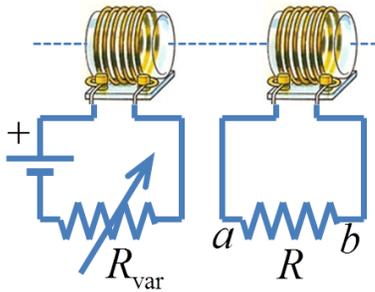**Physics 1214, Homework #6 (due 10/10)**

M1 Two solenoids are coaxial and fairly close to each other. While the resistance of the variable resistor connected to the left-hand solenoid is increased at a constant rate, the induced current through the resistor R will

    A. flow from a to b.

    B. flow from b to a.

    C. be zero because the rate is constant.

M2 A metal loop moves at constant velocity toward a long wire carrying a steady current I, as shown below. The current induced in the loop is directed

    A. clockwise.

    B. counterclockwise.

   C. zero.
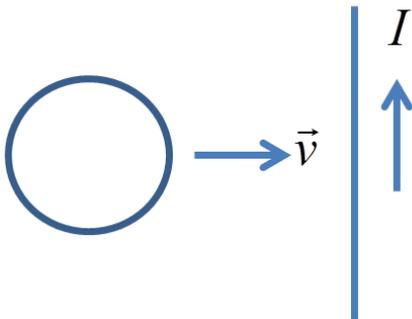
Problems

P1 Two concentric loops of radii 10 cm and 20 cm are in a uniform magnetic field which is increasing at a constant rate of 0.1 T/s. The loops are connected through a resistor $R = 1\ \Omega$. What is the current through the resistor in cases (a) and (b)?

(a)   (b)
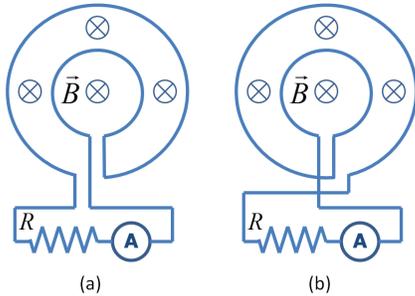
P2 A slide-wire rod is pulled to the right in a uniform magnetic field of 0.2 T with a speed of 5 m/s, as shown below. What is the current through the rod?
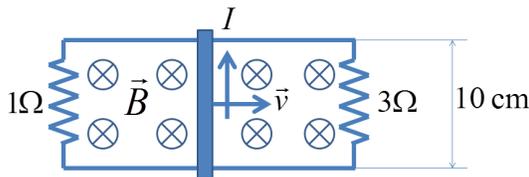
P3 A circular coil of radius 10 cm rotates in magnetic field 0.05 T. The maximum emf produced is 2 mV. What is the angular velocity of the coil?
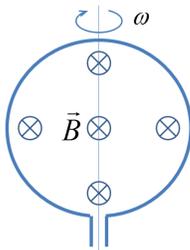
P4 A uniform magnetic field of 0.1 T is restricted to the region shown below, that is, $B = 0.1$ T if 5 cm $< x <$ 25 cm and 0 cm $< y <$ 20 cm, and $B = 0$ otherwise. A rectangular loop with a side length of 1 cm moves along the x axis at 10 m/s and crosses the field region. Draw the emf induced in the loop as a function of time t. Be sure to mark the moments when the emf changes. What is the maximum induced emf?