Year 12 Science: DC circuits: series, parallel and combined

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Find the total resistance of a 4.0 Ω and a 12 Ω resistor in parallel.

2. A 9.0 V battery drives 0.30 A round a circuit. How much charge flows in 2.0 minutes?

3. A lamp has 6.0 V across it and a resistance of 4.0 Ω. What is its power?

4. A 5.0 Ω resistor in series with two 10 Ω resistors in parallel is connected to 20 V. What is the total current?

5. In question 4, what is the current in each 10 Ω resistor?

Exam-style question: a campervan's lights

A campervan's 12 V battery runs two lamps in parallel: a reading lamp of 12 Ω and a ceiling lamp of 4.0 Ω. A dimmer, a rheostat set to 1.0 Ω, is in series with the battery.

6. Show that the two lamps together have a resistance of 3.0 Ω.

7. Calculate the current in the ceiling lamp.

8. Explain why the reading lamp carries a third of the ceiling lamp's current.

9. Calculate the energy the reading lamp transfers in 2.0 hours.

10. The ceiling lamp burns out. Discuss what happens to the brightness of the reading lamp.

Fix the mistake

11. Correct this statement: "Current gets used up as it goes through each lamp, so less comes back to the battery."

12. Correct this statement: "$1/R_t = 1/6.0 + 1/12 = 0.25$, so $R_t = 0.25$ Ω."

13. Correct this statement: "When one branch breaks, the other lamp keeps the same voltage, so nothing else changes."

14. Correct this statement: "The current splits in parallel, so each branch gets half."