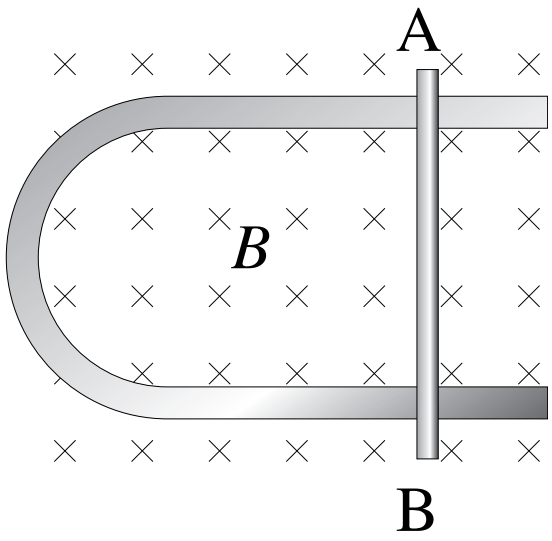
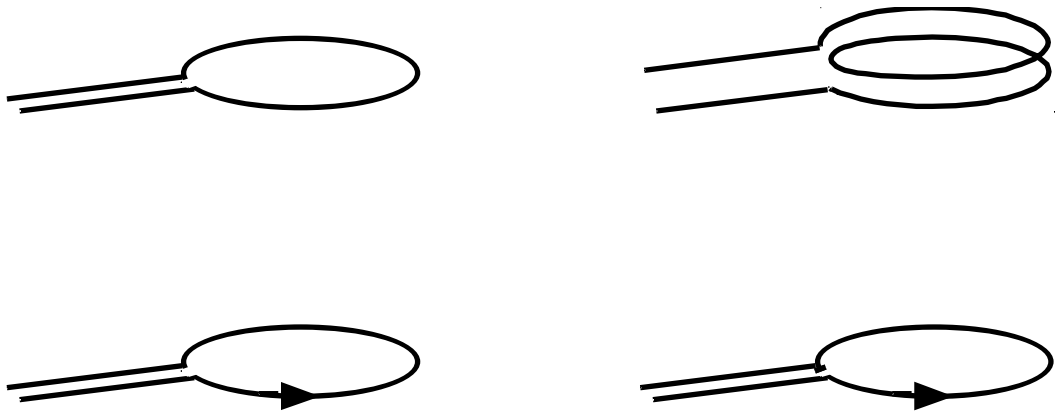
Consider the arrangement shown below. Conducting rod AB is lying on a U-shaped conductor, making good electrical contact. The arrangement is placed in a magnetic field (into page).



If the magnetic field strength is decreased, the rod

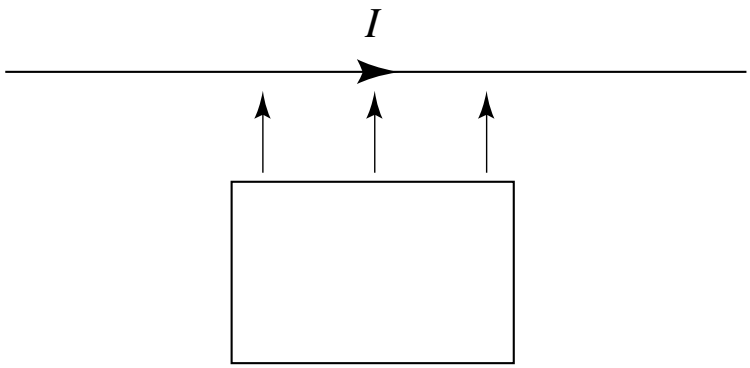
1. remains stationary
2. slides to the right
3. slides to the left
4. rotates clockwise
5. moves up (out of page)
6. moves down (into page)
7. none of the above

On the left, a change in current $dI/dt = c$ in the bottom loop generates an emf E_o in the (identical) top loop. If a second winding is added to the top loop, the emf induced in the double loop is



