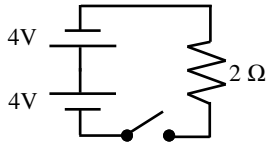
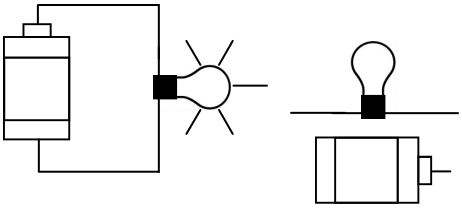
A-Day Due Mon., Apr 20
B-Day: Due Tues., Apr 21

2009 PreAP Circuits 2

1. Use the circuit at the right to answer the following questions.
   A. As drawn right now, is it an open or closed circuit?
   B. With the switch is closed, what is the current in the circuit?

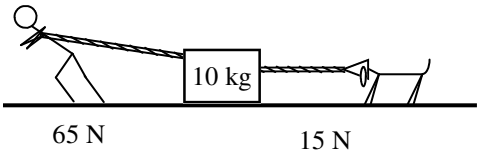




From the Lab:

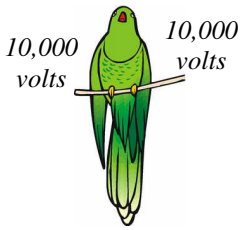
2. Given only the equipment shown at the left, what would you add to...
   A. increase resistance?
   B. increase brightness?
   C. increase voltage?
   D. decrease current?
   E. increase current?
   F. decrease brightness?

3. At the right, draw a battery with wires going to the light bulb in the correct way that would make the light bulb light up. Use correct circuit symbols.



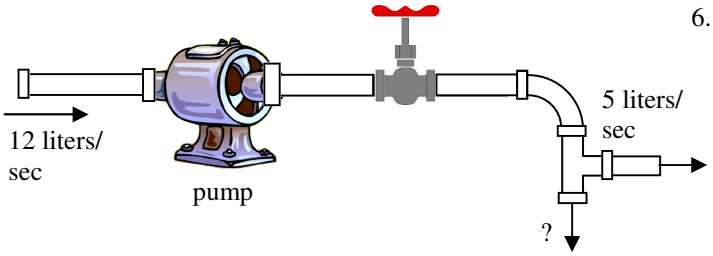
4. Slim Jim is trying to move a 10 kg box. Unfortunately his dog, Bim, is trying to be "helpful".
   A. How much force is actually pulling the box?
   B. What is the acceleration of the box?

   C. So, it is not the force that matters, but the n_____ force.



5. A bird perches on a high voltage wire.
   A. What is the difference of voltage between the bird's legs?
   B. How big of a shock does the bird feel?

   C. What would happen if the wire sagged down until the bird's foot touched the ground?



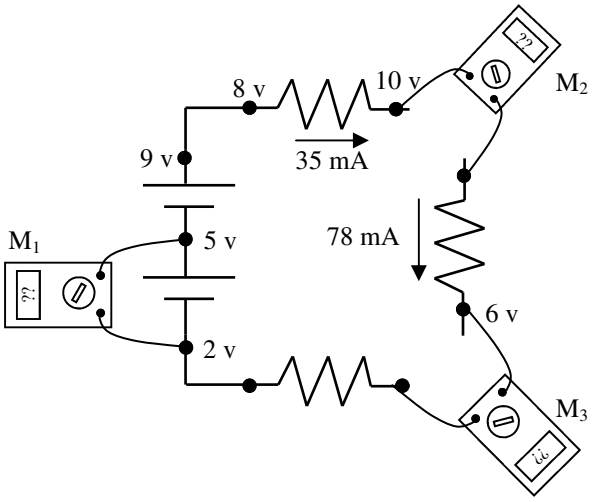
6. 12 liters/sec of water is being pumped by a water pump as shown. The valve is open the whole time.
   A. The water pump is like what part of an electrical circuit?
   B. What is the valve like?
   C. How much water flows thru the valve?
   D. How much water flows out of the bottom end of the pipe?
   This split point is called a junction.

