Series and parallel circuits

GCSE Physics · Electricity
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Name _____ Date _____

1. What can you say about the current at different points in a series circuit? [1]

2. A 3 Ω resistor and a 5 Ω resistor are joined in series. Calculate the total resistance. [1]

3. The two resistors in question 2 are connected to a 6 V battery. Calculate the current. Use I = V ÷ R. [2]

4. Two identical bulbs are connected in series to a 6 V supply. What is the potential difference across each bulb? [1]

5. In a parallel circuit, one branch carries 0.4 A and the other carries 0.6 A. What is the current from the supply? [1]

6. Two 6 Ω resistors are connected in parallel to a 12 V supply. (a) What is the potential difference across each resistor? (b) Calculate the current through each resistor. (c) Calculate the total current from the supply. [3]

7. Explain why adding another branch to a parallel circuit lowers the total resistance. [2]

8. Give two reasons why the lights in a house are wired in parallel, not in series. [2]

Answers

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1. The current is the same at every point, because there is only one path for the charge.
2. $R = 3 + 5 = 8\ \Omega$.
3. $I = 6\ V \div 8\ \Omega = 0.75\ A$.
4. The supply's 6 V is shared equally between identical bulbs: 3 V each.
5. Branch currents add up: $0.4 + 0.6 = 1.0$ A.
6. (a) 12 V across each, the same as the supply. (b) $I = 12 \div 6 = 2$ A in each. (c) $2 + 2 = 4$ A.
7. The new branch gives the charge another path, so more current flows for the same potential difference. A larger current for the same p.d. means a smaller total resistance.
8. Each light gets the full mains potential difference, and each can be switched on and off on its own; if one bulb fails, the others stay on.