



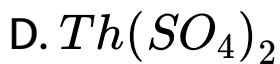
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16. The best electrolyte for coagulation of As_2S_3 sol is

A. NaCl

B. $CuSO_4$

C. $Al(NO_3)_3$



Answer: C



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17. Ferric chloride is applied to stop bleeding because

A. Fe^{3+} ions coagulate negatively charged blood solution

B. Fe^{3+} ions coagulate positively charged

blood solution

C. Cl^{-} ions coagulate positively charged

blood solution

D. Cl^{-} ions coagulate negatively charged

blood solution

Answer: A



View Text Solution

18. Surface tension of lyophilic sols is

A. lower than that of H_2O

B. more than that of H_2O

C. equal to that of H_2O

D. none of these

Answer: A



View Text Solution

19. Two aqueous solutions A and B, are separated by a semi-permeable membrane. The osmotic pressure of solution A immediately begins to decrease. Which of the following statements is true?

A. The solvent molecules are moving from the solution of higher osmotic pressure to that of lower osmotic pressure

B. The initial osmotic pressure of solution B is greater than that of solution A.

C. Solvent molecules are moving from solution B into solution A.

D. Both (a) and (b).

Answer: C

 [View Text Solution](#)

20. Which of the following forms cationic micelles above certain concentration?

A. Sodium dodecyl sulphate

B. Sodium acetate

C. urea

D. Cetyltrimethylammoniumbromide

Answer: D



View Text Solution

21. The ionic conductances of Al^{3+} and SO_4^{2-} at infinite dilution are x and $y \text{ ohm}^{-1} \text{ cm}^2$ respectively. If Kohlrausch law is valid then

molar conductance of aluminium sulphate
infinite dilution will be

A. $3x + 2y$

B. $2x + 3y$

C. $2x + 2y$

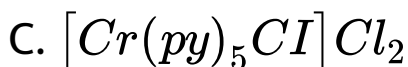
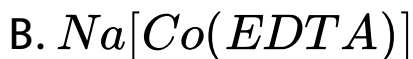
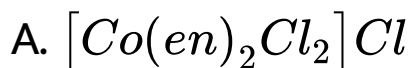
D. $3x + 3y$

Answer: B



View Text Solution

22. A 0.020 m solution of each of the following compounds is prepared. Which solution would you expect to freeze at $-0.149^{\circ}C$?



Answer: D



View Text Solution

23. At isoelectric point

- A. colloidal particles become neutral
- B. colloidal sol becomes highly stable
- C. both of (a) and (b)
- D. none of these

Answer: A



View Text Solution

24. The substance having highest conductivity at room temperature among the following is

A. 0.1 N HCl

B. 0.1 N NaCl

C. graphite

D. glass.

Answer: C



View Text Solution

25. The specific conductivity of N/10 KCl solution at 20° is $0.212\text{ohm}^{-1}\text{cm}^{-1}$ and the resistance of the cell containing this solution of $20^\circ C$ is 55 ohm. The cell constant is

A. 4.616cm^{-1}

B. 11.66cm^{-1}

C. 2.173cm^{-1}

D. 3.324cm^{-1}

Answer: A



View Text Solution

26. A colloidal system in which gas bubbles are dispersed in a liquid is known as

A. foam

B. aerosol

C. sol

D. emulsion

Answer: A



View Text Solution

27. The electric charge for electrode deposition of one gram equivalent of a substance is

- A. one ampere per second
- B. 96,500 coulombs per second
- C. one ampere for one hour
- D. charge on one mole of electrons.

Answer: D



View Text Solution

28. Arsenic sulphide is a negative sol. The reagent with least precipitating power is

A. $AlCl_3$

B. $NaCl$

C. CaF_2

D. glucose.

Answer: D



View Text Solution

29. Electrolysis of a solution of HSO_4^- ions produces $S_2O_8^{2-}$. Assuming 75% current efficiency, what current should be employed to achieve a production rate of 1 mol of $S_2O_8^{2-}$ per hour ?

