FREE REVISION PACK

Series & Parallel Circuits

AQA A-level Physics · 7407 / 7408 · Specification 3.5.1.4

Easy | Medium | Hard | Multiple choice · past-paper questions

7	7	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Current in one parallel branch	AQA June 2017 · AS Paper 2 · Q12	1 mark
2	Easy	Ranking three resistor networks	AQA June 2023 · AS Paper 2 · Q21	1 mark
3	Easy	pd from a point to earth	AQA June 2019 · A-level Paper 1 · Q23	1 mark
4	Medium	Closing a switch that shorts a resistor	AQA June 2025 · A-level Paper 1 · Q28	1 mark
5	Medium	Current in one branch of two	AQA June 2019 · AS Paper 2 · Q34	1 mark
6	Medium	Voltmeter reading as a switch closes	AQA November 2021 · A-level Paper 1 · Q27	1 mark
7	Hard	Voltmeter in series with a resistor	AQA June 2018 · AS Paper 2 · Q34	1 mark

Key ideas to have ready

- Series: $R_T = R_1 + R_2 + \ldots$; the same current flows through each component and the pds add up.
- Parallel: $1/R_T = 1/R_1 + 1/R_2 + \ldots$; each branch has the same pd and the currents add up.
- **Kirchhoff's first law** (conservation of charge): total current into a junction = total current out.
- **Kirchhoff's second law** (conservation of energy): around any closed loop, the sum of the emfs = the sum of the pds.
- An ideal voltmeter has infinite resistance, so no current flows through it.

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

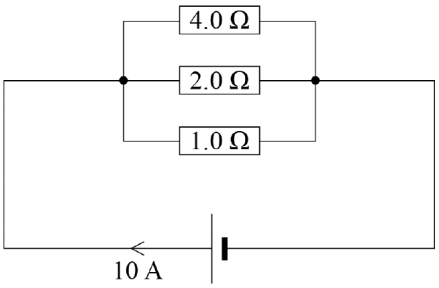
Definitions and one-step ideas. Most students get these right.

Questions 1–3

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

AQA June 2017 · AS Paper 2 · Q12

1 The current in the cell is 10 A as shown.



What is the current in the 2.0 Ω resistor?

[1 mark]

A 0.35 A ⬭

B 2.86 A ⬭

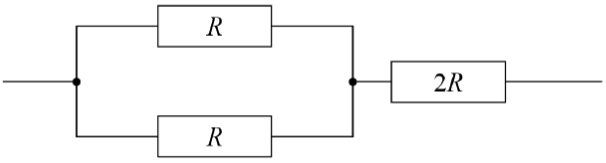
C 3.50 A ⬭

D 7.14 A ⬭

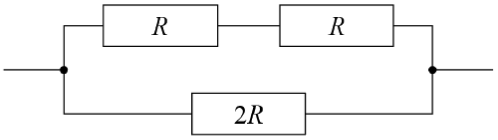
AQA June 2023 · AS Paper 2 · Q21

2 **X**, **Y** and **Z** are three networks of resistors.

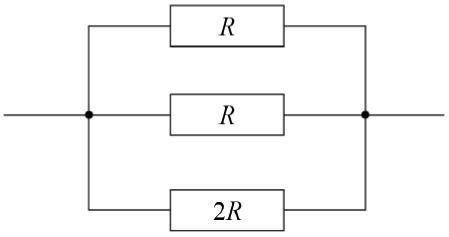
X



Y



Z



Which gives the networks in order of largest total resistance to smallest total resistance?

[1 mark]

A **X**, **Y**, **Z** ⬭

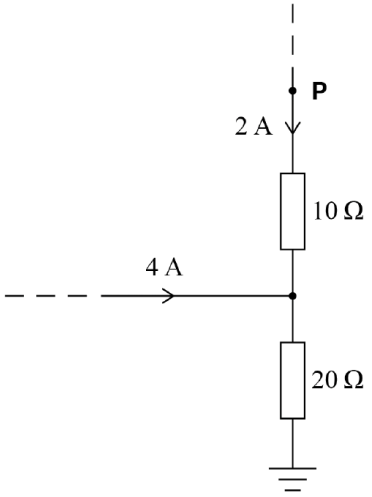
B **Y**, **X**, **Z** ⬭

C **Z**, **X**, **Y** ⬭

D **Z**, **Y**, **X** ⬭

AQA June 2019 · A-level Paper 1 · Q23

3 The diagram shows part of a circuit and the currents in the circuit.



What is the potential difference between point **P** and earth?

