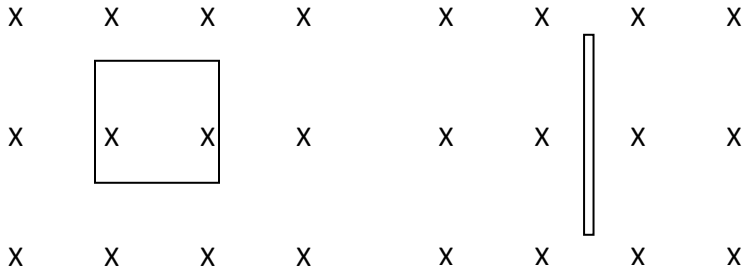**Worksheet 6.7 Electromagnetic Induction part 2** *Do on separate sheet of paper.*

1. A magnetic field ($B=3.2 \times 10^{-3}$ T) passes perpendicular through a circular loop of wire (radius = 5.0 cm). What is the magnetic flux through the loop?   (2.5×10^{-5} Wb)

2. A circular coil (200 turn radius of 6.0 cm) is rotated in a uniform magnetic field ($B = 3.6 \times 10^{-4}$ T) At t = 0 the coil is perpendicular to the field and at t = 0.015s the coil is parallel to the field what is the average emf induced in the coil?
                                                                                                                          (5.4×10^{-2} V)

3. A square loop of wire with an area of 2.5×10^{-3} m^2 is perpendicular to a uniform magnetic field ($B = 2.2 \times 10^{-2}$ T). If the square collapsed to an area of essentially 0 m^2 in a time of 0.100 s as shown in the diagram what is the average induced emf as it is collapsed and what is the direction of the induced current? (Remember to use conventional current)
                                                                                                        (5.5×10^{-4} V clockwise)

X   X   X   X   X   X   X   X

X   X   X   X   X   X   X   X

X   X   X   X   X   X   X   X

4. Find the average emf induced in a circular coil (50 turns radius of 0.050 m) if the magnetic flux through the loops is changing at a rate of 15.0 Wb/s?   (750 V)

5. A square coil (100 turns area of each square loop = 4.0×10^{-3} m^2) is perpendicular to a uniform magnetic field. When the coil is rotated through 90° in 0.12 s, the average induced emf is 0.92 V. What is the magnetic field strength?

                                                                                                                          (2.8×10^{-1} T)

6. A circular coil (10 turns, diameter = 25 cm) is placed perpendicular to a uniform magnetic field ($B = 2.7 \times 10^{-3}$ T). If the direction of the magnetic field is reversed in 0.30s, what is the average emf induced in the coil? (8.8×10^{-3} V)

7. A magnet is quickly removed from a circular coil (25 turns, area = 5.0×10^{-3} m^2) changing the magnetic field within the coil at a rate of 0.40 T/s. What is the average emf induced in the coil?   (5.0×10^{-2} V)

8. A square loop of wire (area= 7.2×10^{-3} m^2) has a resistance of 12.0Ω. Assume that the magnetic field drops uniformly from 1.6 T to zero in 0.050 s as the loop is pulled from the magnetic field.
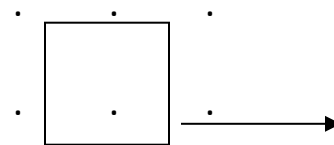
   a) What is the average emf induced in the loop?   (2.3×10^{-1} V)
   b) What is the current induced in the loop?   (1.9×10^{-2} A)
   c) What is the direction of the electron flow in the loop?   (clockwise)

9. A square loop of wire (4.0 cm per side) is placed in a magnetic field (B= 0.20 T).

The magnetic field is increased to 0.50 T in 0.30 s.
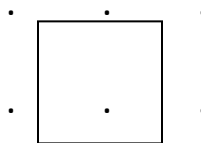
   a) Find the current through the loop if the resistance of the loop is 2.0 Ω.   (8.0×10^{-4} A)
   b) Find the direction of the electron flow through the loop.   (counter-clockwise)