FREE REVISION PACK

e.m.f. & Internal Resistance

Pearson Edexcel International Advanced Level Physics · Unit 2 (WPH12) · Specification points 77–78

Easy | Multiple choice · past-paper questions

5	5	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Lost volts across the internal resistance	Edexcel IAL October 2025 · Unit 2 · Q10	1 mark
2	Easy	e.m.f. from terminal p.d.	Edexcel IAL June 2024 · Unit 2 · Q5	1 mark
3	Easy	Kirchhoff's second law with internal resistance	Edexcel IAL January 2022 · Unit 2 · Q3	1 mark
4	Easy	Internal resistance from a voltmeter reading	Edexcel IAL January 2025 · Unit 2 · Q10	1 mark
5	Easy	Identical cells in parallel	Edexcel IAL October 2025 · Unit 2 · Q8	1 mark

Key ideas to have ready

- $\varepsilon = I(R + r) = V + Ir$: terminal p.d. plus 'lost volts'.
- $r = (\varepsilon - V)/I$.
- Identical cells in series: e.m.f.s and internal resistances add. In parallel: same e.m.f., internal resistance divided.
- The p.d. shares between R and r in proportion to their resistances.

How to use this pack

1. The questions are grouped into levels (Easy). 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 Pearson's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

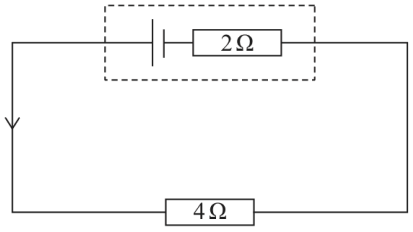
Definitions and one-step ideas. Most students get these right.

Questions 1–5

Choose **one** answer for each question and put a cross in the box next to it.

Edexcel IAL October 2025 · Unit 2 · Q10

1 The diagram shows a 4 Ω resistor connected to a cell of e.m.f. 12 V and internal resistance 2 Ω.



Which of the following expressions gives the potential difference V across the internal resistance of the cell?

☒ **A** $V = 12 \times \frac{2}{4}$

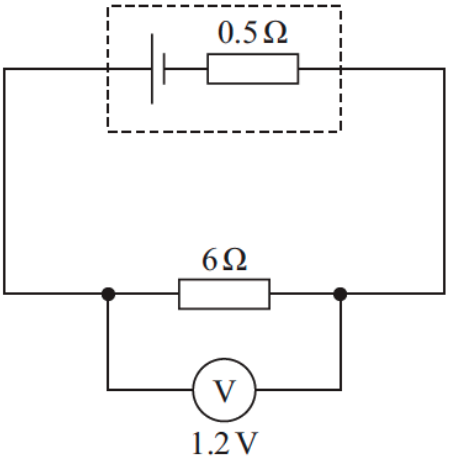
☒ **B** $V = 12 \times \frac{6}{4}$

☒ **C** $V = 12 \times \frac{4}{6}$

☒ **D** $V = 12 \times \frac{2}{6}$

Edexcel IAL June 2024 · Unit 2 · Q5

2 The circuit shown includes a cell with internal resistance 0.5 Ω.



Which of the following expressions gives the e.m.f., in V, of the cell?

☒ **A** $1.2 - \frac{1.2 \times 0.5}{6}$

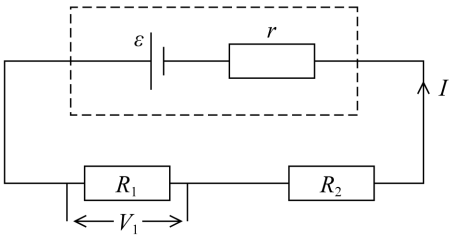
☒ **B** 1.2

☒ **C** $1.2 + \frac{1.2 \times 0.5}{6}$

☒ **D** $1.2 + \frac{6 \times 0.5}{1.2}$

Edexcel IAL January 2022 · Unit 2 · Q3

3 The diagram shows a cell of e.m.f. ε and internal resistance r. The cell is connected in series with two resistors of resistance R_1 and R_2. The potential difference across R_1 is V_1. The current in the circuit is I.



Which of the following expressions is correct?

☒ **A** $\varepsilon = V_1 + Ir$

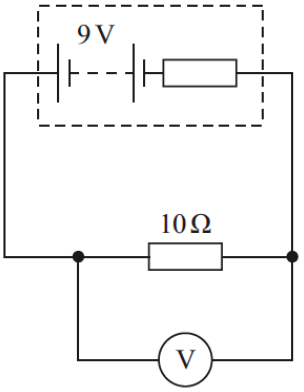
☒ **B** $\varepsilon = IR_1 + Ir$

☒ **C** $\varepsilon = IR_2 + Ir$

☒ **D** $\varepsilon = V_1 + IR_2 + Ir$

Edexcel IAL January 2025 · Unit 2 · Q10

4 A student connected the circuit shown.



The reading on the voltmeter was 6 V.

Which of the following expressions gives the internal resistance, in Ω, of the battery?

☒ **A** $\frac{10 \times (9 - 6)}{6}$

☒ **B** $\frac{6 \times (9 - 6)}{10}$

☒ **C** $\frac{10}{6 \times (9 - 6)}$

☒ **D** $\frac{6}{10 \times (9 - 6)}$

Edexcel IAL October 2025 · Unit 2 · Q8

5 A student connects 5 identical 1.5 V cells in parallel to form a battery.

Each cell has an internal resistance of 1.0 Ω.

Which row of the table gives the e.m.f. and internal resistance of the battery?

		e.m.f. / V	Internal resistance / Ω
☒	**A**	1.5	0.2
☒	**B**	1.5	5
☒	**C**	7.5	0.2
☒	**D**	7.5	5

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