A. 71.47 A

B. 35.7 A

C. 142.96 A

D. 285.93 A

Answer: A





30. Equal quantities of electricity are passed through three voltameters containing $FeSO_4$, $Fe_2(SO_4)_3$ and $Fe(NO_3)_3$. Consider the following statements in this regard :

The amount of iron deposited in $FeSO_4$ and $Fe_2(SO_4)_3$ are equal

2. The amount of iron deposited in $Fe(NO_3)_3$ is two third of the amount of iron deposited in $FeSO_4$.

3 The amount of iron deposited in $Fe_2(SO_4)_3$

and $Fe(NO_3)$ is equal .

Which of the following statements is /are correct ?

A. only 1

B. 1 and 2

C. 2 and 3

D. Only 3

Answer: C



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Wb Jee Workout Single Option Correct Type 2

Mark

1. Give $\Lambda^\circ \left(\frac{1}{3} Al^{3+} \right) = 63 \Omega^{-1} cm^2 mol^{-1}$
and $\Lambda^\circ \left(\frac{1}{2} SO_4^{2-} \right) = 80 \Omega^{-1}$. The value of
 $\Lambda^\infty Al_2(SO_4)_3$ would be

A. $143 \Omega^{-1} cm^2 mol^{-1}$

B. $206 \Omega^{-1} cm^2 mol^{-1}$

C. $286 \Omega^{-1} cm^2 mol^{-1}$

D. $858 \Omega^{-1} cm^2 mol^{-1}$

Answer: D



View Text Solution

2. Molar conductivities of Li^+ , Na^+ , K^+ and Rb^+ ions in aqueous solutions are in the following order.

A. $Li^+ > Na^+ = K^+ < Rb^+$

B. $Li^+ > Na^+ > K^+ = Rb^+$

C. $Rb^+ > K^+ > Na^+ > Li^+$

D. $Li^+ > Rb^+ > K^+ > Na^+$

Answer: C



View Text Solution

3. How much amount of KCl must be added to 1 kg of water so that the freezing point is depressed by 2 K?

$(K_f \text{ for water} = 1.86 \text{ kg mol}^{-1})$

A. 40 g

B. 20 g

C. 10 g

D. 60 g

Answer: A



View Text Solution

4. The freezing point of water is depressed by 0.37°C in a 0.01 molal NaCl solution. The freezing point of 0.02 molal solution of urea is depressed by

A. 0.37°C

B. $0.74^{\circ}C$

C. $0.185^{\circ}C$

D. $0^{\circ}C$

Answer: A



View Text Solution

5. An electrolyte

A. forms complex ions in solution

B. gives ions only when electricity is passed

C. possesses ions even in solid state

D. gives ions only when dissolved in water.

Answer: C



View Text Solution

6. The cell constant for an electrical conductivity cell having two electrodes of area A placed at a distance of l is expressed by

A. l/A

B. l^2 / A

C. A / l

D. $\frac{1}{Al}$

Answer: A



View Text Solution

7. The volume of a colloidal particle, V_C can be compared to the volume of a solute particle in a true solution V_S could be

A. $\frac{V_C}{V_S} \cong 10^3$

B. $\frac{V_C}{V_S} \cong 10^{-3}$

C. $\frac{V_C}{V_S} \cong 10^{23}$

D. $\frac{V_C}{V_S} \cong 1$

Answer: A



View Text Solution

8. Which of the following will show a negative deviation from Raoult's law?

- A. Acetone-benzene
- B. Acetone-ethanol
- C. Benzene-methanol
- D. Acetone-chloroform

Answer: D



View Text Solution

9. A current of 9.65 A is passed for 3 hours between nickel electrodes in 0.5 L of a 2 M

solution of $Ni(NO_3)_2$. The molarity of the solution after electrolysis would be

- A. 0.46 M
- B. 0.625 M
- C. 0.92 M
- D. 1.25 M

Answer: C



View Text Solution

10. Lowering of vapour pressure in 1 motal aqueous solution at $100^{\circ} C$ is

A. 13.44 mm Hg

B. 14.12 mm Hg

C. 31.2 mm Hg

D. 35.2 mm Hg

Answer: A



View Text Solution

11. A solution prepared by dissolving 15 g of non-volatile solute in 270 g of water gave relative lowering of vapour pressure of 0.005.

