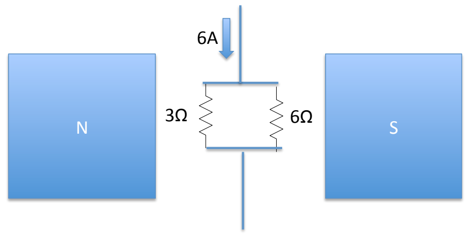

FIG. 1: Loop Figure

1B quiz 3 version B

1. 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

2. 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, mX/mY?

   - a. .92
   - b. .96
   - c. 1.04
   - d. 1.09

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

   - a. .09 A

- b. .45 A
- c. 2.2 A
- d. 9.0 A

4. 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

5. 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

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 $\times 10^{-8}$ T
   - b. 2.5 $\times 10^{-6}$ T
   - c. 5.0 $\times 10^{-6}$ T
   - d. 1.5 $\times 10^{-5}$ T

7. 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-m^2
- c. 6 $\times 10^{-7}$ T-m^2
- d. cannot be determined from information given

8. 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