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Important Formulas of Current Efficiency and Resistance

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List of 15 Important Formulas of Current Efficiency and Resistance

Important Formulas of Current Efficiency and Resistance

1) Cell Constant given Resistance and Resistivity

Open Calculator

fx $$b = \left(\frac{R}{\rho}\right)$$

ex $$5.941176/m = \left(\frac{0.000101\Omega}{0.000017\Omega*m}\right)$$

2) Current Efficiency

Open Calculator

fx $$C.E = \left(\frac{A_o}{m_t}\right) \cdot 100$$

ex $$97.82609 = \left(\frac{45g}{46g}\right) \cdot 100$$

3) Distance between Electrode given Resistance and Resistivity

Open Calculator

fx $$l = \frac{R \cdot A}{\rho}$$

ex $$59.41176m = \frac{0.000101\Omega \cdot 10m^2}{0.000017\Omega*m}$$

4) Electrode Cross-Section Area given Resistance and Resistivity

Open Calculator

fx $$A = \frac{\rho \cdot l}{R}$$

ex $$9.99802\text{m}^2 = \frac{0.000017\Omega\text{*m} \cdot 59.4\text{m}}{0.000101\Omega}$$

5) Excess Pressure given Osmotic Coefficient

Open Calculator

fx $$\pi = (\Phi - 1) \cdot \pi_0$$

ex $$200\text{at} = (5 - 1) \cdot 50\text{at}$$

6) Ideal Pressure given Osmotic Coefficient

Open Calculator

fx $$\pi_0 = \frac{\pi}{\Phi - 1}$$

ex $$50\text{at} = \frac{200\text{at}}{5 - 1}$$

7) Kohlrausch Law

Open Calculator

fx $$\Lambda_m = \Lambda 0\text{m} - \left(\text{K} \cdot \sqrt{\text{c}}\right)$$

ex $$46.10263\text{S*m}^2/\text{mol} = 48\text{S*m}^2/\text{mol} - \left(60 \cdot \sqrt{0.001}\right)$$

8) Mass of Metal to be Deposited

Open Calculator

fx $$M_{metal} = \frac{MW \cdot i_p \cdot t}{nf \cdot [Faraday]}$$

ex $$4.377868g = \frac{120g \cdot 2.2A \cdot 4h}{9 \cdot [Faraday]}$$

9) Resistance given Cell Constant

Open Calculator

fx $$R = (\rho \cdot b)$$

ex $$0.0001\Omega = (0.000017\Omega*m \cdot 5.9/m)$$

10) Resistance given Conductance

Open Calculator

fx $$R = \frac{1}{G}$$

ex $$0.000125\Omega = \frac{1}{8001.25\mho}$$

11) Resistance given Distance between Electrode and Area of Cross-Section of Electrode

Open Calculator

fx $$R = (\rho) \cdot \left(\frac{l}{A}\right)$$

ex $$0.000101\Omega = (0.000017\Omega*m) \cdot \left(\frac{59.4m}{10m^2}\right)$$

