Chapter-30

1. Scientific work is currently under way to determine whether weak oscillating magnetic fields can affect human health. For example, one study found that drivers of trains had a higher incidence of blood cancer than other railway workers, possibly due to long exposure to mechanical devices in the train engine cab. Consider a magnetic field of magnitude 1.00 x 10-3 T, oscillating sinusoidally at 60.0 Hz.
2. A coil formed by wrapping 50 turns of wire in the shape of a square is positioned in a magnetic field so that the normal to the plane of the coil makes an angle of 30.08 with the direction of the field. When the magnetic field is increased uniformly from 200 *µ*T to 600 *µ*T in 0.400 s, an emf of magnitude 80.0 mV is induced in the coil. What is the total length of the wire in the coil?
3. A long solenoid with 1.00 x 103 turns per meter and radius 2.00 cm carries an oscillating current *I* = 5.00 sin 100*πt*, where *I* is in amperes and *t* is in seconds. (a) What is the electric field induced at a radius *r* = 1.00 cm from the axis of the solenoid? (b) What is the direction of this electric field when the current is increasing counterclockwise in the solenoid?