GET BETTER AT PHYSICS · MARK SCHEME

Superposition & Stationary Waves: tiered multiple choice

Edexcel IAL Physics · Unit 2 (WPH12) · Specification points 41–43 · 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
B	C	B	B	D

Easy

Questions 1–4

1 **B**

Wavelength of a stationary wave · Edexcel IAL October 2023 · Unit 2 · Q6

Each loop of a stationary wave is half a wavelength long. VY contains 3 loops, so $3 \times \lambda/2 = 0.6$ m and $\lambda = 0.4$ m.

How students did: 78% of students got this right in October 2023.

2 **C**

Properties of stationary waves · Edexcel IAL January 2023 · Unit 2 · Q10

Adjacent nodes are half a wavelength apart, not one wavelength, so C is the incorrect statement. All points between adjacent nodes are in phase, antinodes have maximum amplitude, and a stationary wave transfers no net energy.

3 **B**

Superposition of two waves on a string · Edexcel IAL January 2025 · Unit 2 · Q4

Each wave moves half a wavelength, so they now overlap by half a wavelength. In the overlap the trough of the left-hand wave lies on top of the trough of the right-hand wave, and the displacements add to give a trough twice as deep. The crests either side do not overlap anything, so they are unchanged: shape B.

> **Watch out:** Use the principle of superposition: add the displacements point by point.

4 **B**

Phase and amplitude of two points on a stationary wave · Edexcel IAL January 2025 · Unit 2 · Q7

P and Q are in the same loop, between the same pair of nodes, so they oscillate in phase (0°). Neither is at the antinode, so each oscillates with an amplitude less than the maximum A.

Medium

Question 5

5 **D**

Phase in a stationary wave · Edexcel IAL January 2022 · Unit 2 · Q7

In a stationary wave, all points between two neighbouring nodes (in the same loop) are in phase; points in neighbouring loops are in antiphase. X is in the first loop and Z is in the second loop, so they are in antiphase. W and X are in the same loop (in phase); Y is in a different loop from W and X.

> **Watch out:** In a stationary wave the phase does not change gradually along the string: it flips by π at each node.

How students did: Examiners listed this among the least successful multiple-choice questions on the January 2022 paper. Many chose B, a common misconception.

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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