FREE REVISION PACK

Resistance & I–V Characteristics

AQA A-level Physics · 7407 / 7408 · Specification 3.5.1.2

Easy | Medium | Multiple choice · past-paper questions

5	5	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Resistor and diode in series	AQA June 2016 · AS Paper 2 · Q29	1 mark
2	Medium	I–V graph of a filament lamp	AQA June 2019 · AS Paper 2 · Q29	1 mark
3	Medium	Finding the ohmic conductor with least resistance	AQA June 2025 · AS Paper 2 · Q18	1 mark
4	Medium	Two components in parallel	AQA 2021 · AS Paper 2 · Q31	1 mark
5	Medium	Reading a diode's I–V characteristic	AQA June 2025 · A-level Paper 1 · Q16	1 mark

Key ideas to have ready

- Resistance R = V / I at any point on an I–V graph. It is *not* the gradient unless the graph is a straight line through the origin.
- An **ohmic conductor** (at constant temperature) has I proportional to V: a straight line through the origin. A steeper line means a smaller resistance.
- A **filament lamp**'s resistance rises as it heats up, so its I–V graph curves towards the V axis.
- A **diode** conducts in one direction only, and only once the pd is above about 0.6 V.

How to use this pack

1. The questions are grouped into levels (Easy and Medium). Work through them in order, and check your answers at the end of each level before moving on.
2. Every question is multiple choice with one correct answer. Write down your working anyway; that is how you find mistakes.
3. The separate mark scheme uses the same numbers and explains every answer.

Levels are based on how students did in AQA's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

Definitions and one-step ideas. Most students get these right.

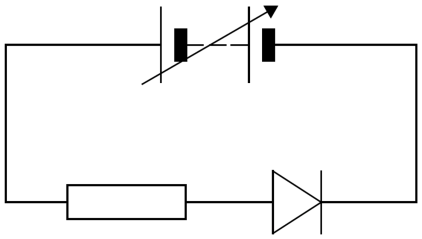
Question 1

Only **one** answer per question is allowed. For each question, completely fill in the circle alongside the appropriate answer.

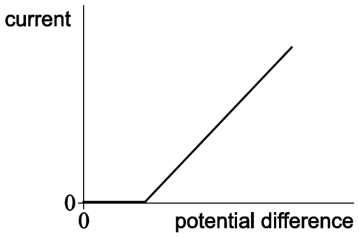
AQA June 2016 · AS Paper 2 · Q29

1 A resistor and diode are connected in series with a variable power supply as shown in the diagram.

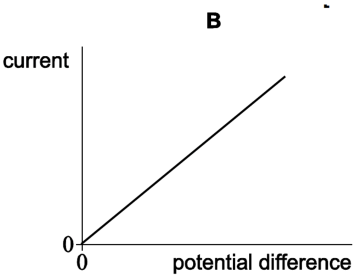
Which best shows the characteristic for the combination of the resistor and diode?



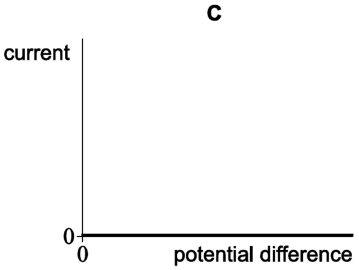
A



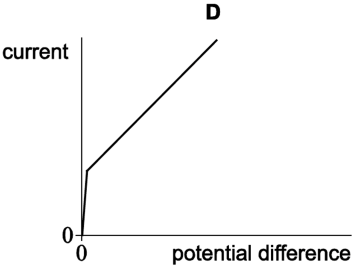
B



C



D



Medium

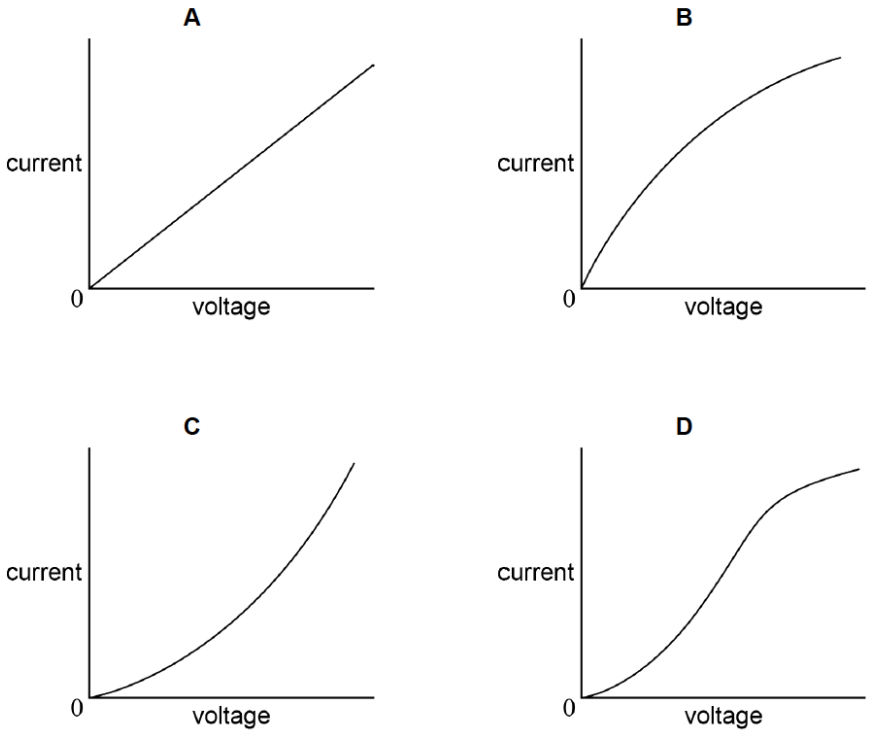
Two or three steps. Roughly a third to a half of students get these right.

