GET BETTER AT PHYSICS · MARK SCHEME

Charge, Current & Potential Difference: tiered multiple choice

AQA A-level Physics · 7407 / 7408 · Specification 3.5.1.1 · 5 questions · 5 marks

1 mark per correct letter

Worked reasoning for every question

How students did = from AQA examiner reports, where available

Answer key

Q1	Q2	Q3	Q4	Q5
C	B	A	B	C

Easy

Questions 1–2

1 **C**

Counting doubly charged ions · AQA June 2018 · A-level Paper 1 · Q25

Charge in 1.0 minute: Q = It = 0.64 × 60 = 38.4 C. Each ion carries 2e = 3.2×10^{-19} C, so the number of ions = 38.4 / 3.2×10^{-19} = 1.2×10^{20}.

Watch out: 2.4×10^{20} (D) divides by e instead of 2e: that counts electrons, not doubly charged ions.

How students did: 58.3% of students got this right in June 2018.

2 **B**

Counting electrons · AQA June 2016 · AS Paper 2 · Q28

Q = It = $20 \times 10^{-3} \times 120$ = 2.4 C. Number of electrons = 2.4 / 1.6×10^{-19} = 1.5×10^{19}.

Watch out: Convert 2 minutes to 120 s and 20 mA to 0.020 A before you start.

How students did: 54% of students got this right in June 2016.

Medium

Questions 3–5

3 **A**

Charge from a current–time graph · AQA June 2025 · A-level Paper 1 · Q29

The current at P is $I_1 + I_2$. At t = 0 this is 5 + 19 = 24 mA, and at t = 60 s it is 12 + 12 = 24 mA.

Both lines are straight, so the total stays at 24 mA. Charge = $24 \times 10^{-3} \times 60$ = 1.44 C.

Watch out: The charge through P is the total area under both lines, not the area under just one of them.

4 **B**

Charge carried by a moving belt · AQA June 2019 · A-level Paper 1 · Q21

Each second the belt moves 0.4 m, so an area of 0.1 × 0.4 = 0.04 m² reaches the sphere. Each square metre carries Q, so the charge per second is 0.04Q.

Watch out: Charge per second is a current: it depends on the area delivered each second, not the area of the whole belt.

5 **C**

Reducing the charge that flows · AQA June 2016 · AS Paper 2 · Q30

Charge = current × time, and t is fixed, so the current must fall. Adding a resistor in series increases the total resistance, so the current (and the charge) decreases.

> **Watch out:** A cell in parallel (A) keeps the same emf, so the current does not change. A cell in series (B) or a resistor in parallel (D) increase the current.

How students did: 40% of students got this right in June 2016; about half chose one of the wrong answers.

End of mark scheme. Answers from AQA's published keys; explanations written for this pack. AQA material is © AQA. More free packs and 1-to-1 tuition: **www.getbetteratphysics.co.uk**

GET BETTER AT PHYSICS · WHAT NEXT?

Got some of these wrong?

Good. The questions you got wrong show you exactly what to work on next. The quickest way to fix them is to work through them with someone who marks these papers.

Book a free 15-minute call

Tell me which questions caught you out. We'll talk about what's going wrong and whether 1-to-1 or small-group tuition would help. There's no obligation.

Book your free call

calendly.com/getbetteratphysics/freechat

Scan to book

Current AQA examiner
I know what the mark schemes reward and where marks are lost.

Matched to your exam board
Sessions follow your specification and the topics you find hardest.

Pay per session
No block booking. 1-to-1 or small groups of up to 4.

More free packs

Tiered past-paper questions with full mark schemes, sorted by topic.
getbetteratphysics.co.uk/free-revision-packs

Masterclasses are coming

Want to hear first? Email **helpme@getbetteratphysics.co.uk** and I'll let you know when dates are announced.

Parents: I use these packs in my own tutoring sessions. Tuition options and prices:
getbetteratphysics.co.uk/tuitionpricing

Free revision resource · not for resale