FREE REVISION PACK

Thermistors & LDRs

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

Easy Medium Hard Multiple choice · past-paper questions

5	5	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Copper wire getting hotter	AQA June 2022 · AS Paper 2 · Q30	1 mark
2	Medium	Resistance–temperature graph for an ntc thermistor	AQA June 2017 · AS Paper 2 · Q33	1 mark
3	Medium	LDR and fixed resistor in series	AQA June 2017 · AS Paper 2 · Q34	1 mark
4	Medium	Finding an LDR's resistance	AQA June 2024 · AS Paper 2 · Q9	1 mark
5	Hard	Thermistor and resistor in parallel	AQA June 2018 · AS Paper 2 · Q31	1 mark

Key ideas to have ready

- For a metal, resistance increases as temperature increases.
- An **ntc thermistor**'s resistance decreases (non-linearly) as its temperature increases.
- A **light-dependent resistor (LDR)**'s resistance decreases as light intensity increases.
- In series, a component's share of the pd goes up when its resistance goes up. Components in parallel with an ideal cell always have the full emf across them.

How to use this pack

1. The questions are grouped into levels (Easy, Medium and Hard). 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 2022 · AS Paper 2 · Q30

1 As the temperature of a copper wire increases, its resistance

[1 mark]

A remains constant. ⬭

B increases. ⬭

C decreases. ⬭

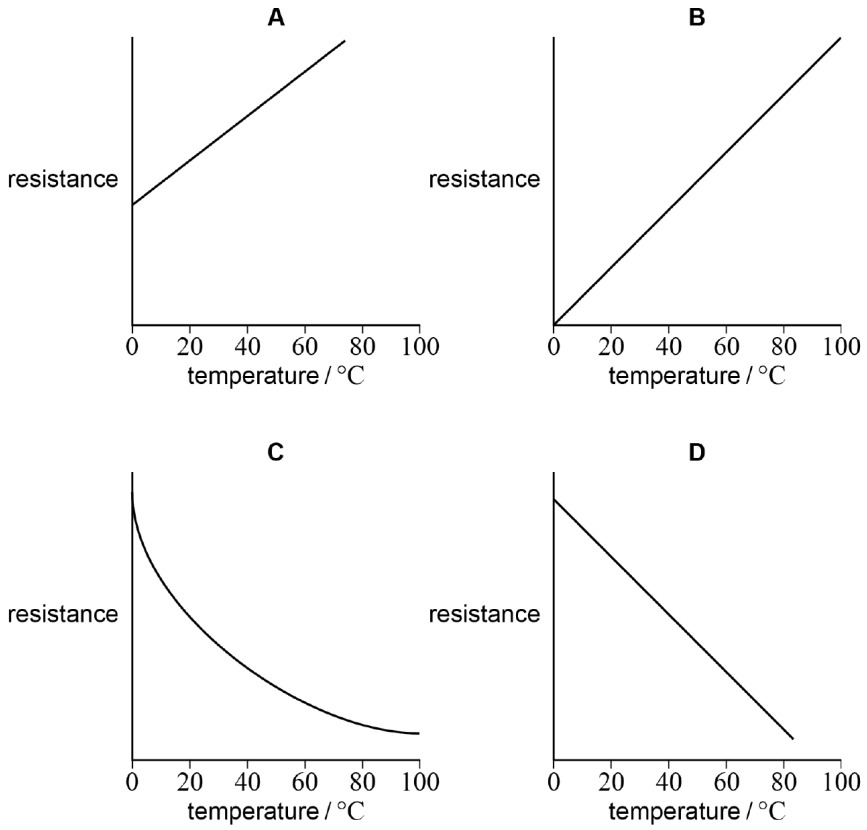
D remains constant at first and then decreases. ⬭

Medium Two or three steps. Roughly a third to a half of students get these right. **Questions 2–4**

AQA June 2017 · AS Paper 2 · Q33

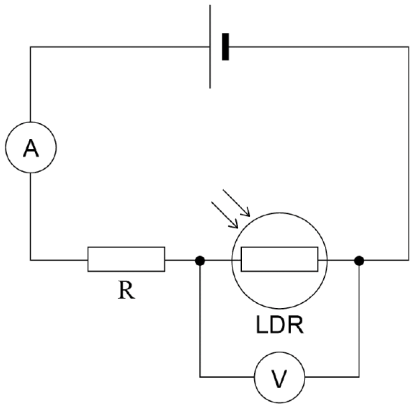
2 Which graph shows the variation of the resistance with temperature for an ntc thermistor?

[1 mark]



AQA June 2017 · AS Paper 2 · Q34

3 The figure shows a light dependent resistor (LDR) and fixed resistor R connected in series across a cell. The internal resistance of the cell is negligible.



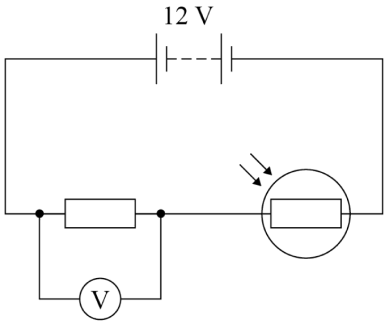
Which row shows how the readings on the ammeter and the voltmeter change when the light intensity incident on the LDR is increased?

[1 mark]

	Ammeter reading	**Voltmeter reading**	
A	decreases	increases	⬭
B	decreases	decreases	⬭
C	increases	increases	⬭
D	increases	decreases	⬭

AQA June 2024 · AS Paper 2 · Q9

4 A circuit contains a battery with an emf of 12 V and negligible internal resistance.



At a certain light intensity, the LDR has a resistance of 480 Ω and the voltmeter reading is 2.0 V.

At a different light intensity, the resistance of the LDR is R and the voltmeter reading is now 8.0 V.

What is R?

[1 mark]

A 48 Ω ⬭

B 96 Ω ⬭

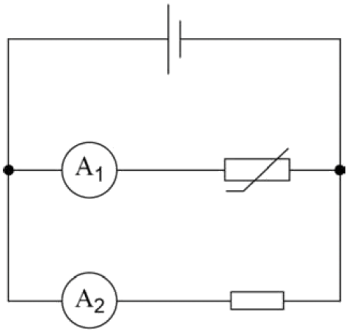
C 120 Ω ⬭

D 160 Ω ⬭

Hard Several steps, often with a trap built in. Fewer than 3 in 10 students get these right. **Question 5**

AQA June 2018 · AS Paper 2 · Q31

5 A circuit consists of a cell, a thermistor, a fixed resistor and two ammeters.



The cell has a constant electromotive force and negligible internal resistance. Readings from the two ammeters are taken.

Which row describes what happens to the current in each ammeter when the temperature of the thermistor decreases?

[1 mark]

	Current in ammeter A_1	Current in ammeter A_2	
A	Decreases	Unchanged	⬭
B	Decreases	Increases	⬭
C	Increases	Decreases	⬭
D	Increases	Unchanged	⬭

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