GET BETTER AT PHYSICS · MARK SCHEME

SI Units & Base Units: tiered multiple choice

Edexcel IAL Physics · Units 1, 2 and 4 · Working as a Physicist (units) · 7 questions · 7 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	Q6	Q7
A	A	B	A	C	C	B

Easy

Questions 1–3

1 **A**

Spotting a scalar from its unit · Edexcel IAL October 2024 · Unit 4 · Q2

kg m^{-3} is the unit of density, which is a scalar. m s^{-2} (acceleration), N C^{-1} (electric field strength) and N s (momentum or impulse) are all units of vector quantities.

How students did: 73% of students got this right in October 2024.

2 **A**

Recognising an SI base unit · Edexcel IAL June 2024 · Unit 4 · Q1

The SI base units are kg, m, s, A, K and mol. The ampere is a base unit. The coulomb (A s), joule (kg m^2 s^{-2}) and tesla (kg A^{-1} s^{-2}) are all derived units.

> **Watch out:** Charge feels 'basic', but in SI it is current that is the base quantity, so the coulomb is derived.

How students did: 65% of students got this right in June 2024.

3 **B**

Base units of a moment · Edexcel IAL October 2019 · Unit 1 · Q2

Moment = force × perpendicular distance, so its unit is N m. Since N = kg m s^{-2}, N m = kg m^2 s^{-2}.

> **Watch out:** Moment and work share the same base units, but they are different quantities.

How students did: 54% of students got this right in October 2019. Many gave A, the unit of force rather than moment.

Medium

Questions 4–6

4 **A**

Writing the ohm in other units · Edexcel IAL October 2021 · Unit 2 · Q5

R = V/I. V = W/Q gives J C^{-1}, and I = Q/t gives C s^{-1}. So Ω = (J C^{-1}) ÷ (C s^{-1}) = J C^{-2} s.

How students did: Examiners reported that fewer than half of students got this right in October 2021.

5 **C**

Base units of the farad · Edexcel IAL October 2020 · Unit 4 · Q4

C = Q/V. The coulomb is A s and the volt is W A^{-1} = kg m^2 s^{-3} A^{-1}. So F = A s ÷ (kg m^2 s^{-3} A^{-1}) = kg^{-1} m^{-2} A^2 s^4.

> **Watch out:** Options A and B are valid units of capacitance, but they are not written in base units.

How students did: 41% of students got this right in October 2020.

6 **C**

Base units of the tesla · Edexcel IAL October 2022 · Unit 4 · Q6

From F = BIl, B = F/(Il), so T = N A^{-1} m^{-1}. Substituting N = kg m s^{-2}: kg m s^{-2} A^{-1} m^{-1} = kg A^{-1} s^{-2}.

> **Watch out:** A and B are correct units but not base units: N and C are not SI base units.

How students did: 36% of students got this right in October 2022.

Hard

Question 7

7 **B**

Base units of power · Edexcel IAL January 2021 · Unit 2 · Q1

P = E/t, so W = J s^{-1} = kg m^2 s^{-3}. Of the options, only the kilogram is an SI base unit. The newton and joule are derived units, and the ampere does not appear in the unit of power.

> **Watch out:** Many students chose a unit that appears in power equations (joule, newton). The question asks for a base unit.

How students did: In January 2021, about a quarter of students got this right. Many seem to have missed the word 'base'; common wrong answers were C and D.

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**

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