

Name:

Physics 589 – Electricity – Sonnenfeld

COMPUTER LAB: DC Circuits: [45 minutes to do lab and 45 more to experiment with software]

1 Writeup

Your writeup should include answers to all the questions that are asked in this guide, and an explanation where it is requested. You DO NOT need to do anything beyond what is requested specifically, nor do you need write a formal lab report.

2 Build A one light-bulb circuit

Assemble the circuit. Pull a light bulb, a battery and two wires out of the bin. Make a circuit to light the lightbulb. Did you make any mistakes before you got it to work? What?

Hint: If you find you need to disconnect a wire at some point, click on the wire to highlight it and hit the delete key.

Measure the current in the circuit Get out the non-contact current measuring instrument and measure the current near the positive terminal of the battery. Near the negative terminal. On the part of the lightbulb closer to the positive terminal of the battery. On the part closer to the negative terminal. What do you find? Are you surprised? Why or why not?

Deduce the resistance of the lightbulb Measure and record the voltage of the battery with the voltmeter. Use Ohm's law ($V=IR$) to calculate the resistance of the light bulb. What is it?

3 Build A two light-bulb series circuit

Add a second lightbulb in series Add a second lightbulb to your original circuit. Predict what the current will be before the first light bulb, between the bulbs, and after the second bulb. Measure the current on the wire between the battery and the first light bulb, on the wire between the two bulbs and on the wire between the last and the battery. Were your predictions right? Discuss

Create a second circuit Make another one-lightbulb circuit (with another battery two wires and a lightbulb) and run that circuit and your two bulb circuit at the same time so you can compare the brightness of the bulbs. What do you see?

4 Build A two light-bulb parallel circuit

Make room for a third circuit Skootch your first two circuits up on the screen to make room for a third circuit.

Make a parallel circuit Connect two light bulbs in parallel to one battery. Run all three circuits together. Compare and discuss the relative brightness of the bulbs. ALSO submit a screen capture of the three circuits running together with your lab report.

Measure currents in the parallel circuit Measure and record the current in the parallel circuit at different locations. How do your results differ from what you saw in the one and two lightbulb cases?