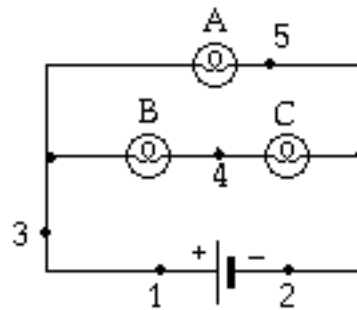


Name _____ Section _____ Date _____

Homework 23 #1: Many Element Circuits and Ohm's Law

Questions 1 through 6 refer to the circuit shown below. In this circuit, the battery maintains a constant potential difference between its terminals at points 1 and 2 (i.e. the internal resistance of the battery is considered negligible). The three light bulbs, A, B, and C, are identical.



1. How do the brightnesses of the three bulbs compare to each other? Explain your reasoning.
2. (a) What happens to the brightness of each of the three bulbs when bulb A is unscrewed and removed from its socket? Explain your reasoning.

(b) What simultaneously happens to the current through points 3, 4 and 5? Explain your reasoning.
3. (a) What happens to the brightness of each of the three bulbs when bulb C is unscrewed and removed from its socket? Explain your reasoning.

(b) What simultaneously happens to the current through points 3, 4 and 5?
Explain your reasoning.

4. (a) What happens to the brightness of each of the three bulbs if a wire is connected from the battery terminal at point 1 to point 4?
- (b) What simultaneously happens to the current through point 3?
- (c) What simultaneously happens to the potential difference across bulb B?
- (d) What simultaneously happens to the potential difference across bulb C?
- (e) What simultaneously happens to the potential difference between points 1 and 5? Explain your reasoning.
5. What happens to the brightness of each of the three bulbs and to the current through point 2 if a wire is connected from the battery terminal at point 2 to the socket terminal at point 5?
6. (a) What happens to the brightness of each of the three bulbs if a fourth bulb (D) is connected in parallel with bulb B (*not in parallel with B and C*). (Sketch the bulb on the circuit.)
- (b) What happens simultaneously to the current through point 3?
- (c) What happens simultaneously to the potential difference between points 3 and 4?

d) What happens simultaneously to the potential difference between points 4 and 2?

7. State Ohm's law in words. For what type of circuit elements does it correctly describe the behavior?

8. Draw diagrams for a 75 W and a 100 W resistor connected in series and connected in parallel:

SERIES:

PARALLEL:

9. In the following circuits, tell which resistors are connected in series, which are connected in parallel, and which are neither in series or parallel.

