PHYS-201 Equation Sheet for Midterm Exam #2
(05/17/2012, MAIN AUDITORIUM, 8:00-8:50 am)

Electromagnetic Waves

$$\oint \vec{\mathbf{E}} \cdot d\vec{\mathbf{A}} = \frac{q}{\varepsilon_0} \qquad \oint \vec{\mathbf{B}} \cdot d\vec{\mathbf{A}} = 0$$

$$\oint \vec{\mathbf{E}} \cdot d\vec{\mathbf{s}} = -\frac{d\Phi_B}{dt} \qquad \oint \vec{\mathbf{B}} \cdot d\vec{\mathbf{s}} = \mu_0 I + \varepsilon_0\mu_0\frac{d\Phi_E}{dt}$$

$$\vec{\mathbf{F}} = q\vec{\mathbf{E}} + q\vec{\mathbf{v}} \times \vec{\mathbf{B}} \qquad \omega = \frac{1}{\sqrt{LC}}$$

$$\frac{E}{B} = c \qquad c = \frac{1}{\sqrt{\varepsilon_0\mu_0}}$$

$$c = \lambda f \qquad f' = f\sqrt{\frac{c+v}{c-v}}$$

$$\vec{\mathbf{S}} = \frac{1}{\mu_0}\vec{\mathbf{E}} \times \vec{\mathbf{B}} \qquad u = \frac{U}{V} = \varepsilon_0 E^2 = \frac{B^2}{\mu_0}$$

$$p = \frac{U}{c} \qquad \text{radiation momentum}$$

$$I = S_{avg} = cu_{avg} \qquad P_{rad} = \frac{(2)S_{avg}}{c} = \frac{(2)I}{c}$$

$$\varepsilon_0 = 8.85 \times 10^{-12}\,\text{As/Vm} \qquad \mu_0 = 4\pi \times 10^{-7}\,\text{Vs/Am}$$

Interference on Thin Films

$$2nt = (m + \frac{1}{2})\lambda \qquad 2nt = m\lambda$$

Diffraction on a Single Slit or Circular Apertures (Chs.36)

$$\sin\theta_{dark} = m\frac{\lambda}{a} \qquad (m = \pm1, \pm2, \pm3, ...)$$

$$\theta_{min} = \frac{\lambda}{a} \qquad \theta_{min} = 1.22\frac{\lambda}{D}$$

Diffraction—Interference on Double & Multiple Slits

$$\delta = d\sin\theta_{bright} = m\lambda \qquad (m = 0, \pm1, \pm2, ...)$$

$$\delta = d\sin\theta_{dark} = (m + \frac{1}{2})\lambda \qquad (m = 0, \pm1, \pm2, ...)$$

$$y_{bright} = L\tan\theta_{bright} \qquad y_{dark} = L\tan\theta_{dark}$$