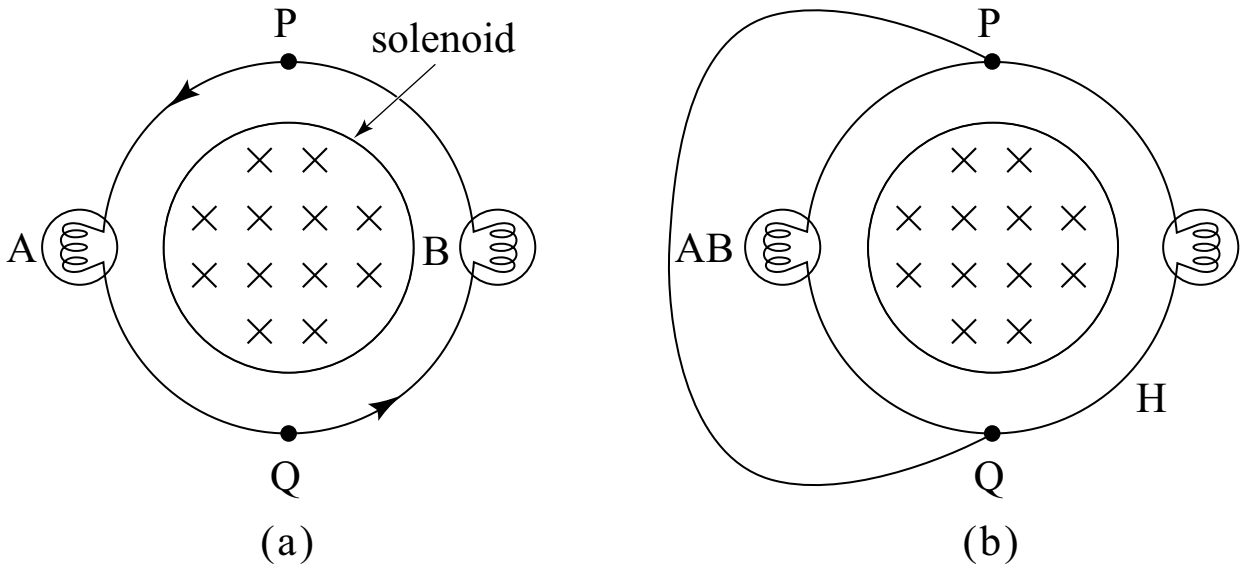
1. $2E_o$
2. E_o
3. $E_o/2$.
4. $E_o/4$.
5. zero.
6. None of the above.

A long, straight wire carries a steady current *I*. A rectangular conducting loop lies in the same plane as the wire, with two sides parallel to the wire and two sides perpendicular. Suppose the loop is pushed toward the wire as shown. Given the direction of *I*, the induced current in the loop is



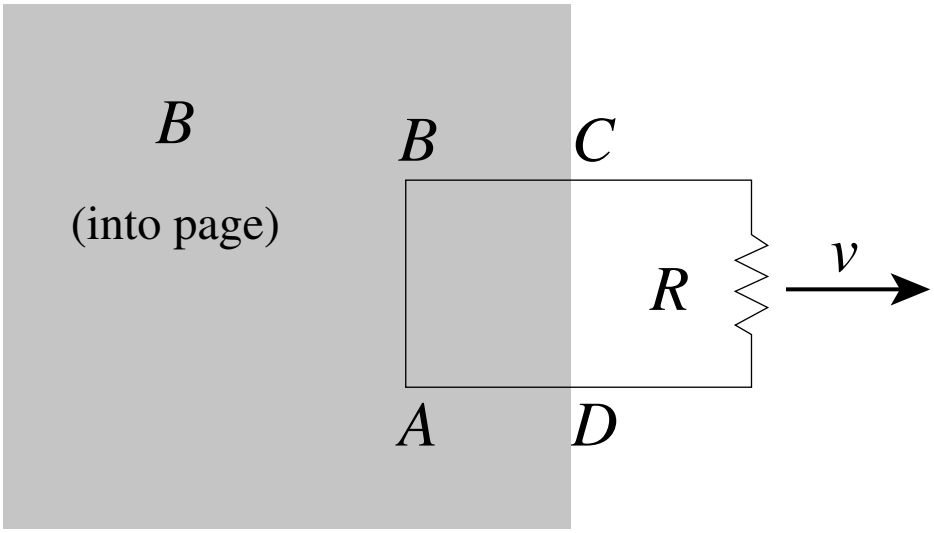
1. clockwise.
2. counterclockwise.
3. need more information

