GET BETTER AT PHYSICS · MARK SCHEME

Simple Harmonic Motion: tiered multiple choice

Edexcel IAL Physics · Unit 5 (WPH15) · Specification points 143–147 · 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
A	D	B	B	B

Easy

Questions 1–5

1 **A**

Displacement from an acceleration–time graph in SHM · Edexcel IAL January 2021 · Unit 5 · Q9

In SHM, $a = -\omega^2 x$, so the acceleration is always in antiphase with the displacement. The displacement graph is the acceleration graph turned upside down: where a is a maximum, x is a minimum. Graph A has the same period and is in antiphase.

How students did: 74% of students got this right in January 2021.

2 **D**

Direction of acceleration in SHM · Edexcel IAL January 2024 · Unit 5 · Q4

SHM is defined by $a = -\omega^2 x$: the acceleration is proportional to the displacement and always directed towards the equilibrium position. Its direction relative to the velocity changes during each cycle.

How students did: Examiners reported that at least 60% of students got this right in January 2024.

3 **B**

Maximum velocity in SHM · Edexcel IAL January 2023 · Unit 5 · Q9

$v_{max} = \omega A$, and $\omega = 2\pi/T$. So $v_{max} = (2\pi/0.65) \times 0.12$ m s^{-1}.

Watch out: $(2\pi/T)^2 \times A$ gives the maximum acceleration, not velocity.

4 **B**

A correct statement about SHM · Edexcel IAL January 2022 · Unit 5 · Q1

In SHM the acceleration is always directed towards the equilibrium position O ($a = -\omega^2 x$). The velocity points away from O for part of each cycle, and acceleration is proportional to displacement, not velocity.

5 **B**

Amplitude from maximum velocity · Edexcel IAL January 2024 · Unit 5 · Q7

In SHM, the maximum velocity $v_{max} = \omega A$. So $A = v_{max}/\omega = 10/2$ cm.

How students did: Examiners reported that at least 60% of students got this right in January 2024.

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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