FREE REVISION PACK

Electrical Power & Energy

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

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

8	8	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	How long a phone battery lasts	AQA June 2018 · A-level Paper 1 · Q26	1 mark
2	Easy	Energy from a heating element	AQA June 2017 · AS Paper 2 · Q18	1 mark
3	Medium	pd when the power is quadrupled	AQA June 2024 · AS Paper 2 · Q13	1 mark
4	Medium	Power in a parallel resistor	AQA June 2025 · AS Paper 2 · Q30	1 mark
5	Medium	Power ratio in a series–parallel circuit	AQA June 2024 · AS Paper 2 · Q18	1 mark
6	Hard	Power–current graph for an ohmic component	AQA June 2018 · AS Paper 2 · Q28	1 mark
7	Hard	Kilowatt-hours to electronvolts	AQA June 2018 · AS Paper 2 · Q29	1 mark
8	Hard	Resistance of a transmission line	AQA June 2016 · AS Paper 2 · Q31	1 mark

Key ideas to have ready

- $P = VI = I^2R = V^2 / R$. Energy transferred $E = VIt = Pt$.
- Energy stored in a battery = charge × pd = QV.
- 1 kW h = 1000 W × 3600 s = 3.6×10^6 J. 1 eV = 1.60×10^{-19} J.
- Transmitting power at high voltage keeps the current low, which reduces the I^2R power lost in the cables.

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 1–2

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

AQA June 2018 · A-level Paper 1 · Q26

1 A mobile phone operates at a constant power of $200\ \text{mW}$
It has a $3.7\ \text{V}$ lithium-ion battery that has a charge capacity of $9400\ \text{C}$

What is the time taken for the battery to discharge completely?

[1 mark]

A 2 hours ⬭

B 48 hours ⬭

C 120 hours ⬭

D 140 hours ⬭

AQA June 2017 · AS Paper 2 · Q18

2 A battery of negligible internal resistance and an emf of $12\ \text{V}$ is connected in series with a heating element. The heating element has a resistance of $6.5\ \Omega$ when in operation.

What is the energy transferred by the heating element when operating for 5 minutes?

[1 mark]

A 111 J ⬭

B 390 J ⬭

C 6650 J ⬭

D 23 400 J ⬭

Medium

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

Questions 3–5

AQA June 2024 · AS Paper 2 · Q13

3 A current of 4.0 A in a resistor produces a power of 8.0 W.

What is the potential difference across this resistor when the power is 32 W?

[1 mark]

A 2.0 V ⬭

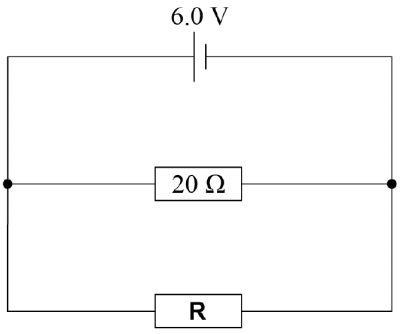
B 4.0 V ⬭

C 8.0 V ⬭

D 16 V ⬭

AQA June 2025 · AS Paper 2 · Q30

4 A cell of negligible internal resistance is connected in parallel to a 20 Ω resistor and a resistor **R**.



The emf of the cell is 6.0 V.
The current in the cell is 1.1 A.

What is the power dissipated in **R**?

[1 mark]

A 1.8 W ⬭

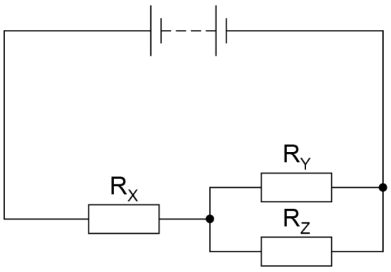
B 3.3 W ⬭

C 4.8 W ⬭

D 6.6 W ⬭

AQA June 2024 · AS Paper 2 · Q18

5 A circuit contains a battery and three identical resistors R_X, R_Y and R_Z.



What is $\frac{\text{power in } R_X}{\text{power in } R_Y}$?

[1 mark]

A 0.25 ⬭

B 0.5 ⬭

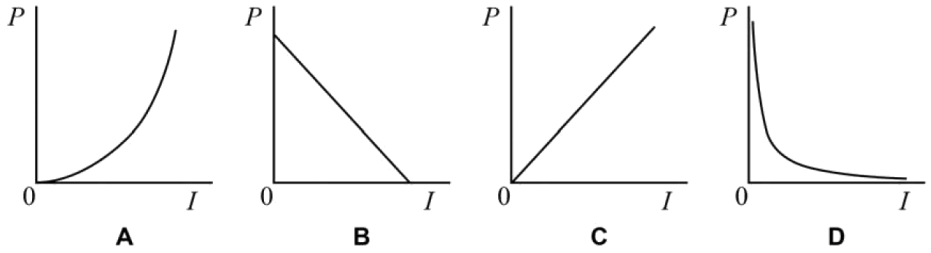
C 2 ⬭

D 4 ⬭

Hard Several steps, often with a trap built in. Fewer than 3 in 10 students get these right. **Questions 6–8**

AQA June 2018 · AS Paper 2 · Q28

6 Which graph shows how power dissipated P varies with current I in a component that obeys Ohm's law?



[1 mark]

A ⬭

B ⬭

C ⬭

D ⬭

AQA June 2018 · AS Paper 2 · Q29

7 1.0 kilowatt-hour (kW h) is equivalent to

[1 mark]

A 6.3×10^{18} eV ⬭

B 6.3×10^{21} eV ⬭

C 2.3×10^{22} eV ⬭

D 2.3×10^{25} eV ⬭

AQA June 2016 · AS Paper 2 · Q31

8 The National Grid uses high-voltage transmission lines to carry electrical power around the UK. A particular transmission line delivers 800 MW of power at 132 kV to the user. It loses 1% of the transmitted power as heat.

What is the resistance of the transmission line?

[1 mark]

A 0.2 Ω ⬭

B 6 Ω ⬭

C 20 Ω ⬭

D 2000 Ω ⬭

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