PHYS1022 Formulae

$$\underline{F}_{1,2} = \frac{kq_1q_2}{r_{1,2}^2}\hat{r}_{1,2}$$

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

$$\Phi_{net} = \oint_S \underline{E}\cdot d\underline{A} = \frac{Q_{enclosed}}{\varepsilon_0}$$

$$V = \frac{q}{4\pi\varepsilon_0 r}$$

$$U = q_0 V$$

$$\Delta V = V_b - V_a = \frac{\Delta U}{q_0} = -\int_a^b \underline{E}\cdot\underline{dl}$$

$$E_x = -\frac{\partial V}{\partial x}$$

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

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

$$u_e = \frac{1}{2}\varepsilon_0 E^2$$

$$I = \frac{\Delta Q}{\Delta t} = qnAv_d$$

$$V = IR$$

$$P = IV = I^2R = \frac{V^2}{R}$$

$$V_C = E(1-e^{-t/RC}) + V_0 e^{-t/RC}$$

$$\underline{F} = q\underline{v}\times\underline{B}$$

$$d\underline{F} = I\,\underline{dl}\times\underline{B}$$

$$\underline{B} = \frac{\mu_0}{4\pi}\frac{q\underline{v}\times\hat{\underline{r}}}{r^2}$$

$$d\underline{B} = \frac{\mu_0}{4\pi}\frac{Id\underline{l}\times\hat{\underline{r}}}{r^2}$$

$$\Phi_m = \int_S \underline{B}\cdot d\underline{A}$$

$$\oint_C \underline{B}\cdot\underline{dl} = \mu_0 I_C$$

$$\varepsilon = -\frac{d}{dt}\int_S \underline{B}\cdot d\underline{A} = -\frac{d\Phi_m}{dt} = \oint_C \underline{E}\cdot\underline{dl}$$