



FIG. 1: Loop Figure

1B quiz 3 version A

1. Two singly ionized isotopes, X and Y, of the same element move with the same speed perpendicular to a uniform magnetic field. Isotope X follows a path of radius 3.32 cm while isotope Y moves along a path 3.45 cm in radius. What is the ratio of the two isotope masses, m_X/m_Y ?
 - a. .92
 - b. .96
 - c. 1.04
 - d. 1.09

2. Two insulated current-carrying straight wires of equal length are arranged in the lab so that Wire A carries a current northward and Wire B carries a current eastward, the wires crossing at their midpoints separated only by their insulation. Which of the following statements are true?
 - a. The net force on Wire B is southward.
 - b. The net force on Wire A is westward.
 - c. There are no forces in any parts of the wires in this situation.
 - d. There are forces, but the net force on each wire is zero

3. A wire coil of area 10 cm^2 with 220 turns experiences a maximum torque of $10^{-3} \text{ N} \cdot \text{m}$ when placed in a magnetic field of $.01 \text{ T}$. Find the current through the coil.

- a. .09 A
 - b. .45 A
 - c. 2.2 A
 - d. 9.0 A
4. Consider the square loop with side length 2 cm shown in the figure above, where the current of 6A divides into flow going through the two resistors of 3Ω (left) and 6Ω (right). The loop is placed in a region of constant magnetic field (created by the bar magnets) of magnitude .01T. What is the total force on the loop? (note: do not include any force on the wires attached to the loop itself)
- a. $6.0 \times 10^{-4}N$ out of the paper
 - b. $1.2 \times 10^{-3}N$ out of the paper
 - c. $6.0 \times 10^{-4}N$ into the paper
 - d. $7.2 \times 10^{-3}N$ into the paper
5. If an electron is released at the equator and falls toward the Earth under the influence of gravity, the magnetic force on the electron will be toward the:
- a. north
 - b. south
 - c. east
 - d. west
6. Two long parallel wires 80 cm apart are carrying currents of 10 A and 20 A in the same direction. What is the magnitude of the magnetic field halfway between the wires?
- a. 5.0×10^{-8} T
 - b. 2.5×10^{-6} T
 - c. 5.0×10^{-6} T
 - d. 1.5×10^{-5} T

7. A solenoid of length 12 cm consists of a wire wrapped tightly around a wooden core. The magnetic field strength is 4.0 T inside the solenoid. If the solenoid is stretched to 30 cm by applying a force to it, what does the magnetic field become?
- a. 1.6T
 - b. 4.0T
 - c. 10T
 - d. 25T
8. We have a hollow metallic sphere with radius 5.0 cm. We insert a current loop of radius 2. cm at the center of the sphere. What is the magnetic flux coming out of the sphere?
- a. 0
 - b. 15.7 T-m²
 - c. 6×10^{-7} T-m²
 - d. cannot be determined from information given