[1 mark]

A 60 V ○

B 100 V ○

C 120 V ○

D 140 V ○

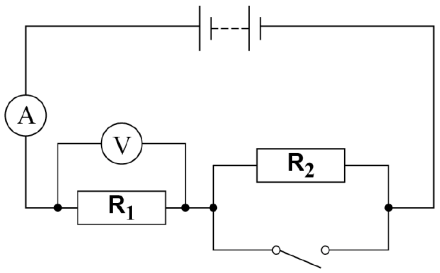
Medium

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

Questions 4–6

AQA June 2025 · A-level Paper 1 · Q28

4 In a circuit, the resistance of resistor $\mathbf{R_1}$ is double the resistance of resistor $\mathbf{R_2}$.
The internal resistance of the battery is negligible.



When the switch is open, the voltmeter reads 12 V and the ammeter reads 12 mA.

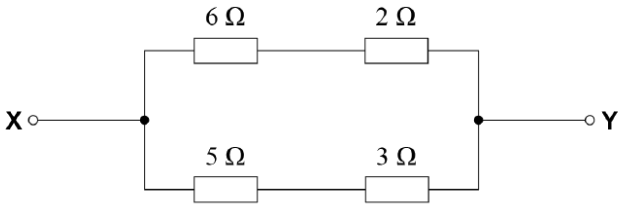
What are the readings on the voltmeter and ammeter when the switch is closed?

[1 mark]

	Voltmeter reading / V	Ammeter reading / mA	
A	4	12	⬭
B	18	12	⬭
C	18	18	⬭
D	24	24	⬭

AQA June 2019 · AS Paper 2 · Q34

5 In the circuit shown, a potential difference of 3.0 V is applied across **XY**.



What is the current in the $5\ \Omega$ resistor?

[1 mark]

A 0.38 A ⬭

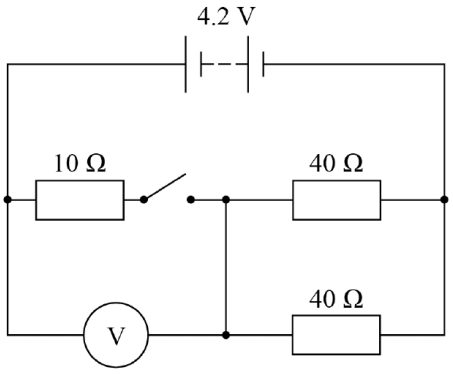
B 0.60 A ⬭

C 0.75 A ⬭

D 2.7 A ⬭

AQA November 2021 · A-level Paper 1 · Q27

6 The battery in this circuit has an emf of 4.2 V and negligible internal resistance.



What are the readings on the voltmeter when the switch is open (off) and when the switch is closed (on)?

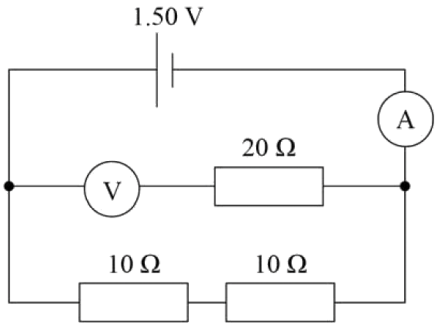
[1 mark]

	Open	Closed	
A	0 V	2.1 V	○
B	4.2 V	2.1 V	○
C	0 V	1.4 V	○
D	4.2 V	1.4 V	○

Hard Several steps, often with a trap built in. Fewer than 3 in 10 students get these right. **Question 7**

AQA June 2018 · AS Paper 2 · Q34

7 The circuit shows a cell with negligible internal resistance connected in a circuit with three resistors, an ammeter and a voltmeter.



Which row shows the readings on the ammeter and voltmeter?

[1 mark]

	Current / A	Voltage / V	
A	0.075	0.75	⬭
B	0.075	1.50	⬭
C	0.150	0.75	⬭
D	0.150	1.50	⬭

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