- What is the magnitude and direction of a magnetic force acting on an electron (charge -1.6 X 10⁻¹⁹ C) moving at 1000 m/s in the same plane as and parallel (but in opposite direction) to a magnetic field of magnitude 10 Tesla?
 - a. 1.6 X 10⁻¹⁵ N, directed out of the plane
 - b. 1.6 X 10⁻¹⁵ N, directed into the plane
 - c. 1.6 X 10⁻¹⁵ N, directed parallel to the plane
 - d. 0 N
- 2. At right is illustrated a proton (charge 1.6 X 10^{-19} C) moving at an angle to but in the same plane as the uniform magnetic field, *B* (300 Tesla). If the speed of the proton is 2 X 10^6 m/s. What is the magnitude and direction of the magnetic force acting upon it?
 - a. 4.8 X 10⁻¹¹ N, directed into the plane
 - b. 1.6 X 10⁻¹³ N, directed into the plane
 - c. 4.8 X 10⁻¹¹ N, directed out of the plane
 - d. 8.3 X 10⁻¹¹ N, directed out of the plane



- a. The wires attract each other
- b. The wires repel each other
- c. The wires exert no force on each others
- d. The wires oscillate

At right is shown a current loop within a uniform magnetic field. When current is flowing in 4. the direction shown:

- a. the loop will rotate counter-clockwise
- b. the loop will rotate clockwise
- c. the loop will be compressed
- d. nothing will occur

Which of the following statements is not true?

- 5. a. An emf will be induced in a circuit through which a magnetic field is changing with time.
 - b. A changing electric field will induce a magnetic field.
 - c. The induced current and induced emf in a circuit are oriented such a way as to oppose the change that produced them.
 - d. none of the above





The illustration below, of a tightly wound solenoid conducting a current as shown, pertains to questions .



6. Which of the following correctly illustrates the magnetic field within the solenoid?



- 7. If the above solenoid (inductor) were in series in a DC circuit with a resistor and a voltage source, what would be its effect on the circuit?
 - a. It would increase the voltage across the resistor.
 - b. If would cause the a decrease in the maximum current of the circuit.
 - c. It would prevent the current from increasing or decreasing instantaneously.
 - d. none of the above
- 8. If in the DC circuit, consisting of our solenoid in series with a resistor and voltage source, the current were allowed to reach a steady state value, and then a switch were thrown placing the resistor and the solenoid in a new circuit loop, excluding the voltage source, it would be seen that current would flow in the new circuit loop, for a time. This illustrates that:
 - I. Energy may be stored in a magnetic field.
 - II. A voltage source must do work against an inductor to create a current.
 - III. An inductor stores charge.
 - a. I
 - b. II
 - c. I and II
 - d. I, II and III