

NAME: _____

DATE: _____

**PHY 1308:
General Physics II
Electricity and Magnetism**

Exam 3

RULES AND NOTES

- You have 50 minutes to complete this exam.
- Write your name and the date on the cover sheet, and hand in this exam at the end. Please attach any extra work on additional paper.
- Attach your formula sheet to your exam as well as any scratch paper on which you perform your calculations.
- Show all work. Writing down an answer, even the correct answer, without showing work will result in significant loss of points.

Potentially Useful Formulas

$$u_B = \frac{1}{2\mu_0} B^2$$

$$V = IR$$

$$Q = VC$$

$$\varepsilon_L = -L \frac{dI}{dt}$$

$$\vec{\tau} = \vec{\mu} \times \vec{B}$$

$$\mu = NIA$$

$$\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2 / (\text{N} \cdot \text{m}^2)$$

$$k = 9.0 \times 10^9 (\text{N} \cdot \text{m}^2) / \text{C}^2$$

$$\mu_0 = 4\pi \times 10^{-7} \text{ N/A}^2$$

$$= 1.26 \times 10^{-6} \text{ N/A}^2$$

MULTIPLE CHOICE (20 Points)

Select only ONE answer for each of the following multiple choice questions. Each question is worth 5 points.

QUESTION 1: Self-inductance refers to what property of a conductor?

- (a) *The tendency to resist changes to enclosed magnetic flux.*
- (b) *The tendency to reinforce changes to enclosed magnetic flux.*
- (c) *The tendency of an external permanent magnet to cause electric current to flow.*
- (d) *The tendency of an external solenoid to cause electric current to flow.*

YOUR ANSWER: _____

QUESTION 2: Magnetic fields are caused by . . .

- (a) *Static (unmoving) electric charge.*
- (b) *Moving electric charge.*
- (c) *The force between electric charges in an electric dipole.*
- (d) *Individual magnetic charges, just like electric fields are caused by electric charges.*

YOUR ANSWER: _____

QUESTION 3: The magnetic force on a charged particle is GREATEST when . . .

- (a) *the particle is moving parallel to a magnetic field.*
- (b) *the particle is moving anti-parallel to (against) a magnetic field.*
- (c) *the particle is moving at a right-angle (90-degrees) to a magnetic field.*
- (d) *the particle is moving at a 45-degree-angle to a magnetic field.*

YOUR ANSWER: _____

QUESTION 4: Two wires lay parallel to each other. The magnetic force between them is attractive when . . .

- (a) *There is current in one wire but not in the other.*
- (b) *There are currents in both wires that flow in the same direction.*
- (c) *There are currents in both wires that flow in the opposite directions.*
- (d) *There is no current at all in either wire.*

YOUR ANSWER: _____