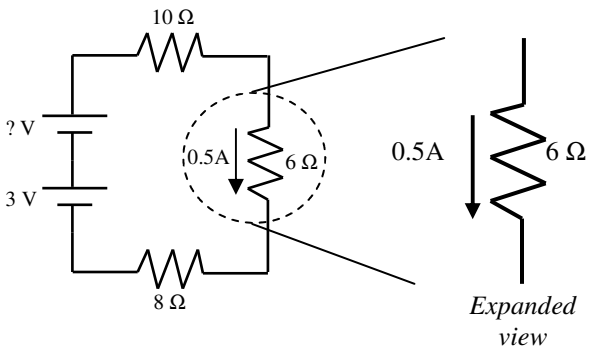
7. The diagram at the right is from our lab in class.
   A. Which meter or meters is an ammeter?
   B. Which meter or meters is a voltmeter?
   C. Which meter or meters is an ohmmeter?
   D. Explain three mistakes with the voltage around the circuit.
      1.

      2.

      3.

   E. Explain one mistake with the current in the circuit.





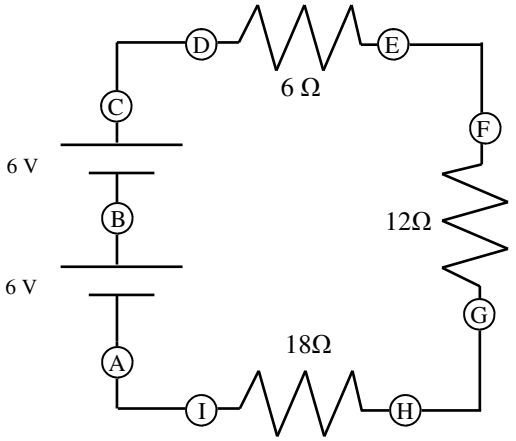
8. Use the circuit at the left to answer the following.
   A. How much current is flowing thru the 6Ω resistor?
   B. How much current is flowing thru the 8Ω resistor?
   C. How much current is flowing thru the batteries?
   D. What is the total resistance of the circuit?
   E. What is the voltage used by the 6Ω resistor?

   F. Calculate the total voltage of the circuit.

   G. What must be the voltage of the upper battery?

   The 3v battery is then removed.
   G. How will the total voltage change?
   H. How will the total resistance change?
   I. How will the current change?

*BIG HINT: This easiest way of doing the following problem is to **work the circuit first**, then answer the questions. Figure out the voltages, etc, on the diagram first. Also, this circuit is a large part of the test. Get help if you need it.*



9. A. What is the total voltage?
   B. What is the total resistance?
   C. What is the total current?

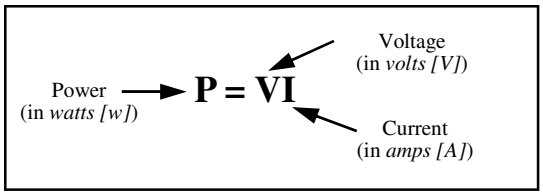
   D. What is the voltage at point A?
   E. What is the voltage at point B?
   F. What is the voltage at point C?
   G. How much voltage is lost from C to D?
   H. How much current is flowing thru the 1Ω resistor?
   I. How much voltage is used by the 1Ω resistor?

   J. How much voltage is left at point E?

   K. How much current is flowing thru the 3Ω resistor?
   L. How much voltage is used by the 3Ω resistor?

   M. Using the equation at the left, how much power is used by the 3Ω resistor?

   N. Using the total voltage and total current, how much power is used by the entire circuit?



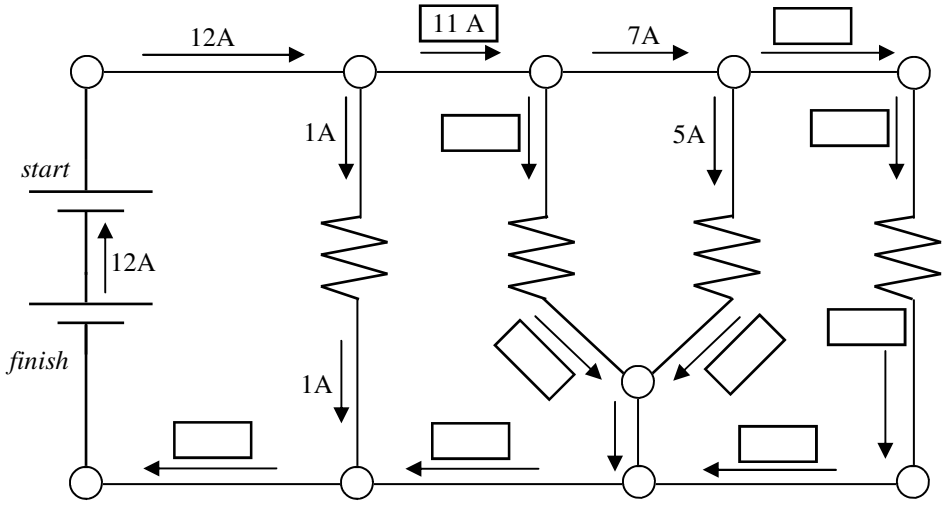
10. Using Ohm's Law (V = IR),
    A. Develop an equation to calculate power with voltage and resistance.

