$$F = k\frac{q_1 q_2}{r^2}$$

$$\vec{F} = q\vec{E} = m\vec{a}$$

$$U = -\vec{p}\cdot\vec{E}$$

$$\vec{\tau} = \vec{p}\times\vec{E}$$

$$\Phi = \int_{Surface} \vec{E}.d\vec{A}$$

$$\Phi_c = \oint \vec{E}.d\vec{A} = \frac{q_{in}}{\varepsilon_0}$$

$$E = \frac{\sigma}{2\varepsilon_o}$$

$$E = \frac{\sigma}{\varepsilon_o}$$

$$E = k\frac{q}{r^2}$$

$$E = k\frac{q}{R^3}r$$

$$E = \frac{2k\lambda}{r}$$

$$\Delta V = V_B - V_A = -\int_A^B \vec{E}.d\vec{S} = \frac{\Delta U}{q_0}$$

$$V = k\frac{q}{r} \quad , \quad V = \sum_{i=1}^{N}\frac{kq_i}{r_i}$$

$$E_x = -\frac{\partial V}{\partial x}, \quad E_y = -\frac{\partial V}{\partial y}, \quad E_z = -\frac{\partial V}{\partial z}$$

$$U = k\frac{q_1 q_2}{r_{12}}$$

$$\Delta U = -W$$

$$C = \frac{q}{V}$$

$$C = \kappa C_{air}$$

$$C = \frac{\varepsilon_o A}{d} \quad (\textit{for parallel plate capacitor})$$

$$C = 2\pi\varepsilon_o \frac{L}{\ln\left(\frac{b}{a}\right)} \quad (\textit{for cylindrical capacitor})$$

$$C = 4\pi\varepsilon_o\left(\frac{ab}{b-a}\right) \quad (\textit{for spherical capacitor})$$

$$C = 4\pi\varepsilon_o R$$

$$U = \frac{1}{2}CV^2$$

$$u = \frac{1}{2}\varepsilon_o E^2$$

$$I = \frac{dQ}{dt} = JA$$

$$R = \frac{V}{I} = \rho\frac{L}{A}$$

$$J = nev_d$$

$$J = \sigma E$$

$$R = R_0\,[1+\alpha(T - T_0)]$$

$$\rho = \rho_0\,[1+\alpha(T - T_0)]$$

$$P = IV$$

$$v = v_o + at$$

$$x - x_o = v_o t + \frac{1}{2}a t^2$$

$$v^2 = v_o^2 + 2a(x - x_o)$$

Constants:

$k = 9.00 \times 10^9\ N.m^2/C^2$

$\varepsilon_0 = 8.85 \times 10^{-12}\ C^2/N.m^2$

$e = 1.60 \times 10^{-19}\ C$

$m_e = 9.11 \times 10^{-31}\ kg$

$m_p = 1.67 \times 10^{-27}\ kg$

$g = 9.80\ m/s^2$

μ = micro = 10^{-6}	M = mega = 10^6
n = nano = 10^{-9}	p = pico = 10^{-12}
m = milli = 10^{-3}	