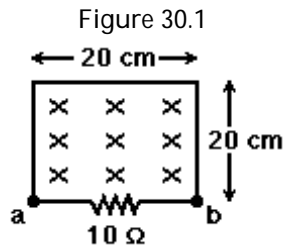


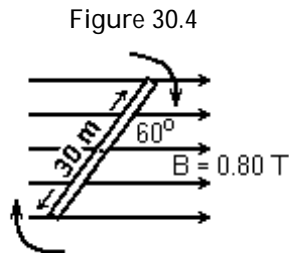
Name_Professor S. K. Sinha _____

$$\mu = 4 \cdot \pi \cdot 10^{-7} = 1.26 \cdot 10^{-6} \text{ N/A}^2$$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.



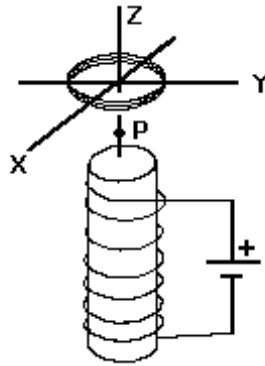
- 1) In Figure 30.1, a wire and a 10 ohm resistor are used to form a circuit in the shape of a square, 20 cm by 20 cm. A uniform but non-steady magnetic field is directed into the plane of the circuit. The magnitude of the magnetic field is decreased from 0.90 T to 0.30 T in a time interval of 60 ms. The average induced current and its direction through the resistor, in this time interval, are closest to:
- A) 40 mA, from a to b
 - B) 40 mA, from b to a
 - C) 60 mA, from a to b
 - D) 24 mA, from b to a
 - E) 24 mA, from a to b



Wire is wound on a square frame, 30 cm by 30 cm, to form a coil of 4 turns. The frame is mounted on a horizontal shaft through its center (perpendicular to the plane of the diagram). The coil is in clockwise rotation, with a period of 0.01 s. A uniform, horizontal, magnetic field of 0.80 T is present. At a given instant, the plane of the coil forms a 60° angle with the horizontal, as shown.

- 2) In Figure 30.4, at that instant, the emf induced in the coil is closest to:
- A) 11 V
 - B) 18 V
 - C) 16 V
 - D) 9 V
 - E) 13 V

Figure 30.5



- 3) In Figure 30.5, a coil of wire is placed on the axis of a solenoid carrying a DC current. Which of the following will NOT result in an EMF being induced in the coil?
- A) Move the coil toward point P.
 - B) Rotate the coil about the z-axis.
 - C) Rotate the coil about the y-axis.
 - D) Rotate the coil about the x-axis.
 - E) Change the current in the solenoid.

Situation 31.1

An 18 mH solenoid inductor is wound on a form 0.80 m in length and 0.10 m in diameter. A coil is tightly wound around the solenoid at its center. The coil resistance is 5.0 ohms. The mutual inductance of the coil and solenoid is $60 \mu\text{H}$. At a given instant, the current in the solenoid is 300 mA, and is decreasing at the rate of 2.5 A/s.

- 4) In Situation 31.1, at the given instant, the induced emf in the solenoid is closest to:
- A) 45 mV
 - B) 30 mV
 - C) 35 mV
 - D) 40 mV
 - E) 50 mV