    B. Develop an equation to calculate power with current and resistance.

11. A. How much power is used by a 180Ω resistor that has 0.25A of current flowing thru it?

    B. What is the basic definition of power (check back in energy)?

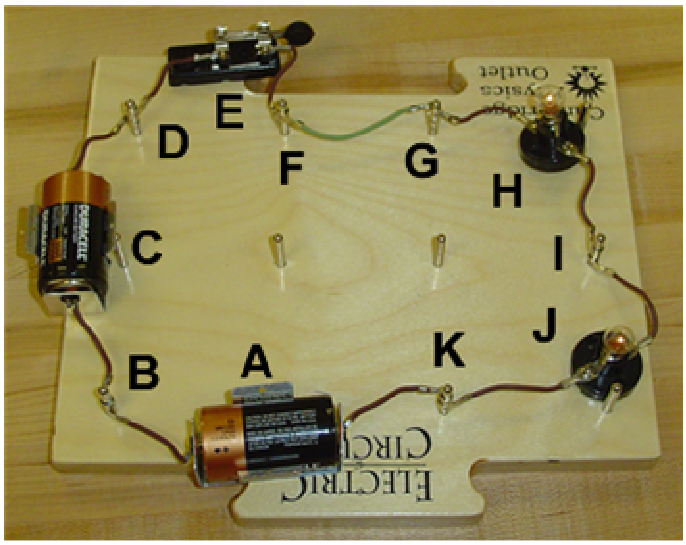
    C. How much time would it take for the resistor to use 150 J?

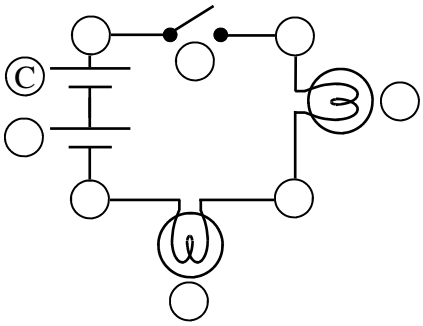


12. The circuit at the right will help you understand current. Start at the top of the batteries (at "start").

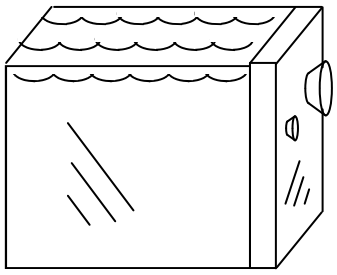
    A. In each of the circles, put one of the following:
    S (split) - one wire splits into 2.
    J (join) - two wire combine
    T (turn) - wire only turns.

    B. In each of the boxes, fill in the current for that part of the circuit. (*Hint: this is just addition and subtraction.)*





13. For each of the circles on the circuit diagram above, put the corresponding letter from the picture at the left. One of them is already done for you.



14. Imagine a large tank of water. In one side of the tank are two holes with plugs in them: a large hole and a small hole.
    A. When removed, which hole will have more resistance?
    B. Which hole will have more water flow thru it?
    C. Water, like electricity, always takes the path of:

    From the book: p.706:

15. Explain what a superconductor is. Include critical temperature and why it would be useful for us to have superconductors at room temperature.

16. (*Follow the example on p.712.*) A 800 W oven cooks a turkey in 4.5 hours. If the electric company charges 13 cents per kWhr, how much does it cost for a 800 W oven to roast a turkey for 4.5 hours?

See *TAKS notes below*:

17. Photosynthesis or Respiration?

A. ___ Occurs in the lungs of animals.
B. ___ Occurs only in plants.
C. ___ Carbon dioxide is a product
D. ___ Takes in sunlight.
E. ___ Uses glucose as energy.
F. ___ Carbon dioxide is a reactant.
G. ____ Produces oxygen.
H. ____ Produces water.
I. ____ Occurs in both plants and animals.
J. ____ Makes glucose.
K. ____ Uses water as a reactant.

These next questions are still from the same notes. Read carefully.

18. Where is ATP created in a cell?

19. What is the proof that respiration is a combustion reaction?