PH 1121 B2012, Dec 12, 2012

Name: _____

Section: _____

EXAMINATION 3

Show ALL work on these pages. If you require more room, write the extra work on the preceding page ... the page facing the problem statement.

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, $F = mv^2/R$, $R = mv/qB$, $E = vB$

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

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

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

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

$$\mathbf{A} = \mathbf{B} \times \mathbf{C} = \hat{\mathbf{i}}(B_y C_z - B_z C_y) + \hat{\mathbf{j}}(B_z C_x - B_x C_z) + \hat{\mathbf{k}}(B_x C_y - B_y C_x)$$

$$\oint \mathbf{B} \cdot \mathbf{dl} = \mu_0 I_{enclosed}$$

SCORE_____