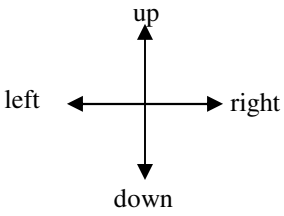
A-day: Due Tues., May 13 (Assigned Fri, May 9)
B-day: Due Wed., May 14 (Assigned Mon., May 12)

2008 Magnetism 3

Equation
$F_{mag} = qvB$
$F_{mag} = B I \ell$

Variable	Unit	Var Name	Notes
B	T (Teslas)	Magnetic field	Goes from N to S; points direction N of compass.
ℓ	m	Length	Length of current carrying wire in B
I	Amps	current	Current in wire of length ℓ
q	Coulombs	charge	+ for protons; – for electrons; 0 for neutrons

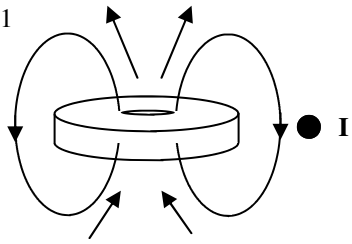
Directions on paper:



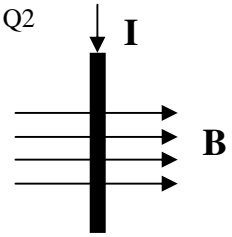
Note: When doing problems on paper out of the page (●) is towards your face.

1. A. On the donut magnet on the right, label N and S.
   B. On the magnet's right side, a wire has current flowing thru it coming out of the page. Notice that B points down the page. Which way is the force on the wire?

Q1



Q2



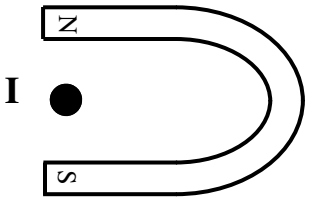
2. A. Is the magnetic field shown at the left due to the wire (circular) or an external magnet?

   B. Find the direction the wire will deflect (move) due to the magnetic field.

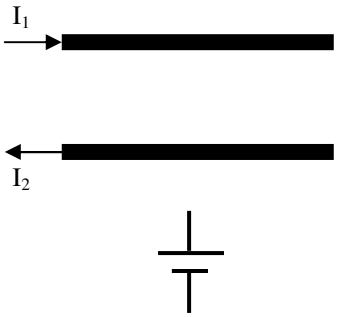
3. A. Which direction is B inside the horseshoe magnet at the right?

   B. Which way will the wire deflect? (*I is out of the page*.)

Q3

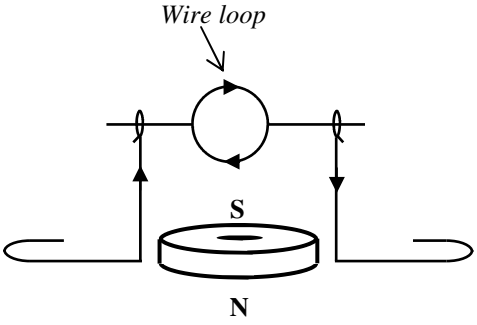


Q4



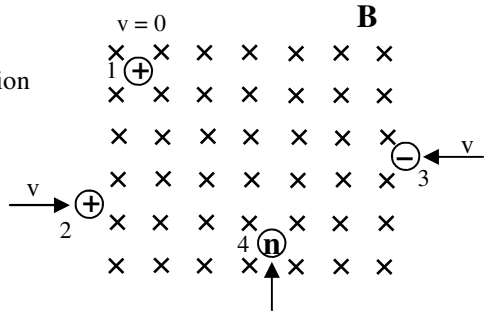
4. The two black lines at the left show two wires with current running in opposite directions. Wire 1 exerts a force on wire 2.
   A. At wire 2 (below wire 1) , which way is the magnetic field from wire 1?
   B. Using the right hand rule, which way is the force on wire 2?
   C. For wire 2, label its + and – sides.
   D. Connect wire 2 to the given battery.

5. The arrows show the direction of the current flow in the suspended wire loop.
   A. Which way is N for the wire loop?
   B. Will the front of the wire loop move towards or away from the donut magnet?



6. Notice the four round objects.
   A. For the proton at the top left (object 1), what is the direction of F_B?

   B. Draw the path that the proton (object 2) at the bottom left will follow.



   C. Draw the path that the electron (object 3) will follow.

   D. What is the direction of the magnetic force on the neutron (object 4) labeled "n"?

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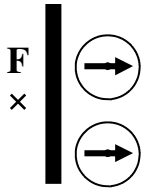
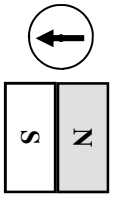
7. A current carrying wire is placed into a magnetic field. The magnetic field pulls the wire into the page. Which direction is the current in the wire?



8. A compass placed anywhere on a line half way between the N and S of a magnet will always be parallel to the magnet. Why? (*Be specific. This requires some explanation.)*



I know I said that there would be very little math in this unit. So here is very little...

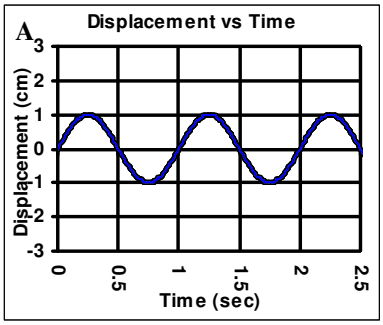
9. Find the variables for the following: 34 m/s is ____; 8 T is ____; 4.5μC is ____; 4 m is ____; 2.5 amps is ____.

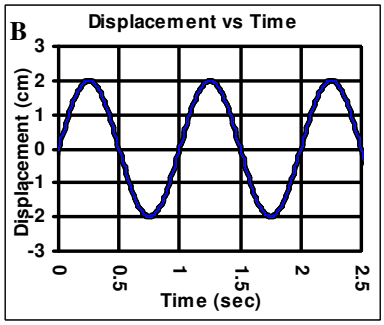
10. How much force does a 6 C charge going 256 m/s feel in a 75 T magnetic field?
Variables: Equation: Solve:

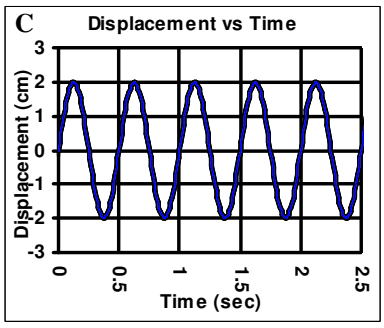
11. 3 cm of a wire is inside a 4.4 T field. If it feels 1.2 N force on it, how much current is running thru the wire?
Variables: Equation: Solve:

Review for Final

12. A person yells into a cavern. After 2.4 seconds, the person hears the echo.
    A. How far does the sound travel? D or 2D?
    B. What is the speed of the sound?
    C. Find the depth of the cavern.







13. A. What is the period of Graph A?
    B. What is the amplitude of Graph C?
    C. Which pendulum swing slower A or B?
    D. Which spring swing faster: A or B?
    E. Which Spring has the greatest amplitude: Spring B or Spring C?
    D. Which graph is spring C?
    E. Which graph is pendulum B?

14. Give two ways to make spring C swing faster.