The molecular weight of the solute is

A. 324

B. 200

C. 225

D. 20

Answer: B



View Text Solution

12. A current of 12 ampere is passed through an electrolytic cell containing aqueous $NiSO_4$ solution. Both Ni and H_2 gas are formed at the cathode. The current efficiency is 60% . What is the mass of nickel deposited on the cathode per hour ?

A. 7.883 g

B. 3.941 g

C. 5.91 g

D. 2.645 g

Answer: A



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13. Kohlrausch law states that at

A. infinite dilution, each ion makes definite contribution to conductance of an electrolyte whatever be the nature of the other ion of the electrolyte

B. infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte

C. finite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte

D. infinite dilution each ion makes definite contribution to equivalent conductance

of an electrolyte depending on the nature of the other ion of the electrolyte.

Answer: A

 [View Text Solution](#)

14. Which of the following will have the highest coagulating power for As_2S_3 colloid ?





Answer: C



View Text Solution

15. On passing a current of 1.0 ampere for 16 min and 5 seconds through 1 L solution of $CuCl_2$, all copper of the solution was

deposited at cathode. The molarity of $CuCl_2$ solution was

A. 0.1M

B. 0.01 M

C. 0.005 M

D. 0.2 M

Answer: C



View Text Solution

Wb Jee Workout One Or More Than One Option Correct Type 2 Mark

1. Consider following solutions :

I 1 M aqueous glucose solution

II 1 M aqueous sodium chloride solution

III. 1 M aqueous ammonium phosphate solution

IV 1 M benzoic acid in benzene

Select correct statements for the above solutions.

A. All are isotonic solutions

B. III is hypotonic of I, II and IV

C. IV is hypotonic I, II and III

D. II is hypotone of III but hypertonic of I
and IV.

Answer: B::C::D



View Text Solution

2. Which of the following are correct statements?

- A. When mixture is more volatile, there is positive deviation from Raoult's law.
- B. When mixture is less volatile, there is negative deviation from Raoult's law
- C. Ethanol and water form ideal solution.
- D. $CHCl_3$ and water form ideal solution

Answer: A::B



View Text Solution

3. Choose the correct reason(s) for the stability of the lyophobic colloidal particles.

A. Preferential adsorption of ions on their surface from the solution

B. Preferential adsorption of solvent on their surface from the solution.

C. Attraction between different particles having opposite charges on their surface.

D. Potential difference between the fixed layer and the diffused layer of opposite charges around the colloidal particles.

Answer: A::D



View Text Solution

4. 58.5 g of NaCl and 180 g of glucose were separately dissolved in 1000 mL of water. Identify the correct statement regarding the

elevation of boiling point (b.pt.) of the resulting solutions.

A. NaCl solution will show higher elevation of b.pt.

B. Glucose solution will show higher elevation of b.pt.

C. Both the solutions will show equal elevation of b.pt

D. The b.pt. of elevation will be shown by neither of the solutions.

Answer: A



View Text Solution

5. At critical micelle concentration (CMC)

A. the ions of surfactant molecules

undergo association to form clusters

B. the turbidity of solution increases

abruptly

C. substances like grease, fats, etc. dissolve
colloidally

D. colligative properties increase suddenly.

Answer: A::B::C



View Text Solution

6. 5.3 % (w/v) Na_2CO_3 solution and 6.3 %
(w/v) $H_2C_2O_4 \cdot 2H_2O$ solution have same

A. molality

B. molarity

C. normality

D. mole fraction.

Answer: B::C



View Text Solution

7. Which of the following statements are false for a solution of chloroform and acetone?

A. The solution formed is an ideal solution

B. The solution formed is a non-ideal solution with positive deviation from Raoult's law

C. The solution formed is a non-ideal solution with negative deviation from Raoult's law.

D. The solution behaves ideally or non-ideally depending upon its composition.

Answer: A::B::D



View Text Solution

8. The correct relationships among the following are :

A. $E_{\text{cell}} = \frac{RT}{nF} \ln F$

B. Cell constant (G^\cdot) = Conductivity (K) \times
Resistance (R)

C. $1Sm^{-1} = 100Scm^{-1}$

D. Equilibrium constant (K) = $e^{-\Delta G^\circ / RT}$

Answer: B::D



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9. The solutions which are isotonic with 6 % (w/V) solution of urea are

