GET BETTER AT PHYSICS · MARK SCHEME

Resistance & I–V Characteristics: tiered multiple choice

AQA A-level Physics · 7407 / 7408 · Specification 3.5.1.2 · 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
A	B	C	D	A

Easy

Question 1

1 **A**

Resistor and diode in series · AQA June 2016 · AS Paper 2 · Q29

No current flows until the pd across the diode reaches its threshold (about 0.6 V), so the graph starts along the V axis. After that the resistor limits the current, so the current rises in a roughly straight line: graph A.

How students did: 55% of students got this right in June 2016.

Medium

Questions 2–5

2 **B**

I–V graph of a filament lamp · AQA June 2019 · AS Paper 2 · Q29

As the current increases the filament gets hotter and its resistance increases. Each extra volt then gives a smaller increase in current, so the graph curves towards the voltage axis: graph B.

> **Watch out:** C curves the other way: that would mean the resistance decreases as the lamp heats up.

How students did: The success rate on this question was quite low in June 2019.

3 **C**

Finding the ohmic conductor with least resistance · AQA June 2025 · AS Paper 2 · Q18

An ohmic conductor has a constant V / I. For A: 2.0 / 0.3 = 4.0 / 0.6 = ... = 6.7 Ω, constant. For C: 2.0 / 0.6 = 4.0 / 1.2 = ... = 3.3 Ω, constant. B and D are not ohmic. C has the smaller resistance.

> **Watch out:** B has the largest currents, but its V / I changes along the table, so it is not ohmic.

How students did: In June 2025 slightly more students chose B than the correct answer.

4 **D**

Two components in parallel · AQA 2021 · AS Paper 2 · Q31

In parallel, each component has the full 12 V across it. Read each graph at 12 V: about 14.0 mA for the straight line and about 9.0 mA for the dashed curve. The battery supplies the sum: 23.0 mA.

> **Watch out:** 7.9 mA (A) is where the two graphs cross. That would only matter if the components were in series and shared the same current.

5 **A**

Reading a diode's I–V characteristic · AQA June 2025 · A-level Paper 1 · Q16

Resistance = V / I at a point. Beyond V_s the current rises much faster than the pd, so V / I gets smaller: the resistance decreases as V increases.

> **Watch out:** B is wrong: resistance is V / I, not 1 / gradient (they are equal only for a straight line through the origin). At T no current flows, so the resistance is very large, not zero (C).

How students did: In June 2025 the correct answer was only the third most popular; half of students chose B.

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**

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