

## CHAPTER 21 P: 2, 4, 5, 6

- (I) The rectangular loop shown in Fig. 21–46 is pushed into the magnetic field which points inward. In what direction is the induced current?
- (I) A 9.6-cm-diameter circular loop of wire is in a 1.10-T magnetic field. The loop is removed from the field in 0.15 s. What is the average induced emf?
- (I) A 12.0-cm-diameter loop of wire is initially oriented perpendicular to a 1.5-T magnetic field. The loop is rotated so that its plane is parallel to the field direction in 0.20 s. What is the average induced emf in the loop?
- (II) A 10.2-cm-diameter wire coil is initially oriented so that its plane is perpendicular to a magnetic field of 0.63 T pointing up. During the course of 0.15 s, the field is changed to one of 0.25 T pointing down. What is the average induced emf in the coil?

## CHAPTER 21 P: 9, 10, 11, 12

- (II) What is the direction of the induced current in the circular loop due to the current shown in each part of Fig. 21–49?
- (II) If the solenoid in Fig. 21–50 is being pulled away from the loop shown, in what direction is the induced current in the loop?
- (II) The magnetic field perpendicular to a circular wire loop 12.0 cm in diameter is changed from +0.52 T to –0.45 T in 180 ms, where + means the field points away from an observer and – toward the observer. (a) Calculate the induced emf. (b) In what direction does the induced current flow?
- (II) The moving rod in Fig. 21–12 is 12.0 cm long and is pulled at a speed of 15.0 cm/s. If the magnetic field is 0.800 T, calculate (a) the emf developed, and (b) the electric field felt by electrons in the rod.

## CHAPTER 21 P: 30, 31, 32, 33, 34

- (I) A transformer is designed to change 120 V into 10,000 V, and there are 164 turns in the primary coil. How many turns are in the secondary coil?
- (I) A transformer has 320 turns in the primary coil and 120 in the secondary coil. What kind of transformer is this, and by what factor does it change the voltage? By what factor does it change the current?
- (I) A step-up transformer increases 25 V to 120 V. What is the current in the secondary coil as compared to the primary coil?
- (I) Neon signs require 12 kV for their operation. To operate from a 240-V line, what must be the ratio of secondary to primary turns of the transformer? What would the voltage output be if the transformer were connected backward?
- (II) A model-train transformer plugs into 120-V ac and draws 0.35 A while supplying 7.5 A to the train. (a) What voltage is present across the tracks? (b) Is the transformer step-up or step-down?