A. 18 % (w/V) solution of glucose

B. 0.5 M solutions of $BaCl_2$

C. 1 M solution of sucrose

D. 1 M solution of acetic acid.

Answer: A::C



[View Text Solution](#)

10. Which statements (s) is/are true about osmotic pressure (π) volume (V) and temperature (T) ?

A. $\pi \propto \frac{1}{V}$ if T is constant.

B. $\pi \propto C$ if T is constant.

C. $\pi \propto V$ if T is constant.

D. π / C is constant if T is constant.

Answer: A::B::D

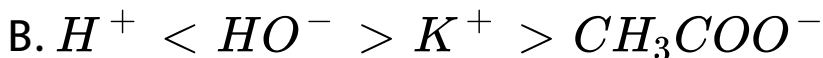
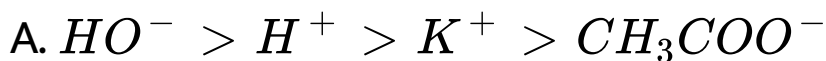


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**Wb Jee Previous Years Questions Single Option
Correct Type 1 Mark**

1. The correct order of equivalent conductances at infinite dilution in water at room temperature of

H^+ , K^+ , CH_3COO^- and HO^- ions is





Answer: B



[View Text Solution](#)

2. A conductivity cell has been calibrated with a 0.01 M 1:1 electrolyte solution (specific conductance,) $K = (1.25 \times 10^{-3} \text{ Scm}^{-1})$ in the cell and the measured resistance was 800 ohms at 25° C . The cell constant will be

A. 1.02cm^{-1}

B. 0.102cm^{-1}

C. 1.00cm^{-1}

D. 0.5cm^{-1}

Answer: C



View Text Solution

3. The measured freezing point depression for a 0.1 m aqueous CH_3COOH solution is 0.19°C . The acid dissociation constant, K_a at

this concentration will be (Given K_f , the molal cryoscopic constant = $1.86 \text{ K kg mol}^{-1}$)

A. 4.76×10^{-5}

B. 4×10^{-5}

C. 8×10^{-5}

D. 2×10^{-5}

Answer: B



View Text Solution

4. Equivalent conductivity at infinite dilution for sodium-potassium oxalate $((COO^-)_2Na^+K^+)$ will be [Given molar conductivities of oxalate, K^+ and Na^+ ions at infinite dilution are 148.2, 50.1, 73.5 $S\ cm^2\ mol^{-2}$ respectively]

A. $271.8\ S\ cm^2\ eq^{-1}$

B. $67.95\ S\ cm^2\ eq^{-1}$

C. $543.6\ S\ cm^2\ eq^{-1}$

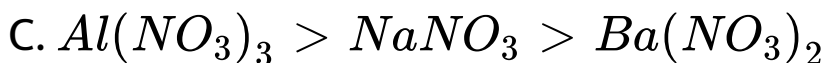
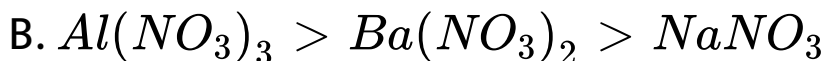
D. $135.9\ cm^2\ eq^{-1}$

Answer: D



View Text Solution

5. The amount of electrolytes required to coagulate a given amount of AgI colloidal solution (-ve charge) will be in the order



Answer: D



View Text Solution

6. The quantity of electricity needed to separately electrolyse 1 M solution of $ZnSO_4$, $AlCl_3$ and $AgNO_3$ completely is in the ratio of

A. 2 : 3 : 1

B. 2 : 1 : 1

C. 2 : 1 : 3

D. 2: 2: 1

Answer: A



View Text Solution

7. At a certain temperature, the value of the slope of the plot of osmotic pressure (π) against concentration ($C \in \text{molL}^{-1}$) of a certain polymer solution is 291 R. The temperature at which osmotic pressure is measured is (R is gas constant)

