FREE REVISION PACK

Resistivity

AQA A-level Physics · 7407 / 7408 · Specification 3.5.1.3

Easy | Medium | Multiple choice · past-paper questions

5	5	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Scaling resistance with length and area	AQA June 2023 · AS Paper 2 · Q19	1 mark
2	Medium	Resistance from length and volume	AQA June 2024 · AS Paper 2 · Q28	1 mark
3	Medium	Doubling length and radius	AQA June 2017 · AS Paper 2 · Q32	1 mark
4	Medium	Voltmeter across one of two wires	AQA November 2021 · A-level Paper 1 · Q29	1 mark
5	Medium	Two putty cylinders in series	AQA June 2018 · A-level Paper 1 · Q27	1 mark

Key ideas to have ready

- $R = \rho L / A$. Resistivity ρ (in Ω m) depends only on the material and its temperature, not on the shape.
- For a wire of diameter d, $A = \pi d^2 / 4$. Doubling the diameter makes the area 4 times larger.
- Resistance is proportional to length and inversely proportional to cross-sectional area.
- In series, the pd divides in proportion to the resistances.

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 2023 · AS Paper 2 · Q19

1 The table shows the lengths and cross-sectional areas of two wires **X** and **Y** of the same metal.

Wire	Length / cm	Cross-sectional area / mm^2
X	47	0.10
Y	23	0.40

The resistance of **X** is 6.0 Ω.
The temperature of **Y** is the same as the temperature of **X**.

What is the resistance of **Y**?

[1 mark]

A 0.12 Ω ⬭

B 0.73 Ω ⬭

C 1.2 Ω ⬭

D 3.1 Ω ⬭

Medium

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

Questions 2–5

AQA June 2024 · AS Paper 2 · Q28

2 An aluminium wire has a length of $12\ \text{cm}$ and a volume of $3.7 \times 10^{-4}\ \text{m}^3$. The resistivity of aluminium is $2.7 \times 10^{-8}\ \Omega\ \text{m}$.

What is the resistance of the wire?

[1 mark]

A $1.1 \times 10^{-6}\ \Omega$ ⬭

B $8.8 \times 10^{-6}\ \Omega$ ⬭

C $1.1 \times 10^{-2}\ \Omega$ ⬭

D $8.8 \times 10^{-2}\ \Omega$ ⬭

AQA June 2017 · AS Paper 2 · Q32

3 A wire has a resistance R.

What is the resistance when both the length and radius of the wire are doubled?

[1 mark]

A $\frac{R}{4}$ ⬭

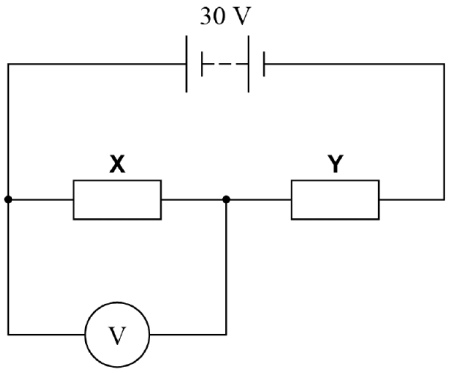
B $\frac{R}{2}$ ⬭

C $2R$ ⬭

D $4R$ ⬭

AQA November 2021 · A-level Paper 1 · Q29

4 Two resistors **X** and **Y** are connected in series with a power supply of emf 30 V and negligible internal resistance.
The resistors are made from wire of the same material. The wires have the same length.
X uses wire of diameter d and **Y** uses wire of diameter $2d$.



What is the reading on the voltmeter?

[1 mark]

A 10 V ⬭

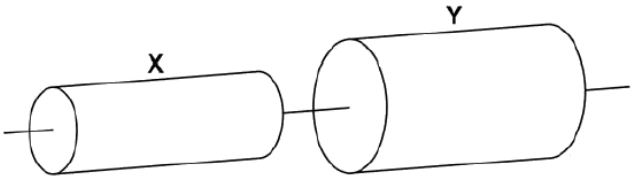
B 15 V ⬭

C 20 V ⬭

D 24 V ⬭

AQA June 2018 · A-level Paper 1 · Q27

5 The two resistors shown are both uniform cylinders of equal length made from the same conducting putty.



The diameter of **Y** is twice that of **X**. The resistance of **Y** is R.

What is the total resistance of the combination?

[1 mark]

A $\frac{4R}{5}$ ⬭

B $3R$ ⬭

C $4R$ ⬭

D $5R$ ⬭

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