FREE REVISION PACK

Phase, Path Difference & Coherence

Pearson Edexcel International Advanced Level Physics · Unit 2 (WPH12) · Specification points 39–40

Easy | Medium | Hard | Multiple choice · past-paper questions

6	6	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Converting degrees to radians	Edexcel IAL October 2025 · Unit 2 · Q5	1 mark
2	Easy	Phase difference from path difference	Edexcel IAL January 2022 · Unit 2 · Q9	1 mark
3	Easy	What coherence means	Edexcel IAL June 2023 · Unit 2 · Q7	1 mark
4	Medium	Phase difference for a path difference of 18 cm	Edexcel IAL June 2023 · Unit 2 · Q6	1 mark
5	Medium	Path difference for a phase difference of 1.5π	Edexcel IAL October 2019 · Unit 2 · Q9	1 mark
6	Hard	Interference of microwaves in an oven	Edexcel IAL October 2021 · Unit 2 · Q7	1 mark

Key ideas to have ready

- Path difference of one wavelength ↔ phase difference of 2π rad (360°).
- Constructive interference: path difference = nλ. Destructive: (n + ½)λ.
- Coherent waves have a constant phase difference (so the same frequency).
- Degrees to radians: multiply by 2π/360.

How to use this pack

1. The questions are grouped into levels (Easy, Medium and Hard). Work through them in order, and check your answers at the end of each level before moving on.
2. Every question is multiple choice with one correct answer. Write down your working anyway; that is how you find mistakes.
3. The separate mark scheme uses the same numbers and explains every answer.

Levels are based on how students did in Pearson's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

Definitions and one-step ideas. Most students get these right.

Questions 1–3

Choose **one** answer for each question and put a cross in the box next to it.

Edexcel IAL October 2025 · Unit 2 · Q5

1 Two points on a wave have a phase difference of 25°.

Which of the following expressions gives the phase difference in radians?

- ☒ **A** $\frac{25 \times 2\pi}{360}$
- ☒ **B** $\frac{25}{180}$
- ☒ **C** $\frac{25 \times \pi}{360}$
- ☒ **D** $\frac{25}{360}$

Edexcel IAL January 2022 · Unit 2 · Q9

2 Two waves with wavelength λ are produced by the same source. The waves travel different distances and then meet.

At the point where they meet, the path difference between the two waves is $\frac{\lambda}{8}$.

Which of the following is the phase difference, in radians, between the two waves?

- ☒ **A** $\frac{\pi}{2}$
- ☒ **B** $\frac{\pi}{4}$
- ☒ **C** $\frac{\pi}{8}$
- ☒ **D** $\frac{\pi}{16}$

Edexcel IAL June 2023 · Unit 2 · Q7

3 Two waves are coherent.

Which of the following **must** be true for the two waves?

- ☒ **A** They are in antiphase with each other.
- ☒ **B** They are in phase with each other.
- ☒ **C** They have the same amplitude.
- ☒ **D** They have the same frequency.

Medium

Two or three steps. Roughly a third to a half of students get these right.

Questions 4–5

Edexcel IAL June 2023 · Unit 2 · Q6

4 Two waves, of wavelength 12 cm, leave a source in phase.

The waves travel along different paths to a point X. The path difference at X is 18 cm.

Which of the following is the phase difference between the two waves at X?

☒ **A** 0 radians

☒ **B** $\frac{\pi}{2}$ radians

☒ **C** π radians

☒ **D** $\frac{3\pi}{2}$ radians

Edexcel IAL October 2019 · Unit 2 · Q9

5 Two waves from the same source travel along different paths and then meet at a point P. The phase difference between the waves at P is 1.5π radians.

Which of the following is a possible path difference that could result in this phase difference being produced at P?

☒ **A** $\frac{3\lambda}{2}$

☒ **B** $\frac{7\lambda}{4}$

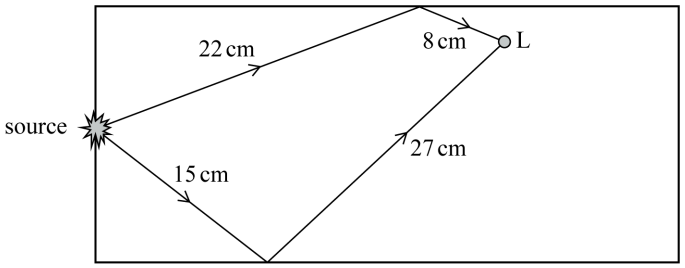
☒ **C** 3λ

☒ **D** $\frac{7\lambda}{2}$

Hard Several steps, often with a trap built in. Fewer than 3 in 10 students get these right. **Question 6**

Edexcel IAL October 2021 · Unit 2 · Q7

6 A microwave oven has a source that emits microwaves in all directions into the oven. The diagram shows the paths of two microwave rays that meet at point L as shown.



The interference between the waves following these two paths could cause heating effects at L depending on the wavelength of the microwaves.

Which row of the table is possible at point L?

	Heating effect at L	Wavelength / cm
☒ **A**	maximum heating	24
☒ **B**	maximum heating	18
☒ **C**	no heating	24
☒ **D**	no heating	18

End of questions. Check your answers with the matching mark scheme. More free packs and 1-to-1 tuition: **www.getbetteratphysics.co.uk**