A. $271^{\circ}C$

B. $18^{\circ}C$

C. $564K$

D. $18K$

Answer: B



[View Text Solution](#)

8. At a particular temperature the ratio of equivalent conductance to specific conductance of a 0.01 (N) NaCl solution is

A. 10^5 cm^3

B. 10^3 cm^3

C. 10 cm^3

D. 10^5 cm

Answer: A



View Text Solution

9. If P^∞ and P are the vapour pressures of the pure solvent and solution and n_1 and n_2 are the moles of solute and solvent respectively in

the solution then the correct relation between

P and P° is

$$A. P^\circ = P \left[\frac{n - 1}{n_1 + n_2} \right]$$

$$B. P^\circ = P \left[\frac{n_2}{n_1 + n_2} \right]$$

$$C. P = P^\circ \left[\frac{n_2}{n_1 + n_2} \right]$$

$$D. P = P^\circ \left[\frac{n_1}{n_1 + n_2} \right]$$

Answer: C



View Text Solution

10. The order of equivalent conductance at infinite dilution for $LiCl$, $NaCl$ and KCl is



Answer: B



View Text Solution

11. Point out the false statement .

A. colloidal sols are homogeneous.

B. Colloids carry + ve or -ve charges

C. Colloids show Tyndall effect.

D. The size range of colloidal particles is 10-

1000 Å

Answer: A



View Text Solution

12. Assuming the compounds to be completely dissociated in aqueous solution, identify the pair of the solutions that can be expected to be isotonic at the same temperature.

A. 0.01 M Urea and 0.01 M NaCl

B. 0.02 M NaCl and 0.01 M Na_2SO_4

C. 0.03M $NaCl$ and 0.02M $MgCl_2$

D. 0.01 M Sucrose and 0.02 M glucose.

Answer: C



View Text Solution

13. How many faradays are required to reduce 1 mole of $Cr_2O_7^{2-}$ to Cr^{3+} in acid medium ?

A. 2

B. 3

C. 5

D. 6

Answer: D





14. What amount of electricity can deposit 1 mole of Al metal at cathode when passed through molten $AlCl_3$?

A. $0.3F$

B. $1F$

C. $3F$

D. $1/3F$

Answer: C

 [View Text Solution](#)

15. The charge carried by 1 millimole of M^{n+} ions is 193 coulombs. The value of n is

A. 1

B. 2

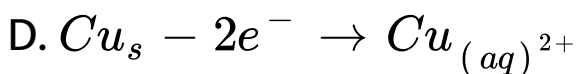
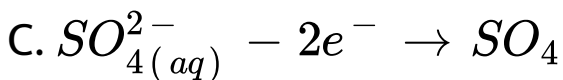
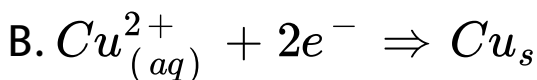
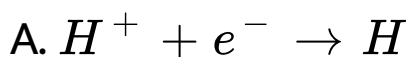
C. 3

D. 4

Answer: B

 [View Text Solution](#)

16. If electrolysis of aqueous $CuSO_4$ solution is carried out using Cu- electrodes, the reaction taking place at the anode is



Answer: D



**Wb Jee Previous Years Questions Single Option
Correct Type 2 Mark**

1. At $25^\circ C$, the molar conductance of $0.007 M$ hydrofluoric acid is $150 \text{ mho } cm^2 \text{ mol}^{-1}$ and its $\Lambda_m^\circ = 500 \text{ mho } cm^2 \text{ mol}^{-1}$. The value of the dissociation constant of the acid at the given concentration at $25^\circ C$ is

A. $7 \times 10^{-4} M$

B. $7 \times 10^{-5} M$

C. $9 \times 10^{-3} M$

D. $9 \times 10^{-4} M$

Answer: D



View Text Solution

2. To observe an elevation of boiling point of $0.05^\circ C$, the amount of solute (Mol. Wt = 100) to be added to 100 g of water ($K_b = 0.5$) is

A. 2g

B. 0.5 g

C. 1 g

D. 0.75 g

Answer: C



View Text Solution