Equations

$F = \frac{k|q_1||q_2|}{r^2}$ $\quad \vec{E} = \frac{\vec{F}}{q_o}$ $\quad \Phi = EAcos\theta$ $\quad \Phi = \frac{q}{\varepsilon_o}$

$\Delta V = \frac{\Delta U}{q_o} = \frac{-W}{q_o}$ $\quad E = \frac{-\Delta V}{\Delta s}$ $\quad V = \frac{kq}{r}$ $\quad U = \frac{kq_oq}{r}$

$C = \frac{Q}{V}$ $\quad C = \frac{\kappa\varepsilon_o A}{d}$ $\quad U = \frac{1}{2}CV^2$ $\quad I = \frac{\Delta Q}{\Delta t}$

$V = IR$ $\quad R = \frac{\rho L}{A}$ $\quad P = IV$ $\quad \tau = RC$

$q(t) = Q(1 - e^{-t/\tau})$ $\quad q(t) = Qe^{-t/\tau}$ $\quad F = |q|vBsin\theta$ $\quad \sum F = ma$

$a_{cp} = \frac{v^2}{r}$ $\quad F = ILBsin\theta$ $\quad \tau = NIBAsin\theta$ $\quad B = \frac{\mu_o I}{2\pi r}$

$\sum B_{\parallel}\Delta L = \mu_o I_{enclosed}$ $\quad B = \frac{N\mu_o I}{2R}$ $\quad B = \mu_o nI$ $\quad \Phi = BAcos\theta$

$\mathcal{E} = -N\frac{\Delta\Phi}{\Delta t}$ $\quad \mathcal{E} = BLv$ $\quad \mathcal{E} = NBA\omega sin(\omega t)$ $\quad |\mathcal{E}| = L\left|\frac{\Delta I}{\Delta t}\right|$

$L = \mu_o n^2 Al$ $\quad I = \frac{\mathcal{E}}{R}(1 - e^{-t/\tau})$ $\quad \tau = \frac{L}{R}$ $\quad U = \frac{1}{2}LI^2$

$\frac{V_p}{V_s} = \frac{N_p}{N_s} = \frac{I_s}{I_p}$ $\quad V = V_{max}sin(\omega t)$ $\quad x_{rms} = \frac{x_{max}}{\sqrt{2}}$ $\quad I_{rms} = \frac{V_{rms}}{X_C}$

$X_C = \frac{1}{\omega C}$ $\quad I_{rms} = \frac{V_{rms}}{X_L}$ $\quad X_L = \omega L$ $\quad \omega_o = \frac{1}{\sqrt{LC}} = 2\pi f$

$f' = f\left(1 \pm \frac{u}{c}\right)$ $\quad c = f\lambda$ $\quad I = I_o cos^2\theta$ $\quad \frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$

$m = \frac{h_i}{h_o} = -\frac{d_i}{d_o}$ $\quad n = \frac{c}{v}$ $\quad n_1 sin\theta_1 = n_2 sin\theta_2$ $\quad D = \frac{1}{f}$

$M = \frac{N}{f}$ *or* $M = \frac{N}{f} + 1$ $\quad M = \frac{\theta'}{\theta}$ $\quad M = \frac{-d_{i1}N}{f_{objective}f_{eyepiece}}$ $\quad M = \frac{f_{objective}}{f_{eyepiece}}$

$dsin\theta = m\lambda$, $m = 0,1,2,....$ $\quad dsin\theta = (m + \frac{1}{2})\lambda$, $m = 0,1,2,....$ $\quad y = Ltan\theta$

$2t = m\lambda_{film}$, $m = 0,1,2,....$ $\quad 2t = (m + \frac{1}{2})\lambda_{film}$, $m = 0,1,2,....$ $\quad \lambda_{film} = \frac{\lambda_{vac}}{n_{film}}$

$Wsin\theta = m\lambda$, m=1,2,3,....

$\Delta t = \frac{\Delta t_o}{\sqrt{1-\frac{v^2}{c^2}}}$ $L = L_o\sqrt{1-\frac{v^2}{c^2}}$ $v_{AB} = \frac{v_{AC}+v_{CB}}{1+\frac{v_{AC}v_{CB}}{c^2}}$ $p = \frac{mv}{\sqrt{1-\frac{v^2}{c^2}}}$

$E = \frac{m_o c^2}{\sqrt{1-\frac{v^2}{c^2}}}$ $f_{peak} = (5.88\text{x}10^{10}/\text{sK})T$ $E = hf$ $K_{max} = hf - W_o$

$p = \frac{h}{\lambda}$ $\lambda' - \lambda = \frac{h}{mc}(1 - cos\theta)$ $\Delta p_y \Delta y \geq \frac{h}{2\pi}$ $\Delta E \Delta t \geq \frac{h}{2\pi}$

$r = (1.2\times10^{-15}m)A^{1/3}$ $N = N_o e^{-\lambda t}$ $T_{1/2} = \frac{.693}{\lambda}$ $R = \left|\frac{\Delta N}{\Delta t}\right| = \lambda N$

Constants

e = 1.60 x 10^{-19}C k = 8.99 x 10^9 Nm^2/C^2 ε_o = 8.85 x 10^{-12} $C^2/(Nm^2)$

1eV = 1.60 x 10^{-19}J $\mu_o = 4\pi\times10^{-7}Tm/A$ c = 3.00 x 10^8 m/s

m_e = 5.49 x 10^{-4}u = 9.11x10^{-31}kg m_p = 1.007267 u m_n = 1.008665u

1u = 931.5 Mev/c^2 = 1.6605 x 10^{-27}kg h = 6.63 x 10^{-34} Js