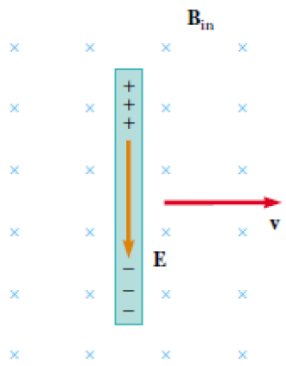
106 PHYS – Homework 2

Chapter 2 Faraday`s law

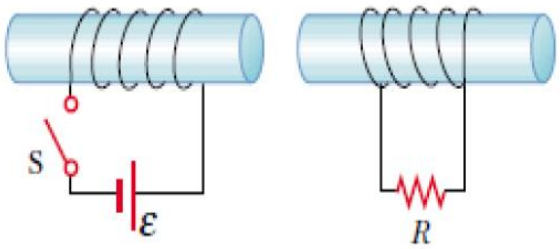
Chapter 31 in the text book

1. As the bar in Figure below moves to the right, an electric field is set up directed downward in the bar. Explain why the electric field would be upward if the bar were moving to the left.



2. A 50-turn rectangular coil of dimensions 5.00 cm X 10.0 cm is allowed to fall from a position where B = 0 to a new position where B = 0.500 T and the magnetic field is directed perpendicular to the plane of the coil. Calculate the magnitude of the average emf that is induced in the coil if the displacement occurs in 0.25s.

3. Find the direction of the current in the resistor in Figure (a) at the instant the switch is closed, (b) after the switch has been closed for several minutes, and (c) at the instant the switch is opened.



4. A flat loop of wire consisting of a single turn of cross-sectional area 8.00 cm^2 is perpendicular to a magnetic field that increases uniformly in magnitude from 0.500 T to 2.50 T in 1.00 s. What is the resulting induced current if the loop has a resistance of 2.00 Ω.

5. A 25-turn circular coil of wire has diameter 1.00 m. It is placed with its axis along the direction of the Earth's magnetic field of 50.0 μT, and then in 0.200 s it is flipped 180°. An average emf of what magnitude is generated in the coil?

6. Consider the arrangement shown in Figure. Assume that R " 6.00Ω, L=1.20 m, and a uniform 2.50-T magnetic field is directed into the page. At what speed should the bar be moved to produce a current of 0.500 A in the resistor?