GET BETTER AT PHYSICS · MARK SCHEME

Potential Dividers: tiered multiple choice

AQA A-level Physics · 7407 / 7408 · Specification 3.5.1.5 · 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
B	C	A	D	A

Easy

Question 1

1 B

A voltmeter that loads the circuit · AQA June 2019 · AS Paper 2 · Q32

The voltmeter (R) is in parallel with Y (R/2): combined resistance = (R × R/2) / (R + R/2) = R/3. This is in series with X (R), so the voltmeter reads 6.0 × (R/3) / (R + R/3) = 6.0 × ¼ = 1.5 V.

> **Watch out:** 2.0 V would be right for an ideal voltmeter. This one has resistance R, which lowers the resistance across Y.

How students did: Over half of students got this right in June 2019.

Medium

Questions 2–5

2 C

Range of a potential divider · AQA June 2023 · AS Paper 2 · Q30

The voltmeter is across the 3.0 kΩ resistor and the variable resistor. V = 9.0 × (3.0 + x) / (6.0 + x), with x in kΩ. At x = 0: 9.0 × 3.0 / 6.0 = 4.5 V. At x = 3.0 kΩ: 9.0 × 6.0 / 9.0 = 6.0 V. So the range is 4.5 V to 6.0 V.

> **Watch out:** The variable resistor changes the total resistance too, so the voltmeter reading never reaches 0 V or 9.0 V.

3 A

Balancing a resistance wire against two resistors · AQA June 2025 · AS Paper 2 · Q7

Zero current means P is at the same potential as the junction of M and N, so XP : PY = M : N. If N's resistance increases, M's share of the pd falls, so the balance point moves towards X. Changing the wire's resistance (B) or the cell (C and D) changes both sides by the same factor, so the balance point would not move.

How students did: In June 2025 the correct answer was the most popular choice.

4 D

Temperature-sensing circuit · AQA 2020 · AS Paper 2 · Q34

When the temperature falls, the thermistor's resistance increases. The total resistance rises, so the current (ammeter) decreases. The thermistor now has a bigger share of the total resistance, so the pd across it (voltmeter) increases.

5 A

Circuit for a full lamp I–V characteristic · AQA June 2023 · AS Paper 2 · Q31

To get pds all the way from 0 to 6.0 V, the variable resistor must be used as a potential divider (connected across the battery, with the lamp taken from the slider). The ammeter must be in series with the lamp and the voltmeter in parallel with it. Only A does all three.

> **Watch out:** A variable resistor in series with the lamp (C, D) can never reduce the lamp's pd to zero. In B the ammeter also measures the current through the potential divider, not just the lamp.

How students did: 35% or fewer of students got this right in June 2023.

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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