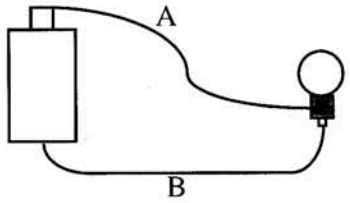
Name C. Coulomb Date _____

HOMEWORK FOR UNIT 22 #1
BATTERIES, BULBS AND CURRENT

1. For the circuit on the right, indi cate whether the statements below are TRUE or FALSE. If a statement is false, give a correct statement.



A. The current flows from the battery, through wire A, through the bulb, and then back to the battery through wire B. True

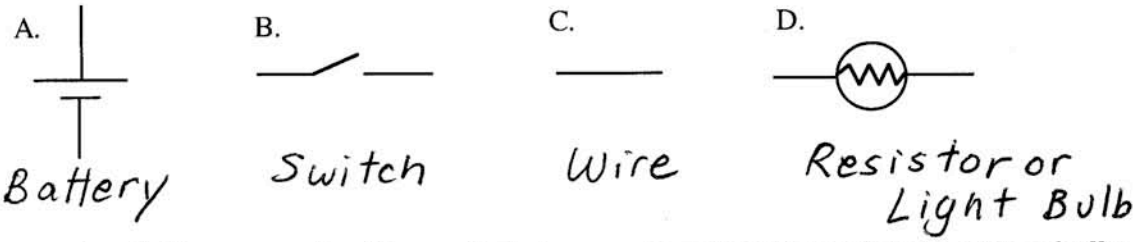
B. Since current is used up by the bulb, the current in wire B is smaller than the current in wire A. False. The current in wire B is the same as the current in wire A.

C. The current flows toward the bulb in both wires A and B. False. The current flows towards in A and away in B.

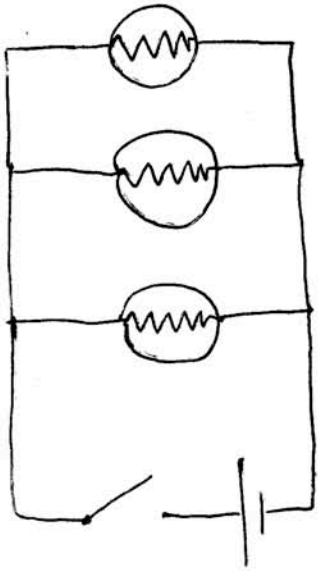
D. If wire B is disconnected, but wire A is left connected, the bulb will still light, but if wire A is disconnected and wire B is left connected, the bulb will not light. False. If any wire is disconnected the bulb will not light

E. A current probe will have the same readings if connected to read the current in wire A or wire B. True

2. What circuit element is represented by each of the following symbols?

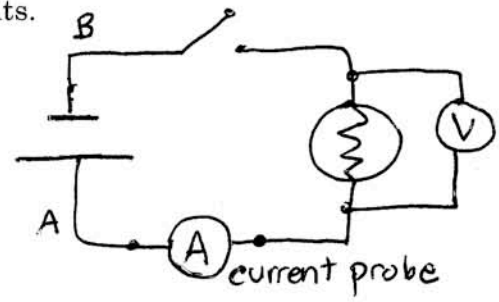


3. Draw a circuit diagram using the symbols in question 2 for three christmas tree bulbs connected to a battery with a switch so that when one bulb is unscrewed, the other two still light.

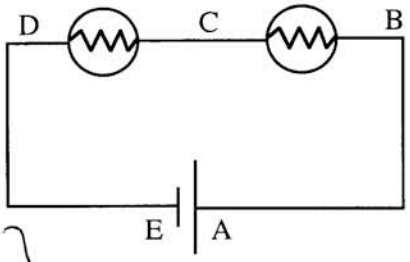


4. Re-draw below the circuit in question 1 with one current probe hooked up to measure the current in wire A and a voltage probe hooked up to measue the voltage across the light bulb. Also include a switch in the circuit to turn the bulb on and off. Use correct symbols for all circuit elements.

(upside-down)



5. A. For the circuit on the right, at w hich point A, B, C, D or E is the voltage the lowest? Explain.



E - because the voltage has dropped across both bulbs and the wires

B. At which point is the potential energy of a positive charge the highest? Explain.

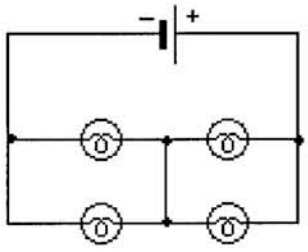
A - because the charge of the has not lost any energy that it gained from the battery

(D and F would be almost the same)

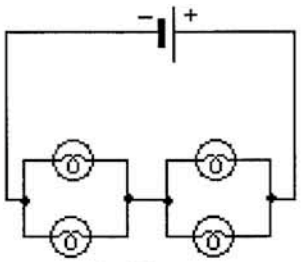
C. At which point is the current the largest? Explain.

The current is the same everywhere in the circuit.

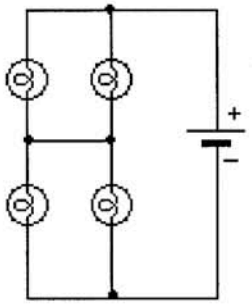
6. Which of the three circuits shown below, if any, are electrically identical? Which are different? Explain your answers.



#1



#2

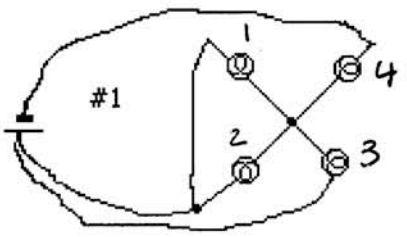


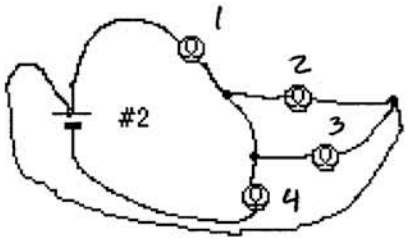
#3

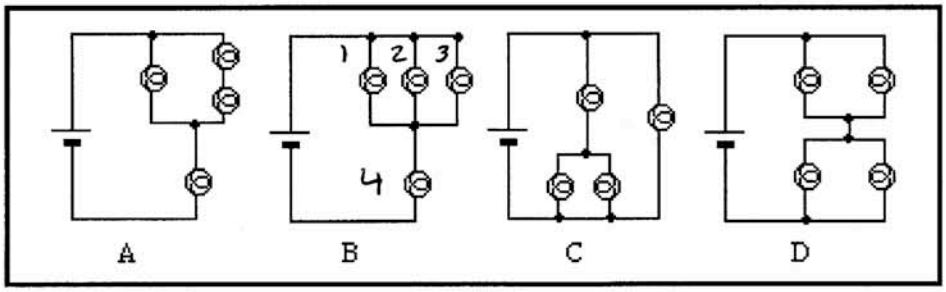
All three of these circuits are electrically identical, i.e. they have the same effective resistan and so the same current supplied by the battery.

The only difference is that in circuit #2 the total current flows in one wire between the two pairs of bulbs.

7. Identify which of the nice, neat circuit diagrams (A,B,C or D) corresponds to messy circuit diagram #1. Explain the reasons for your answer.







#1 corresponds to B because the first three bulbs are in parallel to each other and the last bulb (#4) follows in series.

8. Which neat circuit diagram corresponds to messy circuit diagram #2? Explain the reasons for your answer.

#2 also corresponds to B for the same reason.