In figure (*a*), a solenoid produces a magnetic field whose strength increases into the plane of the page. An induced emf is established in a conducting loop surrounding the solenoid, and this emf lights bulbs *A* and *B*. In figure (*b*), points *P* and *Q* are shorted. After the short is inserted,



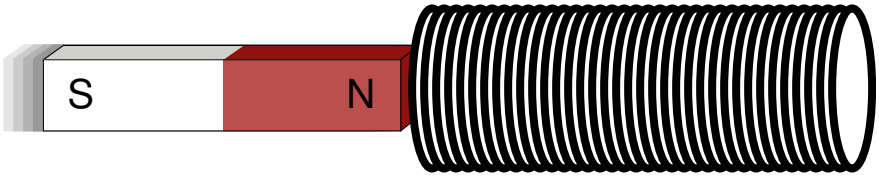
1. bulb *A* goes out; bulb *B* gets brighter.
2. bulb *B* goes out; bulb *A* gets brighter.
3. bulb *A* goes out; bulb *B* gets dimmer.
4. bulb *B* goes out; bulb *A* gets dimmer.
5. both bulbs go out.
6. none of the above

Consider the arrangement shown below. As the loop is moved to the right, a current is induced through the loop and the energy is dissipated in the resistor. The dissipated energy is supplied by



1. work by a magnetic force on *AB*.
2. work by a magnetic force on *AD* and *BC*
3. the person moving the loop
4. a decrease in magnetic field energy
5. a change in charge configuration
6. none of the above

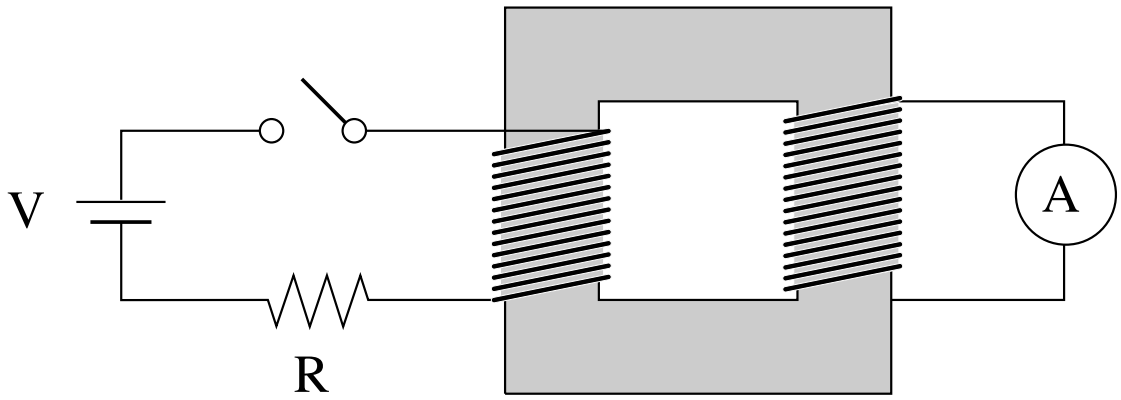
A magnet is inserted into 20 turns of copper wire at a certain speed.



Which of the following is correct?

1. No resistance to insertion is felt; in fact, the magnet is drawn in.
2. Resistance to insertion is felt, and work must be done to push the magnet in.

The primary coil of a transformer is connected to a battery, a resistor, and a switch. The secondary coil is connected to an ammeter. When the switch is thrown closed, the ammeter shows



1. zero current.
2. a nonzero current for a short instant.
3. a steady current.

A magnet is pushed into 20 turns of copper wire at a certain speed. Resistance is felt to its insertion, and work has to be done to push it in.

The experiment is repeated with 20 turns of an insulator, in identical fashion. Compared with the first experiment, the resistance to motion in the second experiment is

1. larger.
2. smaller.
3. the same.
4. Insufficient information is given.