Class XII
Chemistry
Ch:3
Chapter: Electrochemistry

Important Formulae & Concepts

1. $E^{\ominus}{}_{cell} = E^{\ominus}{}_{cathode} - E^{\ominus}{}_{anode}$

2. $E = E^{\ominus} - \dfrac{0.059}{n}\log\dfrac{1}{[M^{n+}]}$ (At 298 K)

3. $E_{cell} = E^{\ominus}{}_{cell} - \dfrac{2.303RT}{nF}\log\dfrac{[\text{Anode ion}]}{[\text{Cathode ion}]}$

4. $E^{\ominus}{}_{cell} = \dfrac{0.059}{n}\log K_c$ (At 298 K)

5. $\Delta G^{\ominus} = -nFE^{\ominus}{}_{cell}$

6. $R = \rho\,\dfrac{l}{A} = \dfrac{1}{\kappa}\dfrac{l}{A}$

7. Conductance: $G = \dfrac{1}{R}$

8. Conductivity = Conductance × Cell constant

9. $\kappa = \dfrac{1}{\rho} = \dfrac{1}{R}\left(\dfrac{l}{A}\right) = G\,\dfrac{l}{A}$

10. Cell constant and is denoted by the symbol G^{*}

11. $\Lambda_m = \dfrac{\text{Specific conductance}}{\text{Molarity}} = \dfrac{\kappa}{C}$

12. $\Lambda_m = \dfrac{\kappa \times 1000}{C}$

    Remember:
    Unit of Λ_m in above formula is Scm^2mol^{-1}

13. $\alpha = \dfrac{\wedge_m^c}{\wedge_m^0}$

14. $K_a = \dfrac{c\,\alpha^2}{1-\alpha}$

15. Kohlrausch's Law of independent migration of ions:

If the limiting molar conductivity of the cations is denoted by λ_+^o and that of the anions by λ_-^o then the limiting molar conductivity of electrolyte is:

$$\wedge_m^0 = v_+\lambda_+^0 + v_-\lambda_-^0$$

Where v_+ and v_- are the number of cations and anions per formula of electrolyte.

16. Faraday constant: It is equal to 96487 C mol^{-1} or approximately equal to 96500 C mol^{-1}.