Physics 12: Lenz’s Law Practice

1. Consider the loop of wire shown If the magnetic field is increased from 0.40T out to 1.0T out, what is the direction of the induced current and what is the polarity of the induced emf?

**B**

2

1

2. A circular coil of wire is placed in a uniform magnetic field. The field points out of the page and the plane of the area is parallel to the plane of the page. For each of the following indicate whether or not an emf will be induced.

a. The coil is quickly moved outward. b. The coil is slowly moved outward.

c. The coil is moved rightward within the field. d. The coil is rotated about the y axis.

e. The coil is rotated about an axis parallel to the field.

f. The coil is rotated about an axis perpendicular to the field.

g. The coil is rotated about the z axis. h. The field is reversed.

i. The field is removed.

3.

N

Consider the diagram above.

a. If the magnet is held stationary is there a flux in the solenoid?

b. If the magnet is held stationary is the flux in the solenoid changing?

c. If the magnet is held stationary is there any induced emf?

d. If the magnet is brought toward the solenoid what will be the direction of the induced current?

e. If the magnet is brought toward the solenoid what will be the direction of the **induced** magnetic field?

f. If the magnet is brought toward the solenoid the left end of the solenoid will have an induced \_\_\_\_\_\_\_\_\_ pole.

g. If the magnet is brought toward the solenoid the cart will roll in what direction?

h. If the magnet is moved away from the solenoid what will be the direction of the induced current?

i. If the magnet is moved away from the solenoid what will be the direction of the **induced** magnetic field?

j. If the magnet is moved away from the solenoid the left end of the solenoid will have an induced \_\_\_\_\_\_\_\_pole.

k. If the magnet is moved away from the solenoid the cart will roll in what direction?

4. The solenoid shown has a constant current flowing upward at the front of the solenod.

A

I B

Which of the following would induce a current in direction A? (more than one may apply)

a. Increase the current in the solenoid. b. Decrease the current in the solenoid.

c. Rotate the solenoid about its central axis. d. Rotate the coil about its central axis.

e. Move the coil to the left (toward the solenoid). f. Move the coil to the right (away from the solenoid).

5.

**B**

E D C B A

1 2

v

At each position shown indicate the polarity of points 1 and 2.

6. Consider the loop below.

A B

a. What will be the induced polarity of the coil as if the field in the region is changed from 2.0T in to 1.0T in 0.25s?

b. What will be the induced polarity of the coil as if the field in the region is changed from 2.0T in to 3.0T in 0.25s?

c. What will be the induced polarity of the coil as if the field in the region is changed from 2.0T in to 1.0T out 0.25s?

d. What will be the induced polarity of the coil as if the field in the region is changed from 2.0T out to 1.0T out 0.25s?

e. What will be the induced polarity of the coil as if the field in the region is changed from 2.0T out to 3.0T out 0.25s?

f. What will be the induced polarity of the coil as if the field in the region is changed from 2.0T out to 1.0T in 0.25s?