Physics 102
Formula sheet for Second Major

$\hat{i}$, $\hat{j}$ and $\hat{k}$ are unit vectors along the positive directions of x-axis, y-axis and z-axis respectively.

$$F = \frac{kq_1q_2}{r^2} \quad , \quad F = q_0 E$$

$$\Phi = \int_{\text{Surface}} \vec{E} \cdot d\vec{A} \quad , \quad E = \frac{kq}{r^2}$$

$$E = \frac{kQ}{R^3} r \quad , \quad E = \frac{2k\lambda}{r}$$

$$\varphi_c = \oint \vec{E}.d\vec{A} = \frac{q_{in}}{\varepsilon_0}; \quad E = \frac{\sigma}{2\varepsilon_o}; \quad E = \frac{\sigma}{\varepsilon_o}$$

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

$$V = \frac{kQ}{r} \quad , \quad W = - \Delta U$$

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

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

$$U = \frac{kq_1q_2}{r_{12}}$$

$$C = \frac{Q}{V} \quad , \quad C_o = \frac{\varepsilon_0 A}{d} \quad , \quad C = 4\pi\varepsilon_o \frac{ab}{b-a},$$

$$U = \frac{1}{2} CV^2 \quad , \quad u = \frac{1}{2}\varepsilon_o E^2, \quad C = \kappa C_0 ,$$

$$I = \frac{dQ}{dt} \quad , \quad I = J A,$$

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

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

$$v = v_o + at$$

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

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

$\varepsilon_0 = 8.85 \times 10^{-12}$ C^2/N.m^2
$k = 9.0 \times 10^9$ N.m^2/C^2
$e = -1.6 \times 10^{-19}$ C
$m_e = 9.11 \times 10^{-31}$ kg
$m_p = 1.67 \times 10^{-27}$ kg
1 eV $= 1.6 \times 10^{-19}$ J
g = 9.8 m/s^2

micro (μ) $= 10^{-6}$
nano (n) $= 10^{-9}$
pico (p) $= 10^{-12}$