GET BETTER AT PHYSICS · MARK SCHEME

e.m.f. & Internal Resistance: tiered multiple choice

Edexcel IAL Physics · Unit 2 (WPH12) · Specification points 77–78 · 5 questions · 5 marks

1 mark per correct letter

Worked reasoning for every question

How students did = from Pearson examiner reports, where available

Answer key

Q1	Q2	Q3	Q4	Q5
D	C	D	A	A

Easy

Questions 1–5

1 **D**

Lost volts across the internal resistance · Edexcel IAL October 2025 · Unit 2 · Q10

The total resistance is 4 + 2 = 6 Ω, and the 12 V e.m.f. is shared in proportion to resistance. The internal resistance gets 2/6 of it: V = 12 × 2/6.

2 **C**

e.m.f. from terminal p.d. · Edexcel IAL June 2024 · Unit 2 · Q5

Current I = V/R = 1.2/6 A. The lost volts across the internal resistance are Ir = (1.2/6) × 0.5. The e.m.f. = terminal p.d. + lost volts = 1.2 + (1.2 × 0.5)/6.

3 **D**

Kirchhoff's second law with internal resistance · Edexcel IAL January 2022 · Unit 2 · Q3

Around the circuit, the e.m.f. equals the sum of the p.d.s: the p.d. across R_1 (V_1), across R_2 (IR_2) and across the internal resistance (Ir). So $\varepsilon = V_1 + IR_2 + Ir$.

4 **A**

Internal resistance from a voltmeter reading · Edexcel IAL January 2025 · Unit 2 · Q10

Current I = V/R = 6/10 A. The 'lost volts' across the internal resistance are 9 − 6 = 3 V. So r = (9 − 6) ÷ (6/10) = 10 × (9 − 6)/6 Ω.

5 **A**

Identical cells in parallel · Edexcel IAL October 2025 · Unit 2 · Q8

Identical cells in parallel give the same e.m.f. as one cell, 1.5 V. Their internal resistances are in parallel: 1/r = 5 × 1/1.0, so r = 0.2 Ω.

> **Watch out:** In series the e.m.f.s add (7.5 V); in parallel they do not.

End of mark scheme. Answers from Pearson's published mark schemes; explanations written for this pack. Pearson Edexcel material is © Pearson Education Ltd. More free packs and 1-to-1 tuition: **www.getbetteratphysics.co.uk**

GET BETTER AT PHYSICS · WHAT NEXT?

Got some of these wrong?

Good. The questions you got wrong show you exactly what to work on next. The quickest way to fix them is to work through them with someone who marks these papers.

Book a free 15-minute call

Tell me which questions caught you out. We'll talk about what's going wrong and whether 1-to-1 or small-group tuition would help. There's no obligation.

Book your free call

calendly.com/getbetteratphysics/freechat

Scan to book

Current AQA examiner

I know what the mark schemes reward and where marks are lost.

Matched to your exam board

Sessions follow your specification and the topics you find hardest.

Pay per session

No block booking. 1-to-1 or small groups of up to 4.

More free packs

Tiered past-paper questions with full mark schemes, sorted by topic.
getbetteratphysics.co.uk/free-revision-packs

Masterclasses are coming

Want to hear first? Email **helpme@getbetteratphysics.co.uk** and I'll let you know when dates are announced.

Parents: I use these packs in my own tutoring sessions. Tuition options and prices: **getbetteratphysics.co.uk/tuitionpricing**