Formulae For ELECTROCHEMISTRY

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FORMULAS- ELECTROCHEMISTY

Important Terms, Definitions & Formulae

XII Chemistry

CHAPTER 3 - ELECTROCHEMISTRY

1. $E^{\ominus}_{cell} = E^{\ominus}_{cathode} - E^{\ominus}_{anode}$
2. $E = E^{\ominus} - \frac{0.059}{n}\log\frac{1}{[M^{n+}]}$ (At 298 K)
3. $E_{cell} = E^{\ominus}_{cell} - \frac{2.303RT}{nF}\log\frac{[\text{Anode ion}]}{[\text{Cathode ion}]}$
4. $E^{\ominus}_{cell} = \frac{0.059}{n}\log K_c$ (At 298 K)
5. $\Delta G^{\ominus} = -nFE^{\ominus}_{cell}$
6. $R = \rho\frac{l}{A} = \frac{1}{\kappa}\frac{l}{A}$
7. $\text{Conductance: } G = \frac{1}{R}$
8. Conductivity = Conductance × Cell constant
9. $\kappa = \frac{1}{\rho} = \frac{1}{R}\left(\frac{l}{A}\right) = G\frac{l}{A}$
10. Cell constant and is denoted by the symbol G^*
11. $\Lambda_m = \frac{\text{Specific conductance}}{\text{Molarity}} = \frac{\kappa}{C}$
12. $\Lambda_m = \frac{\kappa \times 1000}{C}$

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

13. $\alpha = \frac{\wedge^c_m}{\wedge^0_m}$
14. $K_a = \frac{c\alpha^2}{1-\alpha}$

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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:

$$\wedge^0_m = v_+\lambda^0_+ + v_-\lambda^0_-$$

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}.