DPP –8 CONDUCTANCE

Chapter: Electrochemistry

"Do this assignment not for me, not for marks — but for your own growth. Give it your honest effort."

TYPE–1 : Basic Conductance & Resistance Concepts

1. **Cell constant is maximum in case of** **[NCERT Pg. 75]**
   (1) Wire of length 100 m and cross sectional area 100 m^2
   (2) Wire of length 10 m and cross sectional area 10 m^2
   (3) One meter cube of a material
   (4) Equal in all cases
2. **Resistance of decimolar solution is 50 ohm. If electrodes of surface area 0.0004 m^2 each are placed at a distance of 0.02 m then conductivity of solution is**
   (1) 1 S cm^{-1} (2) 0.01 S cm^{-1}
   (3) 0.001 S cm^{-1} (4) 10 S cm^{-1}
3. **The specific conductance of a 0.1 N KCl solution at 23°C is 0.012 ohm^{-1} cm^{-1}. The resistance of cell containing the solution at the same temperature was found to be 55 ohm. The cell constant will be**
   (1) 0.918 cm^{-1} (2) 0.66 cm^{-1}
   (3) 1.142 cm^{-1} (4) 1.12 cm^{-1}
4. **The resistance of 0.0025 M solution of K_2SO_4 is 326 ohm. The specific conductance of the solution, if cell constant is 4 (in ohm).**
   (1) 4.997×10^{-4} (2) 5.997×10^{-7}
   (3) 6.997×10^{-4} (4) 1.20×10^{-2}
5. **The specific conductances in ohm^{-1} cm^{-1} of four electrolytes P, Q, R and S are given in brackets:**
   P (5.0×10^{-8}) **Q** (7.0×10^{-8})
   R (1.0×10^{-10}) **S** (9.2×10^{-3})
   The one that offers highest resistance to the passage of electric current is
   (1) P (2) S
   (3) R (4) Q

TYPE–2 : Molar Conductance Calculations

6. **The molar conductivity of a 0.5 mol/dm^3 solution of $AgNO_3$ with electrolytic conductivity of 5.76×10^{-3} S cm^{-1} at 298 K is**
   (1) 0.086 S cm^2/mol (2) 28.8 S cm^2/mol

(3) 2.88 S cm^2/mol (4) 11.52 S cm^2/mol

7. **The specific conductance of a salt of 0.01 M concentration is 1.061×10^{-4} S cm^{-1}. Molar conductance of the same solution will be:**

(1) 1.061×10^{-4} (2) 1.061

(3) 10.61 (4) 106.1

8. **Specific conductivity of 0.01 N H_2SO_4 solution is 6×10^{-5} S cm^{-1}. Its molar conductivity is**

(1) 1200 S cm^2 mol^{-1} (2) 600 S cm^2 mol^{-1}

(3) 60 S cm^2 mol^{-1} (4) 2400 S cm^2 mol^{-1}

9. **Specific conductance of 0.1 M Nitric acid is 6.3×10^{-2} ohm^{-1} cm^{-1}. The molar conductance of the solution is:**

(1) 630 ohm^{-1} cm^2 mol^{-1}

(2) 315 ohm^{-1} cm^2 mol^{-1}

(3) 100 ohm^{-1} cm^2 mol^{-1}

(4) 6.300 ohm^{-1} cm^2 mol^{-1}

(5) 63.0 ohm^{-1} cm^2 mol^{-1}

10. **The conductance of 0.01 N CH_3COOH solution is 4.5×10^{-4} ohm^{-1} which is present in a tube having length 6 cm and cross sectional area 36 cm^2. The molar conductivity of the solution is [NCERT Pg. 81]**

(1) 7.5 S cm^2 mol^{-1} (2) 8.5 S cm^2 mol^{-1}

(3) 2.5 S cm^2 mol^{-1} (4) 1.5 S cm^2 mol^{-1}

11. **If the electrical resistance of a column of 0.1 mol L^{-1} NaOH solution of diameter 1 cm and length 10 cm is 5×10^3 ohm, what would be the molar conductivity of the solution?**

(1) 254.8 S cm^2 mol^{-1}

(2) 50.96 S cm^2 mol^{-1}

(3) 102.3 S cm^2 mol^{-1}

(4) 25.48 S cm^2 mol^{-1}

12. **For an electrolytic solution having concentration 0.1M and resistance is 1KΩ. If distance between electrode is 100 cm and area is 1 cm^2 then calculate λ_m in S cm^2 mol^{-1}:**

