Physics 200
23-24 Circuit Lab

Name: _____

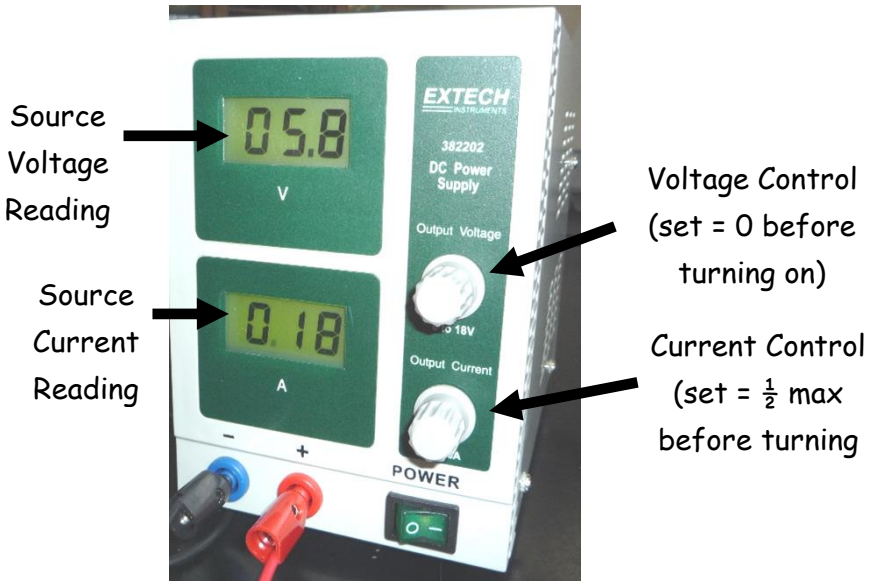
Using the Power Supply:

Step 1: Set Voltage to Zero

Step 2: Set current to ½ of maximum.

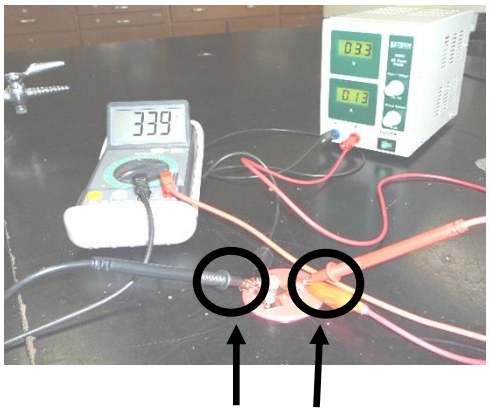
Step 3: Turn on power supply. Keep voltage at or below 6V – keep an eye on changes!

Measuring Source Voltage and Current: See Power Supply Readout



Using the Multimeter for Individual Voltage Drops and continuity:

Set the Digital Multimeter (DMM) to measure DC **voltage** (solid line over dotted line). To measure voltage drop across a resistor (bulb), touch the two probes to each terminal on the bulb holder. This measures the potential difference between the two sides of the bulb. Adjust the meter range until you get a reasonable reading (or ask the teacher what range has been working).



Measure Voltage Drop by touching the two probes of the voltmeter to each terminal of the bulb holder.

Do NOT use the DMM to measure current! You can use the voltage source for finding total current. You must infer the current through each resistor (bulb).

Use the Continuity Tester (sound wave symbol) to check for burned out bulbs or broken alligator clip wires. If it beeps, there is continuity (a continuous conductor between the two points), which means the bulb or wire *should* work.

Important reminders about real vs theoretical circuits:

