## **Worksheet 8.5 – Moving Conductors**

1. A conducting rod 0.35 m long moves perpendicular to a magnetic field (B=0.75 T) at a speed of 1.5m/s calculate the induced emf in the rod .

2. A conducting rod 0.28 m long moves perpendicular to a magnetic field at speed of 0.80m/s if the induced emf is 0.075 V what is the magnitude of the magnetic field?

3. The conducting rod in the diagram below is 22.0 cm long and is moving at a speed of 1.25m/s perpendicular to a 0.150 T magnetic field

x x x x

x x x x

x x x x

If the resistance in the circuit is 2.25 ohms what is the magnitude and direction of the current through the circuit?

4. The conducting rod in the diagram below is 15 cm long and is moving at a speed of 0.95 m/s perpendicular to the magnetic field.

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If the resistance in the circuit is 1.5 ohms and a current of 5.6x10-2 A is induced in the circuit

a) What is the magnitude of the magnetic field?

b) What is the direction of the induced current?

5. The conducting rod in the diagram below is 30.0 cm long and is moved perpendicular to 0.950 T magnetic field.

x x x x

x x x x

x x x x

If the resistance in the circuit is 3.25 ohms what force is required to move the rod at a constant 1.50 m/s?

6. A plane with a wing span of 6.25 m is flying horizontally at a speed of 95.0 m/s if the vertical component of the Earth’s magnetic field is 4.70x10–6 T what is the induced emf between the tips of the wings?

7. The conducting rod in the diagram below is 30.0 cm long and is moving at a speed of 3.00 m/s perpendicular to a 0.600 T magnetic field

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If the resistance in the circuit is 2.25 ohms what is the electric energy dissipated in the resistor in 15.0s?

8. The conducting rod in the diagram below is 1.2 m long and is moving at a speed of 2.5m/s perpendicular to a 0.75 T magnetic field

x x x x

x x x x

x x x x

If the current in the circuit is 0.45 A what is the resistance in the circuit?

9. A conducting rod is 1.0 m long and is moved at a speed of 3.0m/s perpendicular to a 0.95 T magnetic field directed into the page. If the resistance in the circuit is 45.0 ohms how much work is done against the magnetic field in 10s s?

10. A conducting rod is 0.50m long and is moved at a constant speed perpendicular to a 0.65 T magnetic field. If the resistance in the circuit is 2.9 ohms and the induced current is 5.2x10-2 A what is the speed of the conducting rod?

11. A rectangle loop of wire is moved at a speed of 1.80m/s perpendicular to a 1.30 T magnetic field as shown below

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If the length of the side moving perpendicular to the field is
0.625 m and the resistance in the circuit is 1.50 ohms

a) What is the induced current?

b) What is the direction of the current?

12. A rectangle coil of wire containing 5 loops is moved at a speed of 2.7m/s perpendicular to a 1.1 T magnetic field as shown below

If the length of the side of the coil moving perpendicular to the field is 0.18m

and the resistance in the circuit is 3.5 ohms

x x x x

x x x x

x x x x

a) What is the induced current?

b) What is the direction of the current?

**Answers**:

1. (0.39 V)
2. (0.33 T)
3. (1.83x10-2A counter clockwise)
4. a. (0.59 T) b. (counterclockwise)
5. (3.75x10-2 N)
6. (2.79x10-3 V)
7. (1.94 J)
8. (5.0 ohms)
9. (1.8 J)
10. (0.46m/s)
11. (0.975A) (clockwise)
12. (0.76A) (counter-clockwise)