2009 Magnetism 5

Name: _____

I_1

I_2

1. Two current carrying wires are shown at the left. They have current flowing in the same direction.
   A. Below wire 1, which direction does wire 1's magnetic field point?
   B. Above wire 2, which direction does wire 2's magnetic field point?
   C. So, do the wires attract or repel each other?

2. Two current carrying wires have current flowing in opposite directions. Will they be attracted or repelled by each other?

3. Electrons have a negative c_____. Protons have a positive c_____. Neutron have a no c_____.

4. What is electricity?

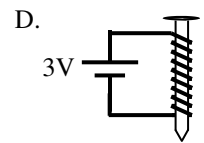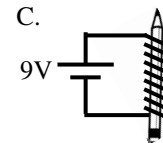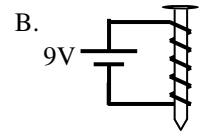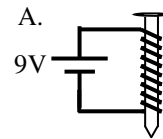5. A moving c_____ feels a m_____ force. Moving e_____ causes m_____.

6. What causes both electricity and magnetism?

7. (*From "Magnet" notes*) On the atomic level, what causes magnetism?

8. If the atomic magnets line up in the same direction, is the substance magnetic?

9. Give three ways to increase the strength of an electromagnet.

A. 9V

B. 9V

C. 9V

D. 3V

10. A. Which of the four electromagnets at the right is the strongest?
    B. Why?

11. Motor, Generator, or Both?
    A. ____ Creates electricity.
    B. ____ Has loops of wire in it.
    C. ____ Creates motion.
    D. ____ Is turned by a force.
    E. ____ The diagram below.

    F. ____ Can make electricity.
    G. ____ Used in a hydroelectric dam.
    H. ____ Used in open or close windows in a car.
    I. ____ Turns when electricity is applied to it.
    J. ____ The diagram below.

   *Work* → [ ] → *Electricity*

    Electricity → [ ] → *Work*
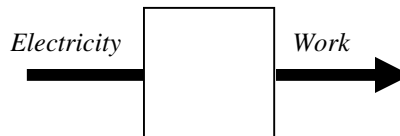
12. A neutron is moving 25 m/s in a 8 T magnetic field, calculate the force on the neutron.

13. A negative object is moving 3 m/s in a 0.25 T magnetic field. If it feels 18 N pulling it, what is the object's charge?

From your book or the Internet, etc
14. Where does the Earth's magnetic field come from?

15. How does the Earth's magnetic field protect us here on Earth?
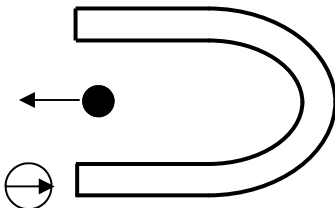
16. A. Use the compass to decide which side is N and S.
    B. The wire is pulled to the left by an external force. What part of the right hand rule (RHR) is the moving wire?

    C. Which direction will the magnetic force be in the wire? D. Which direction will the induced current be?
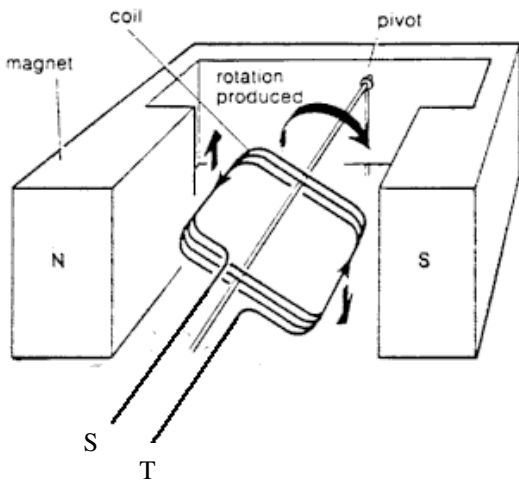
17. The diagram at the left shows a loop of wire moving inside a horseshoe magnet. The loop rotates clockwise around the pivot.
    A. Which direction does the magnetic field point?
    B. When does the rotating loop cut more magnetic field lines, when it is flat or vertical?
    C. Remembering that the wire is your thumb, which side will the induced current flow: out point T or point S?

