Electromagnetism

Book Chapter: 19, 20, 21
Book Pages: 586-608, 620-637, 665-676
Practice Problems: pp612-614; 6, 12, 18, 34: pp644-646; 12, 18, 36: pp682; 40
Terms/ Ideas:
Like repels like
Induction
Magnetic Field
Lines of Force
Left Hand rule
Right hand rule
Magnetic Force
Ammeter
Voltmeter
Magnetic Induction
Induced EMF
AC/DC Generator
Michael Faraday
Faradays Law of E-M induction
Lenz's Law
Transformer
Equations:

$$B_{straightwire} = (2x10^{-7}\frac{N}{A^2})\frac{I}{d}$$

$$B_{centerofloop} = (2\pi x10^{-7}\frac{N}{A^2})\frac{I}{d}$$

$$F = ILB$$

$$\tau = \mu B\sin\theta$$

$$\mu = NIA(magneticmoment)$$

$$\phi = BA\cos\theta$$

$$\varepsilon = -N\Delta\frac{\phi}{t}$$

$$\frac{V_1}{V_2} = \frac{N_1}{N_2}$$

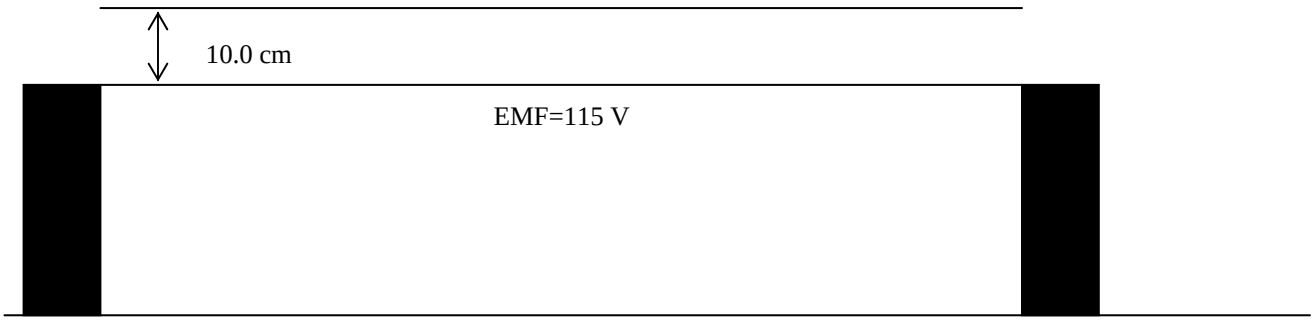
$$F = qvB$$

$$r = \frac{mv}{qB}$$

$$EMF = vBL$$

Free Response:

An EMF of 115 volts is running through a long straight wire. This wire is mounted horizontally between two non-conducting hangers. The wire has a total resistance of .250 Ohms.



Another wire is levitating 10.0 cm above the first wire. The second wire is 2.50 meters long and is 1.50 mm in diameter. The second wire has a density of 8.76 g/cm^3 and a resistance ½ that of the first.

1) What is the EMF flowing through the second wire?

2) In what direction would the Current flow through the second wire?

3) The second wire is removed and a third wire that is 3.0 meters long is moved into place 25.0 mm from the first. If you move the third wire around the first (in a circle) with a velocity of 1.50 meters per second relative to the first wire, what is the induced EMF in the third wire?

4) What is the magnetic field the first wire is affecting the third with?