Equations

$$V = IR, \quad P = IV, \quad \overrightarrow{F} = m\overrightarrow{a}, \quad \phi_E = \int \overrightarrow{E} \cdot d\overrightarrow{A}$$

$$\oint \overrightarrow{E} \cdot \overrightarrow{ds} = -\frac{d\phi_B}{dt}, \quad \oint \overrightarrow{B} \cdot \overrightarrow{ds} = \mu_0 \epsilon_0 \frac{d\phi_E}{dt} + \mu_0 I_{enclosed}, \quad I_{Displacement} = \epsilon_0 \frac{d\phi_E}{dt}$$

$$U_L = (1/2)\ LI^2, \quad U_C = (1/2)\ CV^2, \quad u_B = B^2/(2\mu_0), \quad u_E = \epsilon_0 E^2/2$$

$$c = E/B, \quad Pressure = S/c, \quad \overrightarrow{S} = (1/\mu_0)\ \overrightarrow{E} \times \overrightarrow{B}, \quad S_{av} = E_{max} B_{max}/(2\mu_0)$$

$$\overrightarrow{E} = \overrightarrow{E_0} \sin(kx - \omega t), \quad k = 2\pi/\lambda, \quad \omega = 2\pi f, \quad c_{vacuum} = \lambda f = 1/\sqrt{\epsilon_0 \mu_0}$$

$$n_1 \sin\theta_1 = n_2 \sin\theta_2 \ \ (Snell's\ \ Law), \quad \sin\theta_c = n_2/n_1, \quad n = c/v, \quad n_1\lambda_1 = n_2\lambda_2$$

$$\theta_1 + \theta_2 = 90^o \ \ (Brewster's\ Angle\ Condition)$$

$$E = E_0 \cos\theta_{polarizer}, \quad I = I_0 \cos^2\theta_{polarizer}, \quad \theta_{polarizer} = \theta_E - \theta^{transmission}_{axis}$$

$$I_{unpolarized} \rightarrow I_{unpolarized}/2, \quad Work = \int \overrightarrow{F} \cdot d\overrightarrow{l} = Fl, \quad Power = \frac{dW}{dt} = Fv$$

$$\frac{1}{p} + \frac{1}{i} = \frac{1}{f}, \quad M = -\frac{i}{p} = \frac{h'}{h}, \quad M_{overall} = M_1 \cdot M_2 \cdot M_3 ...$$

$$|f| = |R/2|\ (mirror), \quad \frac{n_1}{p} + \frac{n_2}{i} = \frac{n_2 - n_1}{R}, \quad \frac{1}{f} = (n-1)(\frac{1}{R_1} - \frac{1}{R_2})$$

Constants

$\mu_0 = 4\pi \times 10^{-7}\ \frac{Tm}{A}$

$\epsilon_0 = 8.85 \times 10^{-12}\ \frac{C^2}{Nm^2}$

$c = 3.0 \times 10^8\ m/s$

$g = 9.8\ m/s^2$