

Phys 040C – Prelab 1

Electrostatic Charge and Simple Circuits

Ivan Neto

1. Below are diagrams of six different configurations of bulbs, wires, and batteries. Make a prediction about whether or not each configuration will result in the bulb lighting up.

#1: A wire touches the positive end of the battery and the tip of the bulb.

- The bulb will NOT light up. There is electron movement needed in order to form the arc between the two rods that will produce light. Since there is no negative connection, the arc cannot form as electrons cannot move from rod to rod. There will need to be two wires, one connected to each rod on one end and to each side (positive and negative) on the other.

#2: The tip of the bulb touches the negative end of the battery. A wire touches the positive end of the battery and the metal side of the bulb.

- The light bulb WILL light up. This is, however, assuming that the threads contain a connection to one of the filaments while the tip of the light bulb connects to another filament. It could be the case that the tip of the light bulb contains connections to both filaments, but this is typically not the case in many modern light bulbs.

#3: A wire touches the positive end of the battery and the tip of the bulb. A second wire touches the negative end of the battery and the tip of the bulb.

- The light bulb will NOT light up, assuming that the connections to the filaments are 1) at the bottom of the light bulb and 2) on the screw threads.

#4: One wire touches the positive end of the battery and the tip of the bulb. A second wire touches the positive end of the battery (not the knob in the middle) and the negative end of the battery.

- The light bulb will NOT light up, since a complete circuit has not been created. In order to create this, we would need to connect both filaments to each end of the battery. However, only one filament is being connected, and only to the positive side of the battery.

#5: The metal side of the bulb touches the positive end of the battery. A wire touches the tip of the bulb and the negative end of the battery.

- The light bulb WILL light up. This is because both filaments are being connected to each end of the battery. The first filament is connected through the tip of the light bulb, while the second one is connected through the screw threads in the light bulb.

#6: The tip of the bulb touches the positive end of the battery (but not the knob in the middle). A wire touches the metal side of the bulb and the negative end of the battery.

- The light bulb will NOT light up. The reason behind this is because we are not connecting one of the filaments to one end of the battery. The negative end of the battery is being connected to the filament on the screw threads, while the other filament is not directly touching the knob in the center of the positive side of the battery. This will prevent the filament on the tip of the light bulb from being connected to the circuit. Thus a complete circuit is not achieved.