18. Explain completely how a basic motor works.
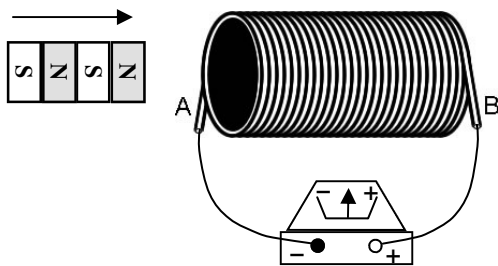
19. What does a commutator do?

20. A North pole of a group of magnets is moved into a solenoid.
    A. Since the induced current wants to oppose a change of magnetic field, which side of the solenoid will be its North?

    B. Will the induced current cause the galvanometer to read positive or negative?

21. A magnet is dropped into a copper tube.   (*If I forgot to show you this, remind me.*)
    A) Is a magnet attracted to copper?
    B) What force pulls down on the magnet?
    C) What is the acceleration due to gravity?
    D) Does the magnet drop faster or slower than the acceleration of gravity as it moves thru the copper tube?
    E) Why?

22. If one sound has a frequency of 460 Hz and a second has a frequency of 462 Hz.
    (*From "Ancillary Sound Topics".)*
    A. Will these two frequencies sound good or bad if played together?
    B. How many beats will be produced?
    C. These beats are due to constructive or destructive interference?

23. Harmonic Motion review:
    A) The repeated part of the motion we call the _____.
    B) The _____ is how long it takes a cycle to repeat.
    C) __ The number of cycles each second is called the _____.
   D) The _____ shows the energy with a stronger wave or a wider swing.

24. Light review topics:
    A) The speed of light in a vacuum is: _____.
    B) The speed of radio waves is: _____.
    C) Which has a longer wavelength: radio waves or x-rays?
    D) Which has a higher frequency: visible light or ultraviolet light?
    E) Light bouncing off of a hard boundary is called: _____.
    F) Light changing speed at a clear boundary is called: _____.
    G) Light bending around corners is called: _____.
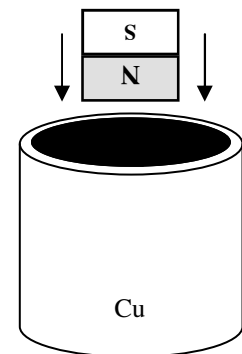
25. A black and white object are placed under a heat lamp,
    A. Which one will heat faster?
    B. Which one will cool faster?
    C. The method of heating is: conduction; convection; radiation?

26. Slim Jim jumps from a pier into a boat.   Using the numbers on the diagram, calculate the final velocity of Jim in the boat.

3 m/s

70 kg

20 kg

8.5 sec
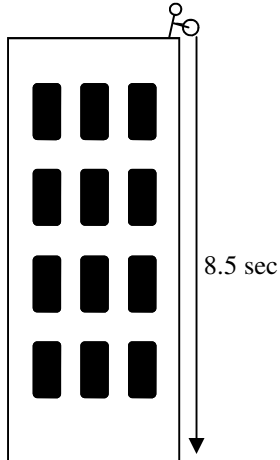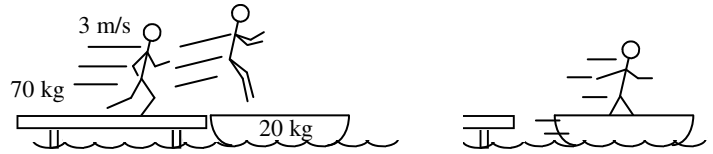
27. Slim Jim drops a ball off of the top of a building.
    A. What is the acceleration of the ball?
    B. Will the displacement of the ball be positive or negative?
    C. What is the initial velocity of the ball?
    D. Using the above information and the time the ball is in the air, calculate the velocity of the ball just before it hits the ground.