

## EQUATIONS NOT FOUND ON THE EQUATION SHEET FOR AP CHEMISTRY

### Atomic Structure -

$$1 \text{ m} = 1 \times 10^9 \text{ nm}$$

Effective nuclear charge -

$$Z_{\text{eff}} (\text{which electron}) = \# \text{ protons} - \text{inner core electrons}$$

$$\text{relative weighted average atomic mass} = \Sigma(\text{isotopic mass} \cdot \text{fractional abundance})$$

### Equilibrium -

$$K_{\text{sp}} = [\text{A}^+]^2 [\text{B}^-] \quad \text{where } \text{A}_2\text{B}(\text{s}) \rightleftharpoons 2\text{A}^+(\text{aq}) + \text{B}^{2-}(\text{aq})$$

$$\% \text{ ionization} = \frac{[\text{x}]}{[\text{acid or base}]} \times 100$$

### Kinetics -

$$\text{Rate law} = k[\text{A}]^m[\text{B}]^n$$

### Gases, Liquids, and Solutions -

Coulomb's Law - (all attractive forces)

$$\text{Energy or force of attraction} \propto \text{charge/distance}$$

$$\text{Formal charge} = \# \text{ valence electrons} - (\# \text{ lone electrons} + \frac{1}{2} \text{ shared electrons})$$

$$\text{Dilution} - M_1V_1 = M_2V_2$$

### Thermodynamics and Electrochemistry -

$$\Delta H_{\text{rxn}}^{\circ} = \Sigma \text{bonds broken} - \Sigma \text{bonds formed}$$

$$q_{\text{hot metal}} = -q_{\text{cold water}}$$

$$q_{\text{hot water}} = -q_{\text{cold water}}$$

$$q_{\text{dissolution}} = -(q_{\text{solution}} + q_{\text{calorimeter}})$$

$$q_{\text{reaction}} = -q_{\text{solution}}$$

$$E^{\circ}_{\text{cell}} = E^{\circ}_{\text{cathode}} - E^{\circ}_{\text{anode}}$$

$$\text{Amp} = \text{coulomb/s}$$

### Other -

$$\% \text{ yield} = \frac{\text{actual}}{\text{theoretical}} \times 100$$

$$\% \text{ error} = \frac{\text{actual} - \text{theoretical}}{\text{theoretical}} \times 100$$

equation for straight line - used for variety of plots -  $y = mx + b$

$$\% \text{ mass} = \frac{\text{g part}}{\text{total mass}} \times 100$$