

**PREFLIGHTS****LESSON 5 – ENERGY IN MAGNETIC FIELDS****LEARNING OBJECTIVES:**

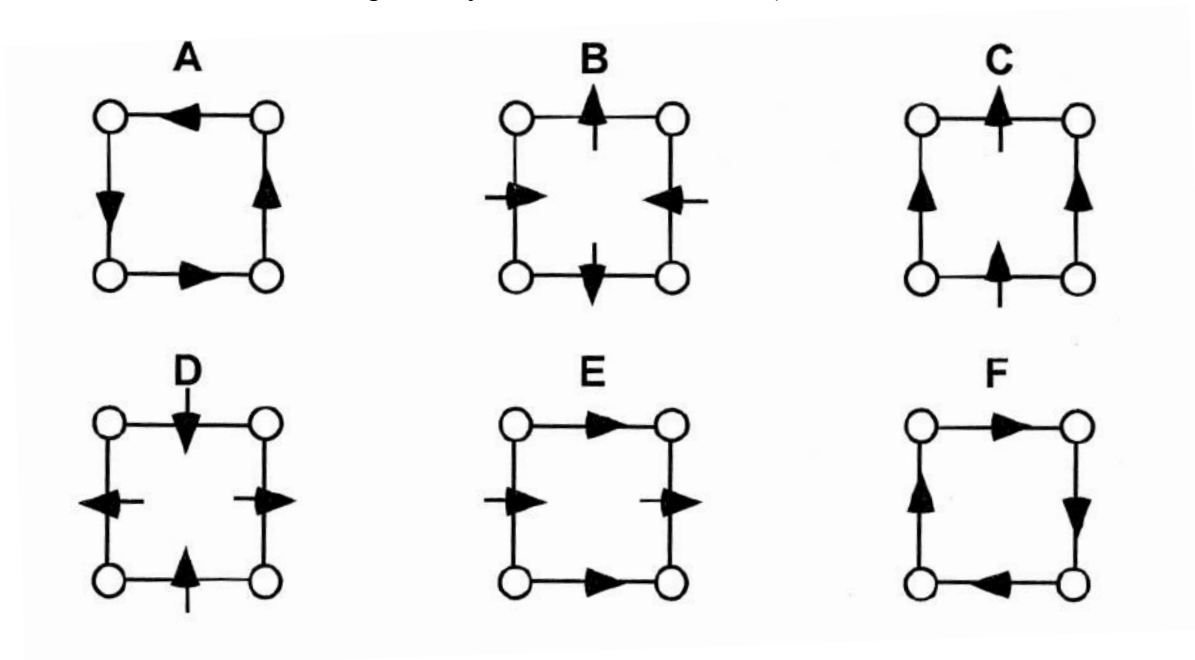
- 1. Describe how energy is stored in magnetic fields.**
- 2. Determine the energy stored in magnetic fields given the details of the current configuration and/or the spatial properties of the magnetic field.**

**1)** Consider Example 7.13 in Griffiths. If the outer cylinder weren't present, and you only had current  $I$  flowing on the surface of the small cylinder of radius  $a$ , what would be the stored magnetic energy? (*Hint: If you become stuck on this question, you might want to glance at the next question*)

**2)** You should have gotten a troublesome answer to the last question. What bad assumption(s) did we make that caused the trouble with our answer?

**3)** Give an example of how you could recover or use the stored magnetic energy in the coaxial cable. I'm looking for specifics, i.e. "I could use the energy to run a toaster by doing..."

4) **Note: This is a review question from Physics 361.** Shown are six situations where current-carrying wires are at the corners of squares. We are viewing the situations from “end-on” of the wires. All of the currents have the same magnitude, but they vary in whether they flow into or out of the page. Also shown in each figure are the directions of the net magnetic fields produced by the currents at the midpoints of the four sides of the square. Rank these situations, from greatest to least, on the basis of the magnitudes of the net magnetic fields at the center of the squares. If two of them have equal magnetic fields, then write an equal sign between them (e.g.,  $A > B = C > D = E \dots$  this is probably not the correct answer).



5) What did you find difficult or confusing in the pre-class work? If nothing was difficult or confusing, tell me what you found most interesting. Please be as specific as possible.

6) Document whatever help you received on the preclass work.