12) Resistivity

Open Calculator

fx $$\rho = R \cdot \frac{A}{l}$$

ex $$1.7E\hat{}\text{-}5\Omega*m = 0.000101\Omega \cdot \frac{10m^2}{59.4m}$$

13) Resistivity given Specific Conductance

Open Calculator

fx $$\rho = \frac{1}{k_{conductance}}$$

ex $$1.7E\hat{}\text{-}5\Omega*m = \frac{1}{60000S/m}$$

14) Solubility

Open Calculator

fx $$S = k_{conductance} \cdot \frac{1000}{\Lambda 0m}$$

ex $$1250mol/L = 60000S/m \cdot \frac{1000}{48S*m^2/mol}$$

15) Solubility Product

Open Calculator

fx $$K_{sp} = m^2$$

ex $$1.4E\hat{}8 = (12mol/L)^2$$

Variables Used

- **A** Electrode Cross-sectional Area *(Square Meter)*
- **A_o** Actual Mass Deposited *(Gram)*
- **b** Cell Constant *(1 per Meter)*
- **c** Concentration of Electrolyte
- **C.E** Current Efficiency
- **G** Conductance *(Mho)*
- **i_p** Electric Current *(Ampere)*
- **K** Kohlrausch Coefficient
- **$k_{conductance}$** Specific Conductance *(Siemens per Meter)*
- **K_{sp}** Solubility Product
- **l** Distance between Electrodes *(Meter)*
- **m** Molar Solubility *(Mole per Liter)*
- **M_{metal}** Mass to be Deposited *(Gram)*
- **m_t** Theoretical Mass Deposited *(Gram)*
- **MW** Molecular Weight *(Gram)*
- **nf** N Factor
- **R** Resistance *(Ohm)*
- **S** Solubility *(Mole per Liter)*
- **t** Time *(Hour)*
- **Λ_m** Molar Conductivity *(Siemens Square Meter per Mole)*
- **Λ0m** Limiting Molar Conductivity *(Siemens Square Meter per Mole)*
- **π** Excess Osmotic Pressure *(Atmosphere Technical)*
- **π_0** Ideal Pressure *(Atmosphere Technical)*

- **ρ** Resistivity *(Ohm Meter)*
- **Φ** Osmotic Coefficient

Constants, Functions, Measurements used

- Constant: **[Faraday]**, 96485.33212 Coulomb / Mole
  Faraday constant
- Function: **sqrt**, sqrt(Number)
  Square root function
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Weight** in Gram (g)
  Weight Unit Conversion
- Measurement: **Time** in Hour (h)
  Time Unit Conversion
- Measurement: **Electric Current** in Ampere (A)
  Electric Current Unit Conversion
- Measurement: **Area** in Square Meter (m²)
  Area Unit Conversion
- Measurement: **Pressure** in Atmosphere Technical (at)
  Pressure Unit Conversion
- Measurement: **Electric Resistance** in Ohm (Ω)
  Electric Resistance Unit Conversion
- Measurement: **Electric Conductance** in Mho (℧)
  Electric Conductance Unit Conversion
- Measurement: **Electric Resistivity** in Ohm Meter (Ω*m)
  Electric Resistivity Unit Conversion
- Measurement: **Electric Conductivity** in Siemens per Meter (S/m)
  Electric Conductivity Unit Conversion
- Measurement: **Molar Concentration** in Mole per Liter (mol/L)
  Molar Concentration Unit Conversion

- Measurement: **Wave Number** in 1 per Meter (1/m)
  Wave Number Unit Conversion
- Measurement: **Molar Conductivity** in Siemens Square Meter per Mole (S*m²/mol)
  Molar Conductivity Unit Conversion

Check other formula lists

- Activity of Electrolytes Formulas
- Concentration of Electrolyte Formulas
- Conductance and Conductivity Formulas
- Debey Huckel Limiting Law Formulas
- Degree of Dissociation Formulas
- Dissociation Constant Formulas
- Electrochemical Cell Formulas
- Electrolytes & Ions Formulas
- EMF of Concentration Cell Formulas
- Equivalent Weight Formulas
- Gibbs Free Energy Formulas
- Gibbs Free Entropy Formulas
- Helmholtz Free Energy Formulas
- Helmholtz Free Entropy Formulas
- Important Formulas of Activity and Concentration of Electrolytes
- Important Formulas of Conductance
- Important Formulas of Current Efficiency and Resistance
- Important Formulas of Gibbs Free Energy and Entropy and Helmholtz Free Energy and Entropy
- Important Formulas of Ionic Activity
- Ionic Strength Formulas
- Mean Activity Coefficient Formulas
- Mean Ionic Activity Formulas
- Normality of Solution Formulas
- Osmotic Coefficient & Current Efficiency Formulas
- Resistance and Resistivity Formulas
- Tafel Slope Formulas
- Temperature of Concentration Cell Formulas
- Transport Number Formulas

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