GET BETTER AT PHYSICS · MARK SCHEME

Phase, Path Difference & Coherence: tiered multiple choice

Edexcel IAL Physics · Unit 2 (WPH12) · Specification points 39–40 · 6 questions · 6 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
A	B	D	C	B	C

Easy

Questions 1–3

1 **A**

Converting degrees to radians · Edexcel IAL October 2025 · Unit 2 · Q5

360° = 2π radians, so 25° = 25 × 2π/360 radians.

2 **B**

Phase difference from path difference · Edexcel IAL January 2022 · Unit 2 · Q9

A path difference of one wavelength corresponds to a phase difference of 2π radians. So λ/8 corresponds to 2π/8 = π/4 radians.

3 **D**

What coherence means · Edexcel IAL June 2023 · Unit 2 · Q7

Coherent waves have a constant phase difference. That is only possible if they have the same frequency. They do not have to be in phase, in antiphase, or of equal amplitude.

Medium

Questions 4–5

4 **C**

Phase difference for a path difference of 18 cm · Edexcel IAL June 2023 · Unit 2 · Q6

18 cm = 1.5 wavelengths. Each whole wavelength brings the waves back in phase, so only the extra half wavelength matters: a phase difference of π radians.

How students did: Examiners reported that fewer than half of students got this right in June 2023.

5 **B**

Path difference for a phase difference of 1.5π · Edexcel IAL October 2019 · Unit 2 · Q9

1.5π radians is ¾ of a cycle, which needs a path difference of ¾λ, or ¾λ plus any whole number of wavelengths. 7λ/4 = λ + ¾λ, so it works. 3λ/2 and 7λ/2 give a phase difference of π; 3λ gives zero.

How students did: Examiners singled this out as one of the hardest multiple-choice questions on the October 2019 paper. Common wrong answers were A and C.

Hard

Question 6

6 **C**

Interference of microwaves in an oven · Edexcel IAL October 2021 · Unit 2 · Q7

Path 1 = 22 + 8 = 30 cm; path 2 = 15 + 27 = 42 cm; path difference = 12 cm. For λ = 24 cm, 12 cm is half a wavelength, so the waves arrive in antiphase: destructive interference and no heating. For λ = 18 cm, 12 cm is ⅔λ, so neither maximum nor zero.

> **Watch out:** Work out each path length first; then compare the path difference with λ and λ/2.

How students did: In October 2021, just over a quarter of students got this right. Examiners said combining more than one idea made this less accessible.

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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