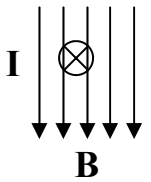
PreAP: Due Tues., May 16 (Assigned Fri.., May 12)
Reg. Due Wed., May 17 (Assigned Mon., May 15)

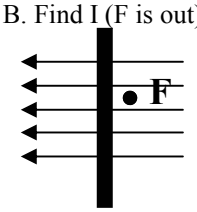
Magnetism Review 1

1. Use the Right Hand Rule (RHR) to find B, q, or F for the following.

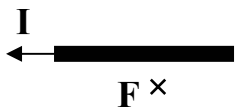
A. Find F (I is into page)



B. Find I (F is out)



C. Find B



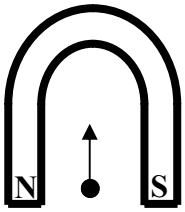
Q4

2. The RHR helps you find the direction of B, I (q), or F.
   A) Is B an internal or external magnetic field?
   B) A straight current carrying wire produces a c_____ B.
   C) So, why can't a current carrying wire's magnetic field cause a force on itself?

   D) Is the RHR force due to the magnetic field or an external force?
   E) To find the force in the RHR, is the q moving or not?

   F) So, when a wire is moved thru a B, this force is NOT due to B, so is the direction of the wire F or I (or q) for the RHR?

Q3

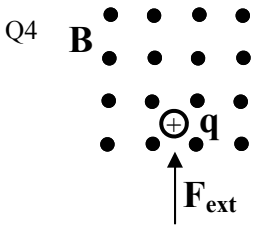


3. The diagram shows a wire moved up by an external force in the magnetic field.
   A) Using the information from #2 above, is the wire's direction F or I (or q) for the RHR?

   B) Then, find the direction of the force that will be felt inside the wire (this is the direction of the current inside the wire).

   So, when a wire is moving in a magnetic field the direction the wire is going is I (or q) in the RHR. (Let's see if we can make this clearer.)

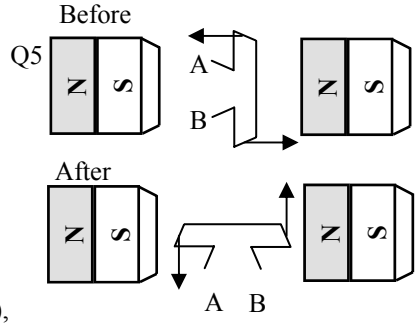
Q4



4. If a vertical force is applied to proton (q) in the B shown, the B will produce a force on the charge in what direction?

5. The diagram shown is (supposed to be) in 3-D. It shows a square loop of wire being turned counterclockwise between the two magnets.
   A) In the before picture: using the top arrow as the direction of the moving wire (as I), find the direction of the F produced in the wire. (I is going left)
   B) So will electricity come out end A or B?
   C) In the after picture: using the left arrow as the direction of the moving wire, find the direction of the F produced in the wire.
   D) So will electricity come out end A or B?
   E) From Faraday's equation, when we rotate this wire loop, what is changing to create the emf?
   F) In which configuration (vertical [before] or horizontal [after]) will the loop be breaking more magnetic field lines?
   G) So, which position produces a greater emf as it is turning?
   H) If you were to hold the loops still and instead close it (reduce the area of the loop), which position (vertical or horizontal) would break more magnetic field lines?
   I) So, which position would create a greater emf when you reduce the area of the loop?

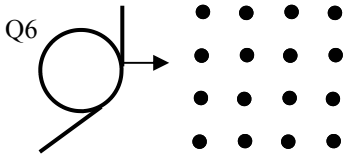
Q5



A square loop (in 3-D) turning CCW between two magnets.

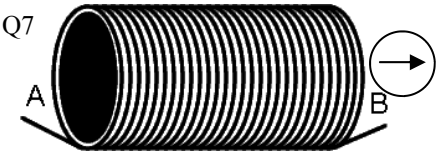
6. Remembering that the moving wire is the direction of I (not F), when the loop of wire is moved into the magnetic field, which way will the force be on that portion of the wire?

