



QUESTION WORKBOOK

Current, charge and the direction problem

Electricity · Year 12

AQA 3.5.1.1 · CIE 9.1, 9.2 · OCR A 4.1.1, 4.2.2

10 questions · 29 marks

PRINT EDITION

SECTION A · Warm-up

A1 A charge of 30 C flows past a point in 10 s. Calculate the current. [2]

A2 Define the coulomb. [2]

A3 12 J of work is done moving a charge of 4.0 C between two points. Calculate the potential difference. [2]

SECTION B · Standard

B1 A current of 0.50 A flows for 2.0 minutes. Calculate (a) the charge that passes and (b) the number of electrons this represents ($e = 1.60 \times 10^{-19}$ C). [3]

- B2** A component has a potential difference of 6.0 V across it and carries a current of 0.25 A. Calculate its resistance. [3]

- B3** A charge of 8.0 C passes through a potential difference of 12 V. Calculate the energy transferred. [3]

- B4** A steady current of 2.0 A flows for 5.0 minutes. Calculate the charge that passes. [3]

SECTION C · Stretch

- C1** A device draws a current of 3.0 A from a 230 V supply for 1.0 hour. Calculate (a) the charge that flows, (b) the energy transferred and (c) the number of electrons that pass ($e = 1.60 \times 10^{-19} \text{ C}$). [4]

- C2** Explain what is meant by conventional current and how it relates to the actual direction electrons move in a metal wire. [4]

- C3** Explain why the convention for current direction was not changed once electrons were discovered to be the charge carriers in metals. [3]