Questions 2–5

AQA June 2019 · AS Paper 2 · Q29

2 Which is the current–voltage characteristic graph for a filament lamp up to its working voltage?

[1 mark]



AQA June 2025 · AS Paper 2 · Q18

3 The characteristics of four electrical components **A**, **B**, **C** and **D** are shown in the table.

The table shows values of potential difference V across each component and the corresponding values of current I in each component.

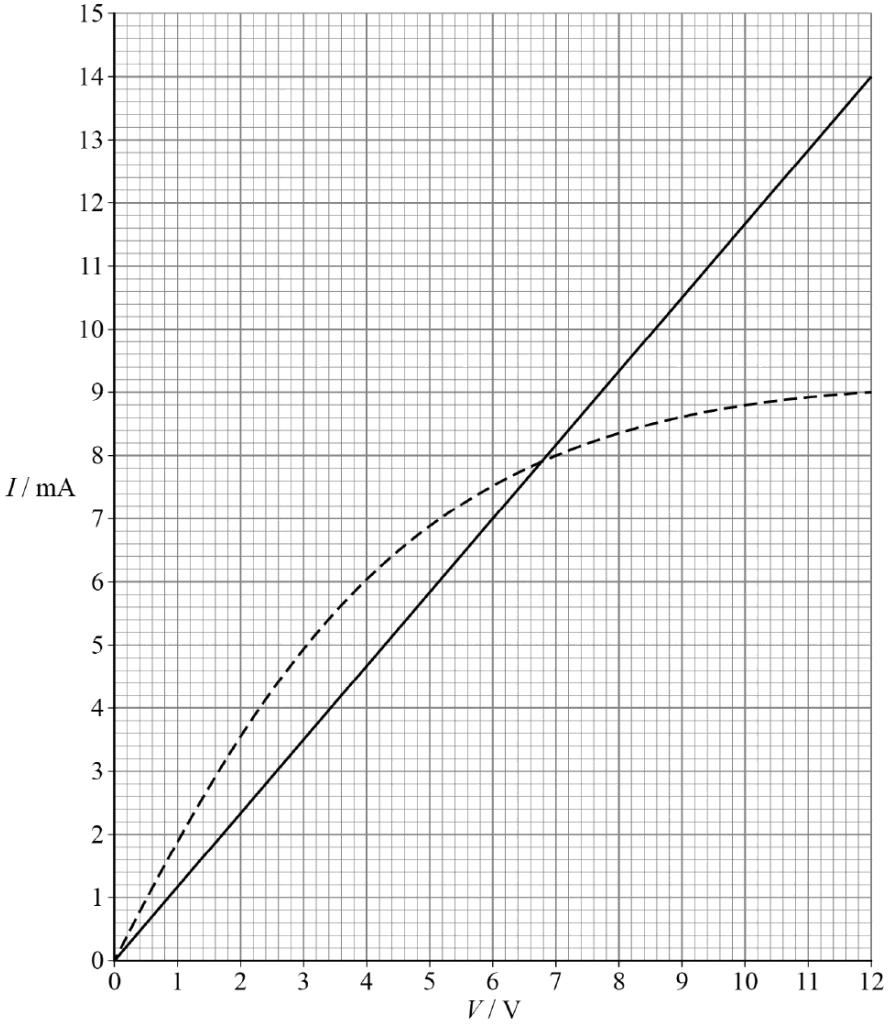
	A	**B**	**C**	**D**
V / V	I / A	I / A	I / A	I / A
0.0	0.0	0.0	0.0	0.0
2.0	0.3	1.5	0.6	0.0
4.0	0.6	2.3	1.2	0.2
6.0	0.9	2.7	1.8	1.2
8.0	1.2	3.1	2.4	2.2
10.0	1.5	3.3	3.0	3.2

Which is the ohmic conductor that has the smallest resistance?

[1 mark]

AQA 2021 · AS Paper 2 · Q31

4 The graph shows the current–voltage (I–V) characteristics for two components.



The two components are connected in parallel with a 12 V battery that has negligible internal resistance.

What is the current in the battery?

[1 mark]

A 7.9 mA ⬭

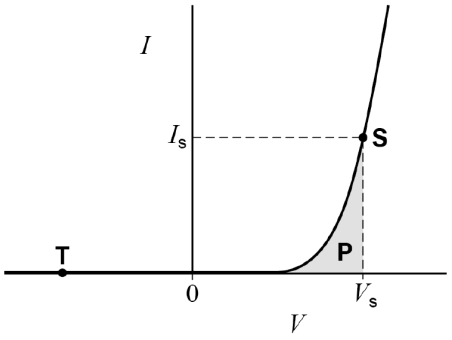
B 14.5 mA ⬭

C 15.8 mA ⬭

D 23.0 mA ⬭

AQA June 2025 · A-level Paper 1 · Q16

5 The graph shows the I–V characteristic for a semiconductor diode.



Which is true for this graph?

[1 mark]

A The resistance of the diode decreases as V increases for $V > V_s$. ⬭

B The resistance at **S** is equal to $\frac{1}{\text{gradient}}$ ⬭

C The resistance at **T** is equal to zero. ⬭

D At $I = I_s$, the power dissipated in the diode is equal to area **P**. ⬭

End of questions. Check your answers with the matching mark scheme. More free packs and 1-to-1 tuition:
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