

Circuit Symbols Charge Current

GCSE Physics · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Describe how to connect an ammeter and a voltmeter to measure the current through, and the potential difference across, a lamp. (2 marks)

Step 1 · Ammeter

In series with the lamp, in the same loop, so the same current flows through both.

Step 2 · Voltmeter

In parallel with the lamp, connected across its two ends.

Answer: Ammeter in series; voltmeter in parallel

Check: A voltmeter compares two points, so it must be connected across the component.

2. Now try one with the steps

A current of 3.0 A flows through a heater for 20 s. Calculate the charge that flows. (2 marks)

Step 1 · Write the equation

Step 2 · Substitute and calculate

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Define electric current. [1]

2. State the unit of electric charge. [1]

3. State how an ammeter is connected in a circuit. [1]

4. Name the component whose resistance decreases intensity increases. [1]

5. State two things needed for a current to flow in a circuit. [2]

6. A current of 2.0 A flows for 30 s. Calculate the charge that flows, in coulombs. [2]

7. A current of 0.50 A flows for 2.0 minutes. Calculate the charge that flows, in coulombs. [2]

8. 900 C of charge flows through a lamp in 5.0 minutes. Calculate the current in amperes. [3]

9. Explain why the current is the same at every point in a single closed loop. [2]

10. A current of 250 mA flows for 1.0 hour. Calculate the charge that flows, in coulombs. [3]

11. Calculate the time for 1500 C of charge to flow at a current of 5.0 A. [2]

12. Describe what the symbol for a diode shows about how current flows through it. [2]

13. A phone battery supplies 7200 C at a steady 0.40 A. Calculate how long it lasts, in hours. [3]

14. Explain the difference between the direction of conventional current and the direction electrons move in a metal wire. [2]

4. Before you hand it in

"Current is used up by the lamp, so less flows back to the cell."

The current is the same all the way round a series loop. Energy is transferred to the lamp, not charge.

$Q = 2 \times 3 = 6 \text{ C}$ for 2 A flowing for 3 minutes

Use seconds: 3 minutes = 180 s, so $Q = 2 \times 180 = 360 \text{ C}$.

Connecting the voltmeter in series

Connect the voltmeter across (in parallel with) the component; the ammeter goes in series.

Drawing the cell with the short thick line

In the cell symbol, the long thin line is the positive terminal and the short thick line is negative.