Q6



7. A) Electricity is put on the s_____, using the compass, which side is N?
   B) Which side was the positive electricity put in: A or B?
   C) So, which side will the positive electricity come out: A or B?
   D) If an ammeter's positive side was attached to A, will it read + or – ?

Q7

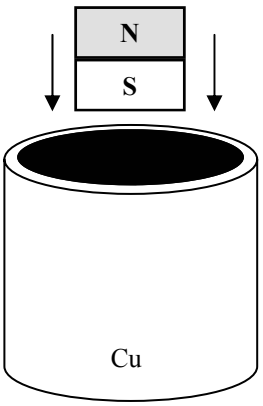


Magnetism Review 1

Understanding Lenz's Law

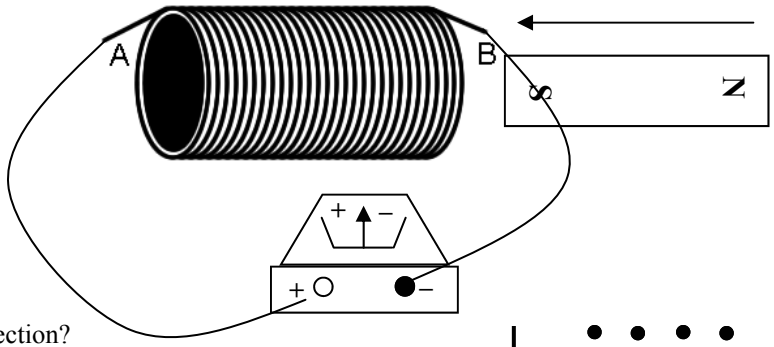
8. Remember when we dropped a magnet thru the copper tube.
   A) Is the copper tube magnetic?
   B) How do you know?
   C) Copper has another property: it is a good c_____.
   D) The magnet falls thru the copper tube slowly, so something has to be opposing gravity. What is it and what direction is it facing?
   E) So, using the circular RHR, which direction must the currents in the tube be going across the front of the tube: to the left or to the right?

Q8



Lenz's Law: the induced magnetic field (and its corresponding current) attempts to oppose any change of magnetic field (which is what we just proved).

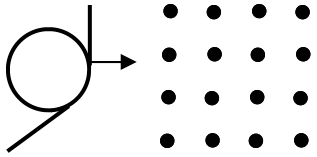
Q9



9. A bar magnet is moved inside a s_____.
   A) Which direction is the induced magnet?
   B) Will the electricity induced in the coils come out side A or side B?
   C) So, will the ammeter read positive or negative?

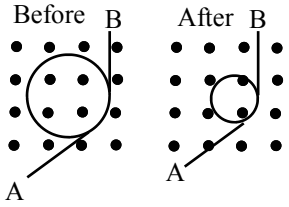
10. A loop is moved into a B, which is out of the page. Remember that the direction of B (out) is the direction of N (your thumb with the circular RHR).
   A) When the loop is moved into the B, the loop produces a B to oppose the change, so make a B going what direction?
   B) So, using the RHR, will the induced current be CW or CCW in the loop?

Q10

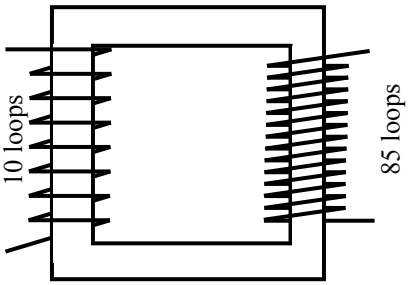


11. A) When the area of the loop is reduced, is B increased or reduced inside the loop?
   B) The loop will oppose this change by producing a B going which direction?
   C) So, the current induced in the loop will move CW or CCW?
   D) So, will the current come out A or B?

Q11



12. Use the picture of the transformer to answer the following:
   A) You put current onto the left side. How many loops in the primary?
   B) In this configuration, is it a step-up or step-down transformer?
   C) If you put the voltage from the wall on the primary, what's the output voltage?
   D) The input current is 3 amps, so what's the output current?



13. A transformer works by what principle (what is equal)?

14. Find the gravitational force between the two shown objects.