# Ch. 23 Worksheet

1. An ammeter is connected to a coil of wire. A magnet is sitting motionless next to the wire such that its south end is near the coil and perpendicular to the plane of the coil as shown. The meter indicates that a current is flowing through the wire from the left toward the right. What, if anything, is wrong with this picture?
   a. The current should be flowing from the right toward the left.
   b. The needle should be slanted toward the right.
   c. The needle should indicate that there is no current flowing.
   d. There is nothing wrong with the picture.
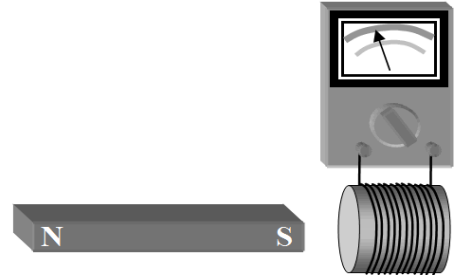
2. A coil of wire that forms a complete loop is moving with a constant speed v toward a very long, current carrying wire, only a portion of which is shown. What affect, if any, does the current carrying wire have on the coil of wire?
   a. Since the magnetic field increases as the coil approaches the wire, a current is induced in the coil.
   b. The rectangle will be distorted as it is pulled in the direction of the current in the wire.
   c. Close to the wire, a magnetic force acts on the loop that accelerates the loop away from the wire.
   d. Since the magnetic field around the wire is not changing, there is no effect on the coil.
   e. Since the coil and the wire are not touching, there is no effect.
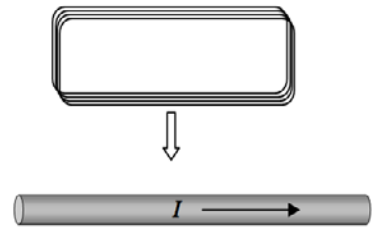
3. A small loop of area 6.8 mm² is placed inside a long solenoid that has 854 turns/cm and carries a sinusoidally varying current i = 1.28 A and angular frequency 212 rad/s. The central axes of the loop and the solenoid coincide. What is the amplitude of the emf induced in the loop?

4. A solenoid having an inductance of 6.30 μH is connected in series with a 1.20 kΩ resistor. If the 14.0 V battery is connected across the pair, how long will it take for the current through the resistor to reach 80.0% of its final value?

5. A coil of inductance 88 mH and unknown resistance and a 0.94 μF capacitor are connected in series with an alternating emf of frequency 930 Hz. If the phase constant between the applied voltage and the current is 75°, what is the resistance of the coil?

6. An oscillating LC circuit has a current of 7.50 mA, potential difference amplitude of 250 mV, and a capacitance of 220 nF. Determine the following:
   a. maximum energy stored in the capacitor
   b. maximum energy stored in the inductor
   c. period of oscillation
   d. the inductance in μH