PHYS 204 Formula Sheet

$\Phi_B = \int \vec{B}\cdot d\vec{A}$	$\omega' = \sqrt{\omega^2 - \left(\frac{R}{2L}\right)^2}$	$I = \frac{1}{c\mu_0}E_{rms}^2$	
$\varepsilon = \oint \vec{E}\cdot d\vec{s} = -\frac{d\Phi_B}{dt}$	$\frac{dU}{dt} = -i^2R$	$I = \frac{P_s}{4\pi r^2}$	
$\Phi_B = BLx$	$\varepsilon = \varepsilon_m \sin\omega_d t$	$I = \frac{1}{2}I_0$; $I = I_0\cos^2\theta$	
$\vec{F_d} = i\vec{L}\times\vec{B}$	$i = i_m \sin(\omega_d t - \varphi)$	$n_1\sin\theta_1 = n_2\sin\theta_2$	
$L = \frac{N\Phi_B}{i}$	$\varepsilon_m = \frac{i_m}{R}$	$\theta_c = \sin^{-1}\frac{n_2}{n_1}$	
$\frac{L}{l} = \mu_0 n^2 A$	$V_R = i_m R$; $V_C = i_m X_C$; $V_L = i_m X_L$	$\theta_B = \tan^{-1}\frac{n_2}{n_1}$	
$\varepsilon_L = -L\frac{di}{dt}$	$X_C = \frac{1}{\omega_d C}$; $X_L = \omega_d L$	$\frac{1}{p}+\frac{1}{i}=\frac{1}{f}=\frac{2}{r}$	
$i = \frac{\varepsilon}{R}\left(1 - e^{-\frac{t}{\tau_L}}\right)$	$i_m = \frac{\varepsilon_m}{\sqrt{R^2+(X_L-X_C)^2}} = \frac{\varepsilon_m}{Z}$	$m = -\frac{i}{p}$; $\lvert m\rvert = \frac{h'}{h}$	
$i = i_0 e^{-\frac{t}{\tau_L}}$	$\tan\varphi = \frac{X_L - X_C}{R}$	$\frac{n_1}{p}+\frac{n_2}{i}=\frac{n_2-n_1}{r}$	
$U_B = \frac{1}{2}Li^2$	$P_{avg} = i_{rms}^2 R = \varepsilon_{rms} i_{rms}\cos\varphi$	$\frac{1}{p}+\frac{1}{i}=\frac{1}{f}=(n-1)\left(\frac{1}{r_1}-\frac{1}{r_2}\right)$	
$u_B = \frac{B^2}{2\mu_0}$	$i_{rms} = \frac{i_m}{\sqrt{2}}$; $\varepsilon_{rms}=\frac{\varepsilon_m}{\sqrt{2}}$	$m_\theta = \frac{25\,cm}{f}$; $m_\theta = -\frac{f_{ob}}{f_{ey}}$	
$u_E = \frac{1}{2}\varepsilon_0E^2$	$\frac{V_s}{V_p}=\frac{N_s}{N_p}$; $\frac{i_s}{i_p}=\frac{N_p}{N_s}$	$M = mm_\theta = -\frac{s}{f_{ob}}\cdot\frac{25\,cm}{f_{ey}}$	
$M_{12} = \frac{N_1\Phi_{12}}{i_2}$	$R_{eq} = \left(\frac{N_p}{N_s}\right)^2 R$	$n = \frac{c}{v}$; $\lambda_n = \frac{\lambda}{n}$	
$\varepsilon_2 = -M\frac{di_1}{dt}$	$\oint_S \vec{E}\cdot d\vec{A} = \frac{q_{enc}}{\varepsilon_0}$	$I = 4I_0\cos^2\frac{\varphi}{2}$; $\varphi = \frac{2\pi}{\lambda}d\sin\theta$	
$U_E = \frac{q^2}{2C}$	$\oint_S \vec{B}\cdot d\vec{A} = 0$	$N_2 - N_1 = \frac{L}{\lambda}(n_2-n_1)$	
$U_B = \frac{Li^2}{2}$	$\oint_C \vec{E}\cdot d\vec{s} = -\frac{d\Phi_B}{dt}$	$2n_2L = \left(m+\frac{1}{2}\right)\lambda$; $2n_2L = m\lambda$	
$U = U_E+U_B = \frac{Q^2}{2C}$	$\oint_C \vec{B}\cdot d\vec{s} = \mu_0\varepsilon_0\frac{d\Phi_E}{dt} + \mu_0 i_{enc}$	$N_m - N_a = \frac{2L}{\lambda}(n-1)$	
$\frac{dU}{dt} = L\frac{d^2q}{dt^2}+\frac{1}{C}q = 0$	$B = \frac{\mu_0\varepsilon_0 r}{2\pi R^2}\frac{d\Phi_E}{dt}$; $B = \frac{\mu_0\varepsilon_0}{2\pi r}\frac{d\Phi_E}{dt}$	$a\sin\theta = \left(m+\frac{1}{2}\right)\lambda$; $a\sin\theta = m\lambda$	
$q = Q\cos(\omega t+\varphi)$	$M = \frac{\mu}{V} = C\frac{B_{ext}}{T}$	$I(\theta) = I_m\left(\frac{\sin\alpha}{\alpha}\right)^2$; $\alpha = \frac{\pi a}{\lambda}\sin\theta$	
$\omega = \frac{1}{\sqrt{LC}}$	$E = E_m\sin(kx-\omega t)$	$\sin\theta = 1.22\frac{\lambda}{d}$; $\theta_R = 1.22\frac{\lambda}{d}$	
$i = -\omega Q\sin(\omega t+\varphi)$	$B = B_m\sin(kx-\omega t)$	$I(\theta) = I_m\cos^2\beta\cdot\left(\frac{\sin\alpha}{\alpha}\right)^2$; $\beta = \frac{\pi d}{\lambda}\sin\theta$	
$L\frac{d^2q}{dt^2}+R\frac{dq}{dt}+\frac{1}{C}q = 0$	$c = \frac{E_m}{B_m} = \frac{1}{\sqrt{\mu_0\varepsilon_0}}$	$\Delta\theta_{hw} = \frac{\lambda}{Nd\cos\theta}$; $D = \frac{\Delta\theta}{\Delta\lambda} = \frac{m}{d\cos\theta}$; $R = \frac{\lambda_{avg}}{\Delta\lambda} = Nm$	
$q = Qe^{-\frac{Rt}{2L}}\cos(\omega' t+\varphi)$	$\vec{S} = \frac{1}{\mu_0}\vec{E}\times\vec{B}$	$2d\sin\theta = m\lambda$	