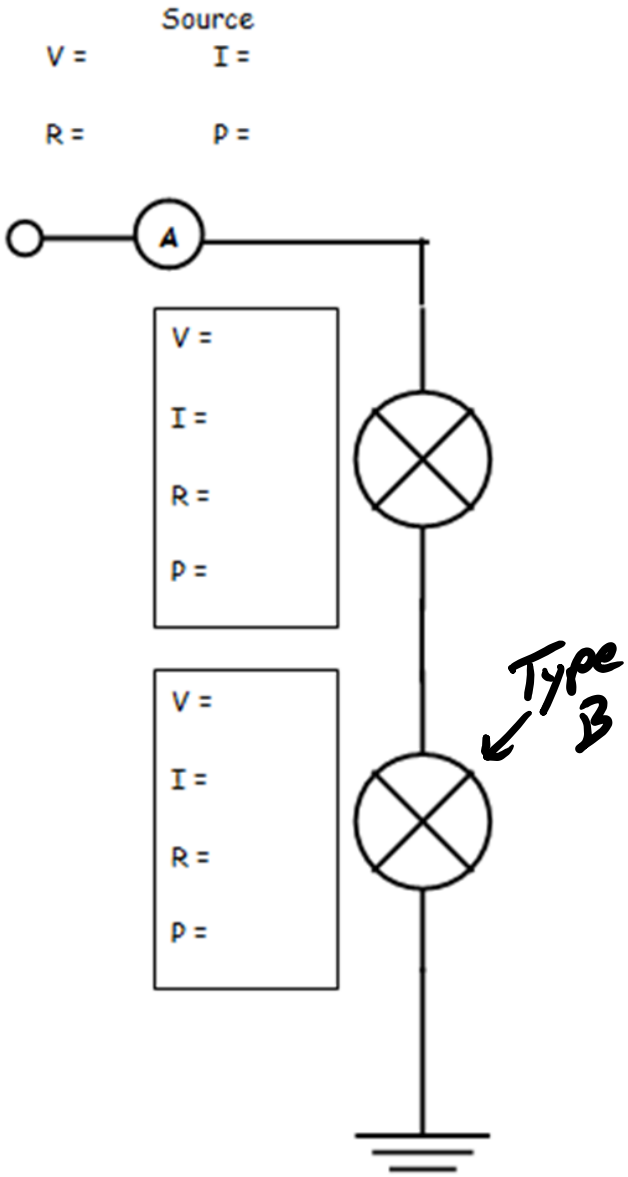
1. Real wires have resistance. This means they will take a little bit of the power (I^2R) and a little bit of the voltage drop (in series). Since $R = \rho L/A$, longer wires have more resistance. So, if your calculations are a little bit off, this may be why.

2. Incandescent bulbs are non-ohmic. This means their resistances vary depending on the amount of voltage they receive. So, when you are collecting data, keep the voltage constant! **One trick for determining a bulb's resistance at a particular voltage is to create a simple circuit with just that bulb, and adjust the voltage to the voltage in question. Then read the current from the power source.**

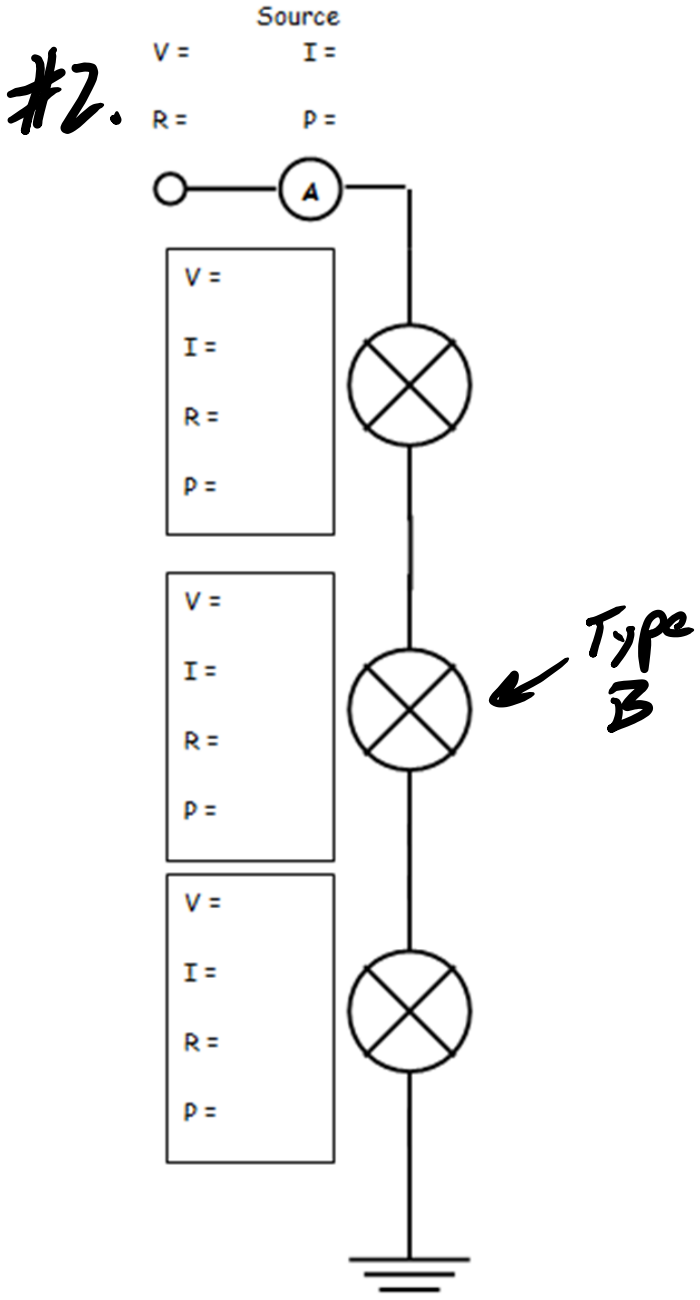
Directions: Build a circuit. Use the power source readout to determine the source current and voltage drop [**keep it at 6V or less]. Next use a multimeter to determine the voltage drop across each bulb (X symbol). Use your circuit knowledge to find the rest of the information.

