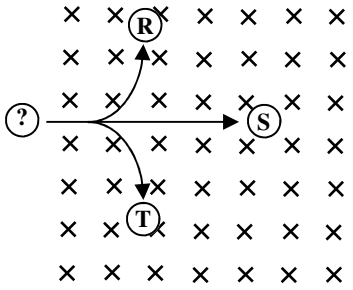
A-day: Due Wed., May 27
B-day: Due Thurs., May 28

2009 Magnetism 6

Name: _____



I cannot put everything on one homework. What was covered on Magnetism 5 will not be covered on this homework. Also, there is enough information on Transformers in the notes and the website. I won't go over it again.

1. Scientists need to determine the charge of a particle, so they project it into a magnetic field. By watching its path, they will know its charge.
   A. ___ Which path proves it is negatively charged?
   B. ___ Which path proves it has no charge?
   C. ___ Which path proves it is positively charged?

   This is one way that scientists can determine the charge of a particle. The picture at the left is that of "pair production", when an electron and a positron (an anti-electron) are formed in a nuclear accelerator. (I don't know which is which.) The two particles have equal mass (more mass would be a much larger spiral path), but you can see by the opposite paths that they have opposite charges. The positron is the antimatter particle of an electron.

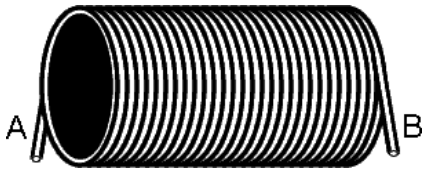
$$F_{mag} = q v B$$

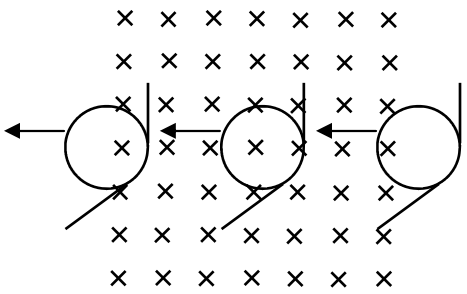
2. If an electron feels 3500 N of force when moving thru a 25 T magnetic field. How fast is it moving? ($1\ e = -1.6\times10^{-19}$ C).

3. Attracted to a magnetic: yes or no?
   A. ____ Aluminum
   B. ____ Steel
   C. ____ A penny
   D. ____ A compass
   E. ____ A copper wire with no electricity flowing.
   F. ____ A current carrying wire.
   G. ____ A moving charge.
   H. ____ Another magnetic
   I. ____ Iron
   J. ____ A charge at rest (a stationary charge).

4. Permanent magnet, temporary magnet, electromagnet?
   A. ____ A piece of iron when next to a magnet.
   B. ____ Will not lose its magnetism.
   C. ____ Loops of wire when electricity is flowing.
   D. ____ Can have its poles switched by a second magnet.

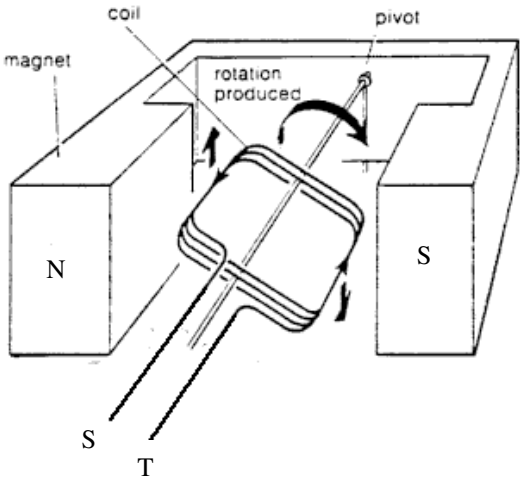
5. Use the diagram at the right to answer the following.
   A. The coils of wire is called a: _____.
   B. If positive current flows into A and out B, which side is North?
   C. If positive current flows into B and out A, which side is North?
   D. So, when the current flowing thru the wires is reverse, the direction of the magnetic field is r_____.
   E. Where is the magnetic field the strongest: inside the center of the coils; at the opening; on the side of the coils?





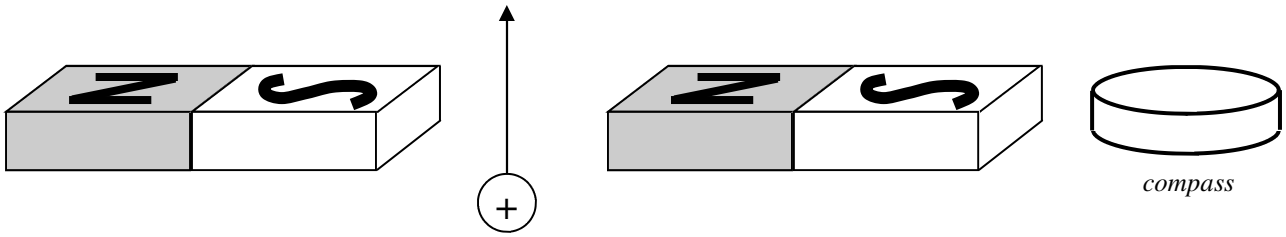
6. A. If the left loop is not moving, is there an induced current? The loop is then moved from right to left.
   B. When is there current in the loop?

   C. As the loop is exiting the field (leftmost loop), is the induced current CW or CCW?

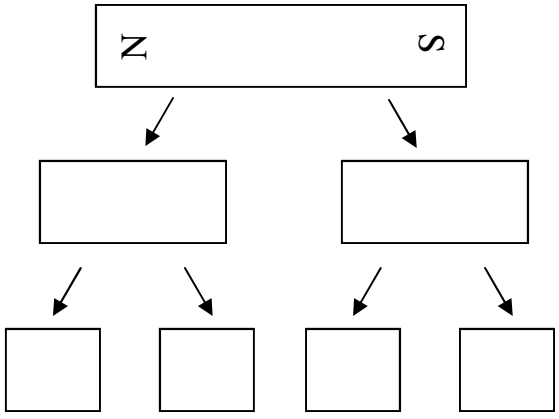


7. The loop is rotating between the ends of a horseshoe magnet. The right side of the loop is moving down.
   A. What kind of current does the turning loop produce as it does a complete revolution (as it continues to rotate)?

   B. At the position it is right now, does current come out S or out T?



8. A proton is moving between two bar magnets as shown above.
   A. Which direction does B point between the magnets?
   B. Which direction is the magnetic force on the proton?
   C. Draw the compass needle in the compass at the right side of the diagram.



9. A bar magnet is split in half. Each of the two halves is also halved.
   A. Label each of the bars.
   B. How small would the bar be to have a single North or single South pole?

It's been quite a journey. I appreciate those of you that have worked on the homework yourself and taken the time to actually learn the material. I hope some of you have also realized that paying attention and doing homework can be useful and, at times, enjoyable.

And in the words of the inimitable Porky Pig: "That's All Folks."

"Bye."