Magnetism 7

1. Remembering the motors I showed you in class. Any motor must have two kinds of magnets. What are they?

2. How does it work? (*Explain*.)

3. Atomically, what is the difference between magnetic substances and non-magnetic substances? (*Check your book or the notes*.)

Q4

4. Use the diagram at the right to answer the following.
   A) Which direction is the wire loop's north pole?
   B) So, which way will the front of the loop turn?
   C) After the loop has turned, if the current in the loop remains constant, what will happen to the loop?
   D) As the loop turns, if the current stops, what happens to the loop?
   E) If the current stops, will the loop want to keep turning or go back?
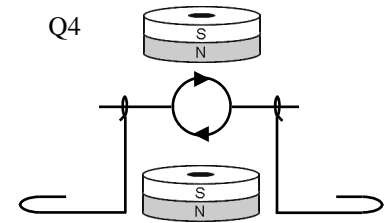
5. A loop of wire is turned in between two magnets as shown at the right.
   A) Is the moving loop the force or the charge for the right-hand rule?
   B) If the loop is turned clockwise as shown, will the current come out end 1 or end 2?
   C) As the loop turns, when will it have the most emf: when horizontal or vertical?

6. Again using the loop in between the two magnets. If the loop of wire is closed, will that produce more emf when it is closed horizontally or vertically?

7. Give three ways that an emf can be produced in a wire loop.
   (*Hint: look at the emf equation.*)
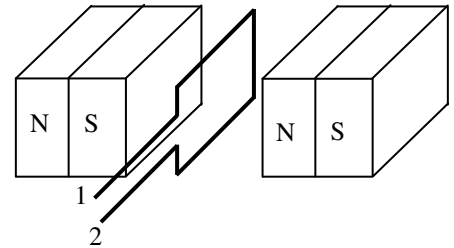
8. A) The magnetic field is going which direction?
   B) If the loop of wire is moved into the B a current is produced in the   loop. What is chang-ing to cause the emf?
   C) Which direction will the current be: clockwise or counterclockwise?

9. A pivoting wire apparatus can lift 10 paperclips when put into a magnetic field. 40 paperclips have a mass of 18 grams. Find the magnetic force applied by the apparatus.

10. For this equation: Fmag = qvB give what each letter stands for and its units.

11. For this equation: Fmag = BIℓ give what each letter stands for and its units.

Q12

B
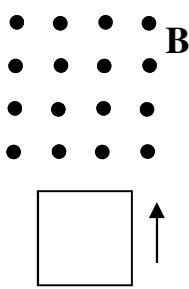
12. A square loop of wire is moved into a magnetic field from the bottom.
    A) As it moves into B, which direction will the current in the wire move?
    B) When it is entirely in B, which direction will the current in the wire move?
    C) When it moves out of B, which direction will the current in the wire move?

13. (Putting it all together...) A bar magnet is moved into a solenoid. Will the ammeter read positive or negative.

Q13

Q13 →

S   N

A

B

+   −

+ ○   ● −

14. A magnet is pulled out of coils of wire (40 loops) which causes a change of magnetic field of -38 T in 4 seconds. An induced emf of 24 volts and loops are oriented at 0 degrees to one another.
    A) Find the area of each loop.
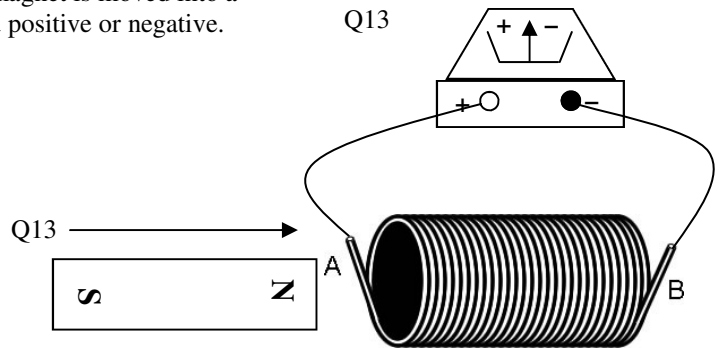
    B) Find the radius of each loop (each loop is a circle).

(Using your book to answer questions about the photoelectric effect…)
15. We use the photoelectric effect everyday in certain devices. Give one.

16. An electron requires 1,000 J of energy to be ejected from a metal.
    A) If a photon with 1,000 J is shined onto the metal, will an electron be ejected?
    B) If a photon of 1,200 J is shined onto the metal, will an electron be ejected?
    C) If a photon of 800 J is shined onto the metal, will an electron be ejected?
    D) If two photons of 800 J are shined onto the metal, will an electron be ejected?

17. What does the photoelectric effect prove about light and electrons?

18. A) The device at the right is called a _____.
    B) If 240 volts DC are put on the top of the device, how much current comes out at the bottom?
    C) Regardless of how much DC voltage is put on the top, will it create a magnetic field?
    D) How does the magnetic flux of the top compare to the magnetic flux of the bottom?
19. If I put AC voltage on the bottom of the device.
    A) The primary is which side?
    B) If I put voltage on the bottom side, which side is the secondary?
    C) If I put voltage on the top side, would it increase or decrease voltage?
    D) To make it a step-down transformer on which side would I put the voltage?

20. If I put 120 V AC on the bottom, what voltage will I get out on top?

8 loops

24 loops

21. Using your answer from above, if the input current is 6 amps, what will be the output current?