FREE REVISION PACK

Interference & Young's Double Slit

AQA A-level Physics · 7407 / 7408 · Specification 3.3.2.1

Easy | Medium | Multiple choice · past-paper questions

6	6	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	What increases the fringe spacing?	AQA June 2018 · A-level Paper 1 · Q16	1 mark
2	Easy	Another arrangement with the same fringe spacing	AQA June 2019 · AS Paper 2 · Q18	1 mark
3	Easy	Slit separation from ten fringes	AQA June 2022 · A-level Paper 1 · Q20	1 mark
4	Medium	Moving one microwave source to the next maximum	AQA June 2024 · AS Paper 2 · Q15	1 mark
5	Medium	Wavelength from two consecutive maxima	AQA June 2024 · A-level Paper 1 · Q16	1 mark
6	Medium	What decreases the fringe separation?	AQA 2021 · AS Paper 2 · Q19	1 mark

Key ideas to have ready

- Interference needs coherent sources: the same frequency and a constant phase difference.
- Maxima where the path difference is a whole number of wavelengths (nλ); minima where it is (n + ½)λ.
- Young's double slit: fringe spacing w = λD / s (λ wavelength, D slit-to-screen distance, s slit separation).
- A longer wavelength (lower frequency), a larger D or a smaller s all increase the fringe spacing.

How to use this pack

1. The questions are grouped into levels (Easy and Medium). 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 AQA's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

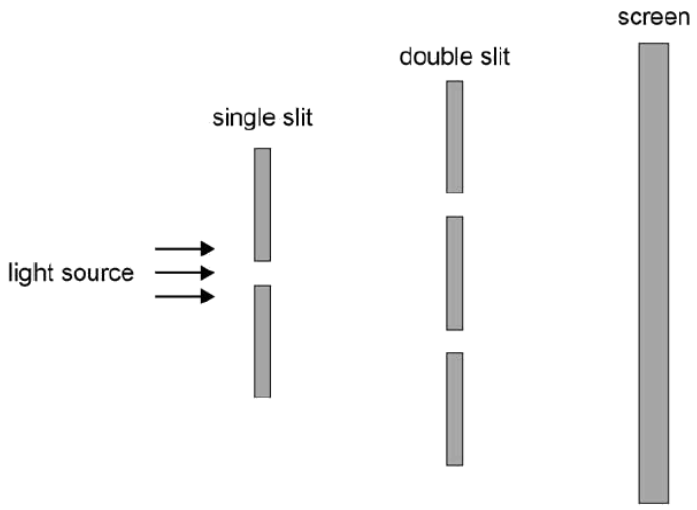
Definitions and one-step ideas. Most students get these right.

Questions 1–3

Only **one** answer per question is allowed. For each question, completely fill in the circle alongside the appropriate answer.

AQA June 2018 · A-level Paper 1 · Q16

1 Light from a point source passes through a single slit and is then incident on a double-slit arrangement. An interference pattern is observed on the screen.



What will increase the fringe spacing?

[1 mark]

A increasing the separation of the single slit and the double slit ⬭

B increasing the width of the single slit ⬭

C decreasing the distance between the double slits and the screen ⬭

D decreasing the separation of the double slits ⬭

AQA June 2019 · AS Paper 2 · Q18

2 In a Young's double-slit experiment, the spacing of the double slits is s and the distance between the slits and the screen on which fringes are formed is D. When monochromatic light of wavelength λ is incident on the slits the distance between adjacent fringes on the screen is w.

Which row shows another arrangement that produces a fringe spacing of w?

[1 mark]

	Spacing of double slits	Distance between the slits and the screen	Wavelength of the light	
A	$4s$	$2D$	2λ	⬭
B	$2s$	$4D$	2λ	⬭
C	$2s$	$2D$	4λ	⬭
D	$2s$	$2D$	2λ	⬭

AQA June 2022 · A-level Paper 1 · Q20

3 Light of wavelength 5.2×10^{-7} m is used in a Young's double-slit experiment.
The distance from the slits to the screen is 1.5 m.
The width of ten fringes is 3.5 cm.

What is the separation of the two slits?

[1 mark]

A 2.2×10^{-5} m ⬭

B 9.9×10^{-5} m ⬭

C 1.1×10^{-4} m ⬭

D 2.2×10^{-4} m ⬭

Medium

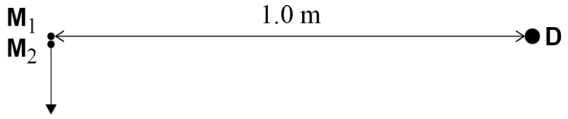
Two or three steps. Roughly a third to a half of students get these right.

Questions 4–6

AQA June 2024 · AS Paper 2 · Q15

4 Sources $\mathbf{M_1}$ and $\mathbf{M_2}$ emit coherent microwaves of wavelength $5.0\ \text{cm}$.

When $\mathbf{M_1}$ and $\mathbf{M_2}$ are very close, a maximum of intensity occurs at a point **D** that is $1.0\ \text{m}$ away.



$\mathbf{M_2}$ is moved away from $\mathbf{M_1}$ along the line perpendicular to $\mathbf{M_1D}$.

The next maximum of intensity occurs at **D** when the distance between $\mathbf{M_1}$ and $\mathbf{M_2}$ is

[1 mark]

A 5.0 cm ⬭

B 10 cm ⬭

C 16 cm ⬭

D 32 cm ⬭

AQA June 2024 · A-level Paper 1 · Q16

5 Point sources of sound of the same frequency are placed at S_1 and S_2.



A sound detector is moved slowly along the line **PQ**. Consecutive maxima of sound intensity are detected at **W** and **Y** and consecutive minima are detected at **X** and **Z**.

What is the wavelength of the sound?

[1 mark]

A $(S_1Y–S_2Y) – (S_1W–S_2W)$ ⬭

B $(S_1X–S_2X) – (S_1W–S_2W)$ ⬭

C $(S_1Y–S_2Y) – (S_1X–S_2X)$ ⬭

D $(S_1Z–S_2Z) – (S_1W–S_2W)$ ⬭

AQA 2021 · AS Paper 2 · Q19

6 In a Young's double-slit experiment, monochromatic light is incident on two narrow slits and the resulting interference pattern is observed on a screen.

Which change **decreases** the fringe separation?

[1 mark]

A decreasing the separation between the two slits ⬭

B increasing the distance between the slits and the screen ⬭

C using monochromatic light of higher frequency ⬭

D using monochromatic light of longer wavelength ⬭

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