About The Circuit Diagrams: The small circle at the top left end of the circuit represents the red (positive) terminal of the power source. Each X represents a bulb (resistor). The ground symbols (three dashes of diminishing length) represent connections to the black (negative) terminal on the power source. The "A" represents the presence of the internal ammeter that is built into the power source. "Type B" means you are supposed to use a different type of bulb (compared to the other bulbs) in this position.

#1.



#2.

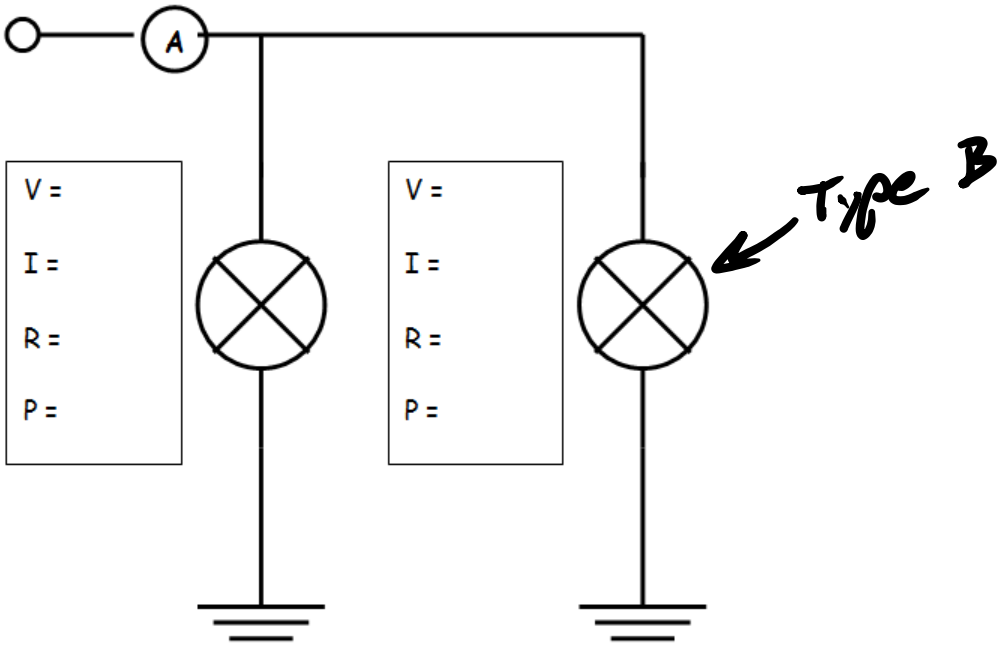


#3.

