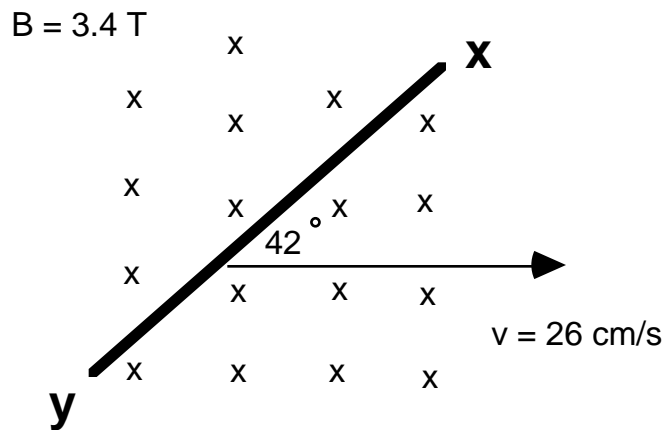


Electromagnetic Induction : Test-60

- 1) What is electromagnetic induction?
- 2) Find the induced emf in a wire, if the 2.7 cm long wire moves with a velocity of 58 cm/s in a 4.2 T field. The wire, field, and velocity are all perpendicular to each other.
- 3) A 4.5 cm long wire moves in the field shown below.



- a) Find the emf induced between x and y.
 - b) Which end has a surplus of electrons; x or y?
- 4) A step down transformer has a secondary to primary turns ratio of 1/15.
 - a) If the secondary voltage is 120 volts, what must the primary voltage be?
 - b) If the maximum secondary current is 27 amps, find the maximum primary current. (assume that the power lost is zero)
 - 5) a) A generator transmits power to a load through a pair of transmission lines. The lines have a power loss of 39 watts. If the power delivered to the load is 5182 watts find the power output of the generator.
 - b) If the average current produced by the generator is 65 amps, find the resistance of the wires.

6) The armature windings in a DC motor have a resistance 6.8 ohms. The motor has 120. volts across it.

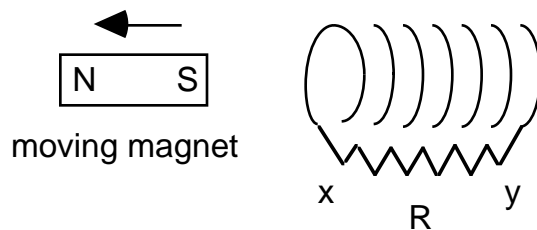
a) Find the initial current.

b) Find the counter emf when the rotor is rotating at the maximum rate if the current is 3.1 amps.

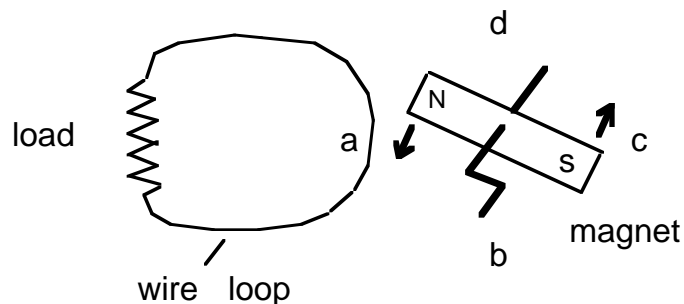
7)a) Find the flux through a loop with an area of 3.7 cm^2 , in a region where the magnetic field has a magnitude of 6.2 T, if the plane of the loop is perpendicular to the field.

b) If the loop is removed from the field in 0.25 seconds, find the induced emf.

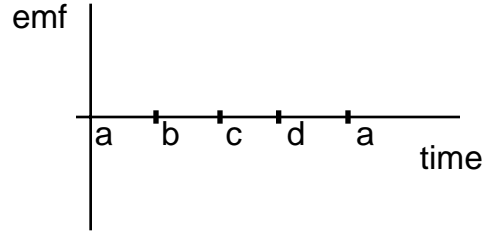
8) Find the direction of the current through the resistor R, if the magnet is moved towards the left.



9) The simple Owen generator is shown below. Answer the following questions.

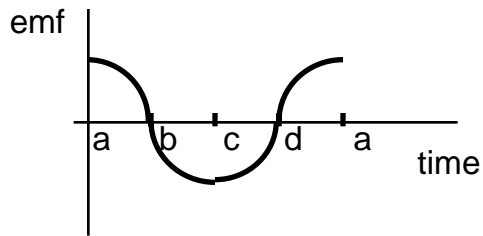


a) When the magnet is rotated, a current is induced in the wire and energy is delivered to the load. Sketch the emf versus time curve below. (assume that time = zero when the north pole passes point a)



b) Give three ways to increase the emf of the above generator.

Answers: 1) When a conductor moves in a magnetic field, an emf is induced in that conductor., 2) 0.066 volts, 3)a) 0.027 volts, b) y, 4)a) 1800 volts, b) 1.8 amps, 5)a) 5221 watts, b) 0.0092 ohms, 6)a) 18 amps, b) 99 volts, 7)a) 0.0023 webers, b) 0.0092 volts, 8) x to y, 9)a)



b) use a stronger magnet, rotate the magnet faster, use more loops.