PH 1120 B09
AM Exam

Name: _____
Section: _____

EXAMINATION 4

Show ALL work (with logically complete statements!) on these pages. If you require more room, write the extra work on the preceding page ... the page facing the problem statement.

Numerical answers should be expressed to 3 significant digits. Answers should carry units, wherever necessary. Express vectors in **i, j, k** notation or else indicate their magnitude and direction unambiguously. Place your answer in the BOX, where provided.

The following convention will be used for vectors in this exam

i -- unit vector pointing to the right in the plane of the page
j -- unit vector pointing vertically up in the plane of the page
k -- unit vector perpendicular to the page and pointing out of it
• -- a magnetic field or current pointing out of the page
× -- a magnetic field or current going into the page

This exam is CLOSED BOOK, CLOSED NOTES.

Electron charge = -1.6 x 10^{-19}C, Electron mass = 9.11 x 10^{-31}kg
Proton charge = 1.6x10^{-19}C, Proton mass = 1.67 x 10^{-27}kg
$\mathbf{F} = q(\mathbf{v} \times \mathbf{B})$, $\mathbf{F} = I(\mathbf{L} \times \mathbf{B})$, F=ma, $F = mv^2/R$, R = mv/qB , E =vB

$$d\mathbf{B} = \frac{\mu_0}{4\pi}\frac{Id\mathbf{l}\times\hat{\mathbf{r}}}{r^2}, \quad \mu_0 = 4\pi\cdot 10^{-7} T\cdot m/A$$

$$B = \frac{\mu_0 I}{2\pi r}, \quad F = \frac{\mu_0 I_1 I_2 L}{2\pi r}, B = \frac{\mu_0 NI}{2a}, \quad B = \frac{\mu_0 NIa^2}{2\left(x^2+a^2\right)^{3/2}}$$

$$B = \mu_0 nI, \ \Phi_B = \mathbf{B}\bullet\mathbf{A} = BA\cos\theta$$

$$Emf = -\frac{d\Phi_B}{dt}$$

$$\mathbf{A} = \mathbf{B}\times\mathbf{C} = \hat{\mathbf{i}}(B_yC_z - B_zC_y) + \hat{\mathbf{j}}(B_zC_x - B_xC_z) + \hat{\mathbf{k}}(B_xC_y - B_yC_x)$$

1	
2	
3	
4	

Problems carry the following points:
1=35,2=35,3=15,4=15