(1) 100 (2) 1000 (3) 500 (4) 50

13. **Resistance of a conductivity cell filled with a solution of an electrolyte of concentration 0.1 M is 100 Ω. The conductivity of this solution is 1.29 S m^{-1}. Resistance of the same cell when filled with 0.02 M of the same solution is 520 Ω. The molar conductivity of 0.02 M solution of the electrolyte will be.**

(1) 124×10^{-4} S m^2 mol^{-1}

(2) 1240×10^{-4} S m^2 mol^{-1}

(3) 1.24×10^{-4} S m^2 mol^{-1}

(4) 12.4×10^{-4} S m^2 mol^{-1}

14. **Resistance of 0.2 M solution of an electrolyte is 50 Ω. The specific conductance of the solution is 1.4 S m^{-1}. The resistance of 0.5 M solution of the same electrolyte is 280 Ω. The molar conductivity of 0.5 M solution of the electrolyte in S m^2 mol^{-1} is:**

(1) 5×10^3 (2) 5×10^2

(3) 5×10^{-4} (4) 5×10^{-3}

15. **A 0.1M solution of monobasic acid has specific resistance of 'r' ohm-cm, its molar**

conductivity is

(1) 10/r (2) 10r

(3) 10^4/r (4) 10^4r

16. **What will be the molar conductance 'Λ', (in S cm^2 mol^{-1}) if resistivity is 'x' for 0.1 N H_2SO_4 solution?**

(1) $\Lambda = \frac{x \times 1000}{0.1}$ (2) $\Lambda = \frac{2 \times 1000}{x \times 0.1}$

(3) $\Lambda = \frac{x \times 1000}{0.5}$ (4) $\Lambda = \frac{0.5}{1000\,x}$

TYPE–3 : Equivalent Conductance Calculations

17. **Which relation is correct?**

(1) Molar conductance = conductivity × concentration

(2) Equivalent conductance = $\frac{\text{Conductivity}}{\text{Volume}}$

(3) Cell constant = $\frac{\text{Conductivity}}{\text{Conductance}}$

(4) Conductance = specific conductivity × cell constant

18. **If the specific conductance of 1M H_2SO_4 solution is 26×10^{-2} S cm^{-1}, then the equivalent conductivity would be**

(1) 1.3×10^2 S cm^2 eq^{-1} (2) 1.6×10^2 S cm^2 eq^{-1}

(3) 13 S cm^2 mol^{-1} (4) 1.3×10^3 S cm^2 mol^{-1}

19. **The specific conductance of a 0.01 M solution of KCl is 0.0014 ohm^{-1} cm^{-1} at 25°C. Its equivalent conductance (cm^2 ohm^{-1} eq^{-1}) is:**

(1) 140 (2) 14

(3) 1.4 (4) 0.14

20. **The specific conductivity of 0.5N solution is 0.01286 ohm^{-1} cm^{-1} and its equivalent conductance (in ohm^{-1} cm^2 eq^{-1})?**

(1) 257.4 (2) 2.574

(3) 25.74 (4) 0.2574

21. **If the specific resistance of a solution of concentration C g eq L^{-1} is R, then its equivalent conductance is:**

(1) $\frac{100\text{R}}{\text{C}}$ (2) $\frac{\text{RC}}{1000}$

(3) $\frac{1000}{\text{RC}}$ (4) $\frac{\text{C}}{1000\text{R}}$

22. **The resistance of 1 N solution of CH_3COOH is 250 Ω, when measured in a cell of cell constant 1.15 cm^{-1}. The equivalent conductance will be**

(1) 4.6 Ω^{-1} cm^2 eq^{-1} (2) 9.2 Ω^{-1} cm^2 eq^{-1}

(3) 18.4 Ω^{-1}cm^{2}eq^{-1} (4) 0.023 Ω^{-1}cm^{2}eq^{-1}

23. **The resistance of 0.01 N solution of an electrolyte was found to be 210 Ω at 298 K using a conductivity cell of cell constant 0.66 cm^{-1}. The equivalent conductance of solution is:**

(1) 314.28 mho cm^2 eq^{-1} (2) 3.14 mho cm^2 eq^{-1}

(3) 314.28 mho^{-1} cm^2 eq^{-1} (4) 3.14 mho^{-1} cm^2 eq^{-1}

24. **Which of the following solutions of KCl has the lowest value of equivalent conductance?**

(1) 1 M (2) 0.1 M

(3) 0.01 M (4) 0.001 M

25. **In the equation Λ = sp. cond. $\times$ V, If V is the volume in cc containing 1 equivalent of the electrolyte then V for a $\frac{N}{10}$ solution will be:**

(1) 10 c.c. (2) 100 c.c.

(3) 1000 c.c. (4) 10,000 c.c.