Source

V = I =

R = P =

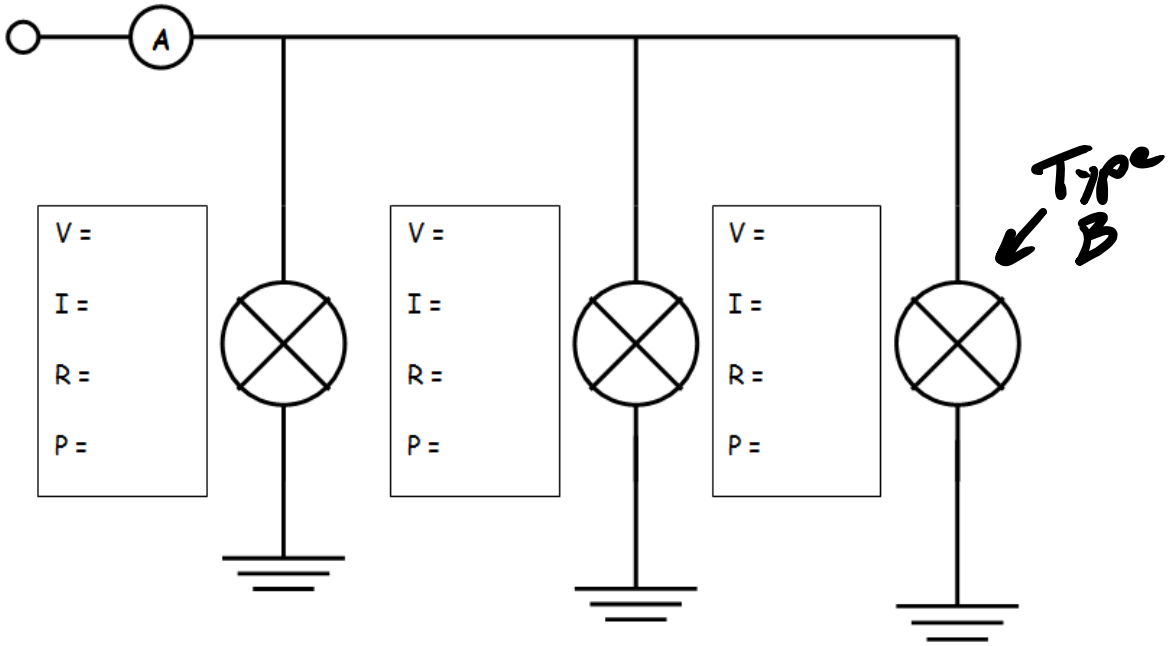


#4.

Source

V = I =

R = P =



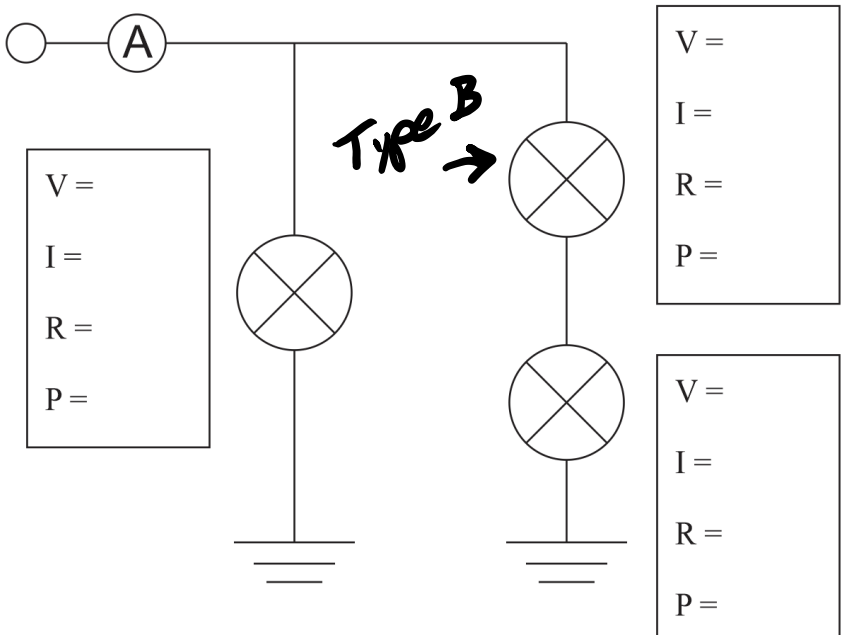
✱ Challenge Page: I added this page for students seeking some extra challenge.

#5.

Source

V = I =

R = P =



#6.

Source

V = I =

R = P =