Chapter 15

$v = f\lambda$ $\qquad k = \frac{2\pi}{\lambda}$ $\qquad\qquad \omega = 2\pi f = \frac{2\pi}{T}$ $\qquad \frac{\partial^2 y(x,t)}{\partial x^2} = \frac{1}{v^2}\frac{\partial^2 y(x,t)}{\partial t^2}$

$\frac{\partial y(x,t)}{\partial t} = \mp v\frac{\partial y(x,t)}{\partial x}$ $\quad v = \sqrt{\frac{F}{\mu}}$ $\qquad\qquad$ Power $= F_y(x,t)v_y(x,t)$ $\quad P_{\text{av}} = \frac{1}{2}\sqrt{\mu F}\omega^2 A^2$

$\frac{I_1}{I_2} = \frac{r_2^2}{r_1^2}$ $\qquad\qquad y(x,t) = A_{\text{sw}}\sin(kx)\cos(\omega t)$

Chapter 16

$p(x,t) = -B\frac{\partial y(x,t)}{\partial x}$ $\qquad p_{\text{max}} = BkA$ $\quad v = \sqrt{\frac{B}{\rho}}$ $\qquad\qquad v = \sqrt{\frac{\gamma RT}{M}}$

$T_{\text{kelvin}} = T_C + 273.15$ $\quad v = \sqrt{\frac{Y}{\rho}}$ $\qquad I = \langle p(x,t)v_y(x,t)\rangle_t$ $\quad I = \frac{1}{2}\sqrt{\rho B}\omega^2 A^2$

$\beta = (10\text{dB})\log\frac{I}{I_0}$ $\qquad I_0 = 10^{-12}\frac{W}{m^2}$ $\quad f_{\text{beat}} = f_a - f_b$ $\qquad f_L = \frac{v+v_L}{v+v_S}f_S$

Chapter 21

$F = k\frac{|q_1 q_2|}{r^2} = \frac{1}{4\pi\epsilon_0}\frac{|q_1 q_2|}{r^2}$ $\quad \epsilon_0 = 8.85\times 10^{-12}\frac{C^2}{Nm^2}$ $\quad k = 8.988\times 10^9 \frac{Nm^2}{C^2}$ $\quad \vec{E} = \frac{1}{4\pi\epsilon_0}\frac{q}{r^2}\hat{r}$

$p = dq$ $\qquad\qquad \vec{\tau} = \vec{p}\times\vec{E}$ $\qquad\qquad U = -\vec{p}\cdot\vec{E}$

Chapter 22

$\Phi_E \equiv \int \vec{E}\cdot \mathrm{d}\vec{A}$ $\quad \oint \vec{E}\cdot \mathrm{d}\vec{A} = \frac{Q_{\text{encl}}}{\epsilon_0}$

Chapter 23

$V = \frac{1}{4\pi\epsilon_0}\frac{q}{r}$ $\quad -\Delta V = V_a - V_b = \int_a^b \vec{E}\cdot \mathrm{d}\vec{l}$ $\quad \vec{E} = -\left(\hat{\mathrm{i}}\frac{\partial V}{\partial x} + \hat{\mathrm{j}}\frac{\partial V}{\partial y} + \hat{\mathrm{k}}\frac{\partial V}{\partial z}\right)$

Chapter 24

$C = \frac{Q}{V_{ab}}$ $\qquad \frac{1}{C_{\text{series}}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + ...$ $\quad C_{\text{parallel}} = C_1 + C_2 + C_3 + ...$ $\quad U = \frac{1}{2}CV^2 = \frac{1}{2}QV$

$u = \frac{1}{2}\epsilon_0 E^2$ $\quad C = KC_0$ $\qquad\qquad u = \frac{1}{2}K\epsilon_0 E^2$ $\qquad\qquad \oint K\vec{E}\cdot \mathrm{d}\vec{A} = \frac{Q_{\text{encl-free}}}{\epsilon_0}$

Chapter 25

$I = \frac{\mathrm{d}Q}{\mathrm{d}t} = n|q|v_d A$ $\qquad \vec{J} = nq\vec{v}_d$ $\quad \rho = \frac{E}{J}$ $\qquad \rho(T) = \rho_0\left[1 + \alpha\left(T - T_0\right)\right]$

$V = IR$ $\qquad\qquad R = \frac{\rho L}{A}$ $\quad V_{ab} = \mathcal{E} - Ir$ $\quad P = V_{ab}I$

$P_{\text{resistor}} = V_{ab}I = I^2 R$

Chapter 26

$R_{\text{eq}} = R_1 + R_2 + R_3 + ...$ $\qquad \frac{1}{R_{\text{eq}}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + ...$ $\quad$ KCR $\sum I = 0$ $\quad$ KVR $\sum V = 0$

$V_C = \frac{q}{C}$ $\qquad\qquad q_C(t) = C\mathcal{E}\left(1 - e^{-t/RC}\right)$ $\quad i = \frac{\mathrm{d}q}{\mathrm{d}t}$

Chapter 27

$\vec{F} = q\vec{v}\times\vec{B}$ $\qquad \Phi_B = \int \vec{B}\cdot \mathrm{d}\vec{A}$ $\quad \oint \vec{B}\cdot \mathrm{d}\vec{A} = 0$ $\quad R = \frac{mv}{|q|B}$ $\qquad \vec{F} = I\vec{l}\times\vec{B}$

$\mathrm{d}\vec{F} = I\mathrm{d}\vec{l}\times\vec{B}$ $\quad \mu = IA$ $\qquad\qquad \vec{\tau} = \vec{\mu}\times\vec{B}$ $\qquad U = -\vec{\mu}\cdot\vec{B}$

Chapter 28

$\vec{B} = \frac{\mu_0}{4\pi}\frac{q\vec{v}\times\hat{r}}{r^2}$ $\quad \mathrm{d}\vec{B} = \frac{\mu_0}{4\pi}\frac{I\mathrm{d}\vec{l}\times\hat{r}}{r^2}$ $\quad B_{\text{straight wire}} = \frac{\mu_0 I}{2\pi r}$