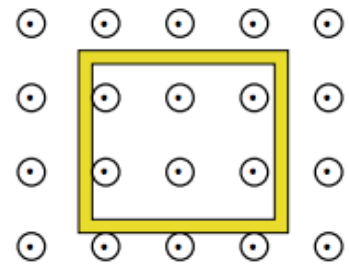## Faraday's and Lenz's laws problem set

1. (problem 20.1 additional questions – you did the original problem last week).

   There's a 0.5-T magnetic field through a rectangular coil of dimensions 0.08 m by 0.12 m.

   a. What would the induced EMF be in the coil if the magnetic field was turned off over a 0.2 second period?

   b. If the coil's resistance is 30 ohms, what will the induced current be?

   c. For how long would the induced current flow?

   d. In what direction would the induced current flow?

2. (problem 20.15)

   What is the direction of current in the resistor if the magnet (in green) is moved:
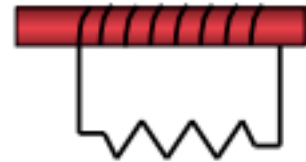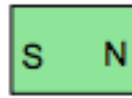
   a.) to the left, relative to its starting position shown?

   b.) to the right, relative to its starting position shown?

3. (Fletch's 17.4)

   Each of the loops in the figure are identical. Each has a length of 0.2 m, a width of 0.08 m, and resistance of 4 ohms. Each is moving with a velocity of magnitude 0.28 m/s, and *Loops A, C, and F each have 0.05 m of their lengths not in the magnetic field* at the time shown in the figure (that is, the length outside the field at this moment is 0.05 m for each one). The magnetic field in the region is a constant 3×10^{-2} T into the page.
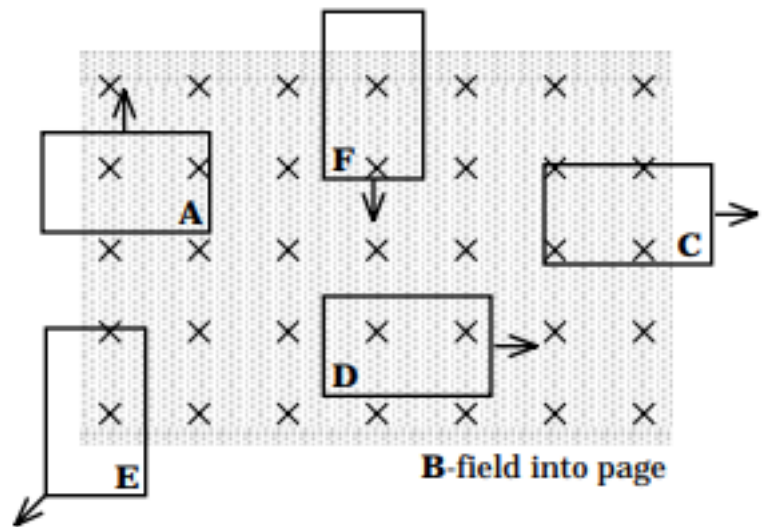
   B-field into page

   FIGURE II

a.) What is the direction of the induced current for each loop at the instant shown in the sketch?

b.) What is the induced EMF generated in loops A, C, and F at the instant shown?

c.) What is the magnitude and direction of the induced magnetic force on loop F at the instant shown?

d.) In what direction is the induced magnetic force on loops A, C, and D at the instant shown?