

FORMULAE SHEET

Subject: UPEM (PHY2001)

$$\vec{F} = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r^2} \hat{r}$$

$$\vec{E} = \frac{\vec{F}}{q_0}$$

$$\vec{E} = \frac{1}{4\pi\epsilon_0} \frac{Q}{r^2} \hat{r}$$

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

$$U = -p \cos \phi$$

$$\varphi_E = \oint \vec{E} \cdot d\vec{A}$$

$$V = \frac{1}{4\pi\epsilon_0} \frac{q}{r}$$

$$C = \frac{Q}{V_{ab}}$$

$$C_0 = \frac{\epsilon_0 A}{d}$$

$$U = \frac{1}{2} \frac{Q^2}{C}$$

$$u = \frac{1}{2} \epsilon_0 E^2$$

$$C = K C_0$$

$$I = e v_d A n$$

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

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

$$V_{ab} = \mathcal{E} - Ir$$

$$I_{fs} R_c = (I_a - I_{fs}) R_{sh}$$

$$V_{fs} = I_{fs} (R_c + R_s)$$

$$q = Q_f \left(1 - e^{-\frac{t}{RC}} \right)$$

$$i = I_0 e^{-\frac{t}{RC}}$$

$$\tau = RC$$

$$q = Q_0 e^{-\frac{t}{RC}}$$

$$i = I_0 e^{-\frac{t}{RC}}$$

$$\vec{F} = |q| (\vec{v} \times \vec{B})$$

$$\vec{F} = q (\vec{v}_d \times \vec{B})$$

$$\vec{F} = i (\vec{\ell} \times \vec{B})$$

$$dB = \frac{\mu_0}{4\pi} \frac{I d\ell \sin \theta}{r^2}$$

$$B = \frac{\mu_0 I}{2 \pi x}$$

$$B_x = \frac{\mu_0 N I}{2 a}$$

$$\oint \vec{B} \cdot d\vec{A} = \mu_0 I_{encl}$$

$$\mathcal{E} = -N \frac{d\phi_B}{dt}$$

$$i_D = \epsilon \frac{d\phi_E}{dt}$$

$$\mathcal{E} = -L \frac{di}{dt}$$

$$U_E = \frac{1}{2} L I^2$$

$$i = I_0 \left[1 - e^{-\left(\frac{R}{L}\right)t} \right]$$

$$\omega = \sqrt{\frac{1}{LC}}$$

$$\omega' = \sqrt{\frac{1}{LC} - \frac{R^2}{4L^2}}$$

$$V_{rms} = \frac{V}{\sqrt{2}}$$

$$I_{rms} = \frac{I}{\sqrt{2}}$$

$$X_L = \omega L$$

$$X_C = \frac{1}{\omega C}$$

$$Z = \sqrt{R^2 + \left(\omega L - \frac{1}{\omega C} \right)^2}$$

$$p_{av} = V_{rms} I_{rms} \cos \phi$$

$$E = c B$$

$$B = \mu_0 \epsilon_0 c E$$

$$c = \sqrt{\frac{1}{\mu_0 \epsilon_0}}$$

$$\oint \vec{E} \cdot d\vec{A} = \frac{Q_{encl}}{\epsilon_0}$$

$$\oint \vec{B} \cdot d\vec{A} = 0$$

$$\oint \vec{E} \cdot d\vec{l} = -\frac{d\phi_B}{dt}$$

$$\oint \vec{B} \cdot d\vec{l} = \mu_0 (i_C + i_D)_{encl}$$