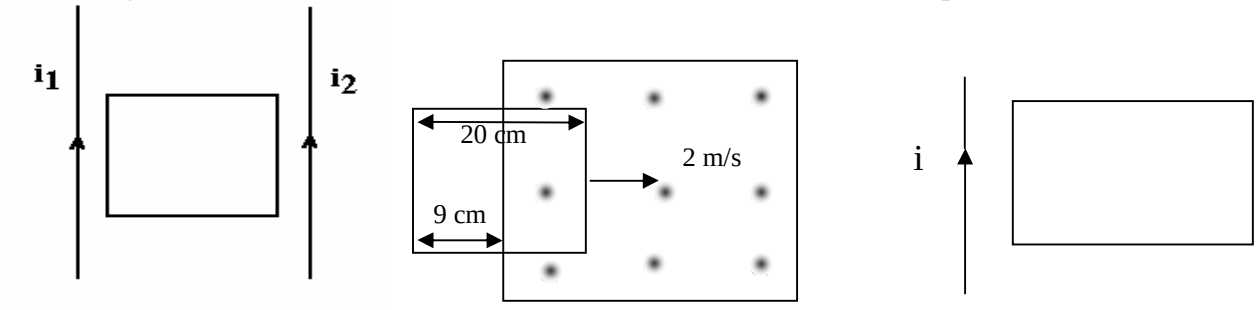
Chapter 31

1- A single turn plane loop of wire of cross sectional area 40 cm**2 is perpendicular to a magnetic field that increases uniformly in magnitude from 0.5 T to 5.5 T in 2.0 seconds.What is the resistance of the wire if the induced current has a value of 1.0*10**(-3) A? [10 Ohms]

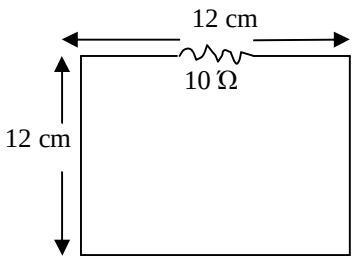
2- A 2.0 Tesla uniform magnetic field makes an angle of 60 degrees with the xy-plane. The magnetic flux through an area of 3 m**2 portion of the xy-plane is : 5.2 Wb.

3- A rectangular loop of wire is placed midway between two long straight parallel conductors as shown in figure. The conductors carry currents i1 and i2 as indicated. If i1 is increasing and i2 is constant, then the induced current in the loop is [counterclockwise]



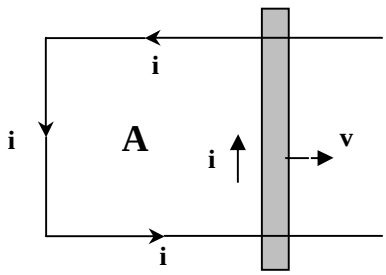
4- The square coil shown in the figure is 20 cm on a side and has 15 turns of wire on it. It is moving to the right at 2 m/s. Find the induced emf in it at the instant shown, and the direction of the induced current in the coil. (The magnetic field is 0.2 T and its direction is out of the page). [1.2 V, clockwise]

5- A long straight wire is in the plane of a rectangular conducting loop as shown in the figure. The straight wire carries an increasing current "i" in the direction shown. The current in the rectangular is: [counter clockwise]



6- The circuit shown in figure 9 is in a uniform magnetic field that is into the page and is decreasing in magnitude at a rate of 150 T/s. The current in the circuit is: [0.22 A]

7- The figure shows a bar moving to the right on two conducting rails. To make an induced current in the direction indicated, a constant magnetic field in region "A" should be in what direction? [Into the page]



8- A 400-turn coil of total resistance 6.0 ohm has a cross sectional area of 30 cm**2. How rapidly should a magnetic field parallel to the coil axis change in order to induce a current of 0.3 A in the coil? [1.5 T/s]

9- A circular wire loop of area 0.5 m**2 is perpendicular to a magnetic field of 0.8 T. If the coil is removed completely from the field in 0.1 s, the average emf induced in the loop has a magnitude [4.0 V]