DPP – 07

CLASS – 12th

TOPIC – ELECTROCHEMISTRY

Q.1 Which has maximum conductivity :

(A) $[Cr(NH_3)_3Cl_3]$

(B) $[Cr(NH_3)_4Cl_2]Cl$

(C) $[Cr(NH_3)_5Cl]Cl_2$

(D) $[Cr(NH_3)_6]Cl_3$

Q.2 Resistance of a decimolar solution between two electrodes 0.02 meter apart and 0.0004m^2 in area was found to be 50 ohm. Specific conductance (κ) is

(A) 0.01 s cm^{-1}

(B) 1 s cm^{-1}

(C) 0.001 s cm^{-1}

(D) 10 s cm^{-1}

Q.3 Molar conductances of $BaCl_2$, H_2SO_4 and HCl at infinite dilutions are X_1, X_2 and X_3, respectively. Molar conductance of $BaSO_4$ at infinite dilution will be :

(A) $[X_1 + X_2 - X_3]/2$

(B) $[X_1 + X_2 - 2X_3]$

(C) $2\ (X_1 + X_2 - 2X_3)$

(D) $(X_1 + X_2 - 2X_3)/2$

Q.4 Molar conductance of 0.1 M acetic acid is 7 $ohm^{-1}\ cm^2\ mol^{-1}$. If the molar cond. of acetic acid at infinite dilution is 380.8 $ohm^{-1}\ cm^2\ mol^{-1}$, the value of dissociation constant will be

(A) 226×10^{-5} mol dm^{-3}

(B) 1.66×10^{-3} mol dm^{-1}

(C) 1.66×10^{-2} mol dm^{-3}

(D) 3.442×10^{-5} mol dm^{-3}

SOLUTION

(CHEMISTRY) ELECTROCHEMISTRY

DPP – 07

CLASS – 11th

TOPIC – ELECTROCHEMISTRY

Sol.1 Correct option is D)

More the number of ions more will be the conductivity

1. $[Cr(NH_3)_3Cl_3]$ = Number of ions = 1

2. $[Cr(NH_3)_4Cl_2]Cl$ = Number of ions = 1 + 1 =2

3. $[Cr(NH_3)_5C_1]Cl_2$ = Number of ions = 1 + 2 =3

4. $[Cr(NH_3)_6]Cl_3$ = Number of ions = 1 + 3 =4

Thus,$[Cr(NH_3)_6]Cl_3$ has most conductivity

Sol.2 Correct option is B)

$$k = c\frac{1}{A}$$

$$= \frac{1}{R}\frac{1}{A} = \frac{1}{50}\frac{0.02}{0.0004}$$

$$\frac{1\times 10000\times 2}{50\times 4\times 100} = 1\ Sm^{-1}$$

Sol.3 Correct option is B)

Molar conductances of $BaCl_2$, H_2SO_4 and HCl at infinite dilution are X_1, X_2 and X_3 respectively.

Molar conductance of $BaSO_4$ at infinite dilution is $X_1 + X_2 - 2X_3$.

$$\wedge^{m}_{BaSO_4} = \wedge^{m}_{BaCl_2} + \wedge^{m}_{H_2SO_4} - 2\wedge^{m}_{HCl}$$

$$\wedge^{m}_{BaSO_4} = X_1 + X_2 - 2X_3$$

Sol.4 Correct option is D)

$$\alpha = \frac{\wedge_m \text{ molar conductance}}{\wedge_m \text{ mol.cond. at infinite dilution}}$$

α = 0.0183 since $\alpha < 5\%$

$K = Ca^2$ -------> $K = 0.1 \times (0.0183)^2$

$K = 3.4 \times 10^{-5}\ moldm^{-2}$