



QUESTION WORKBOOK

# Interference and Young's double slit

Waves · Year 12

AQA 3.3.2.1 · CIE 8.3 · OCR A 4.4.3

10 questions · 30 marks

PRINT EDITION

**SECTION A** · Warm-up

**A1** State the condition, in terms of path difference, for constructive and for destructive interference. [2]

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**A2** Explain what is meant by two sources being coherent. [2]

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**A3** State the double-slit fringe-spacing equation and name each quantity in it. [2]

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**SECTION B** · Standard

**B1** In a double-slit experiment, light of wavelength 600 nm illuminates slits 0.50 mm apart, and the screen is 1.5 m away. Calculate the fringe spacing. [4]

- B2** A double-slit pattern has a fringe spacing of 2.4 mm on a screen 2.0 m from slits 0.40 mm apart. Calculate the wavelength of the light. [3]

- B3** Light of wavelength 650 nm produces fringes 1.3 mm apart on a screen 1.2 m from the slits. Calculate the slit separation. [3]

- B4** In a double-slit experiment using 600 nm light, state the path difference at the second bright fringe from the centre, giving your answer in micrometres. [3]

## SECTION C · Stretch

- C1** In a double-slit experiment, 500 nm light and a screen distance of 2.0 m give fringes with slits 0.25 mm apart. Calculate the fringe spacing, then state and calculate the new spacing if the slit separation is halved. [4]

- C2** Explain why coherent, monochromatic light is needed to see clear double-slit fringes, and describe the central fringe seen when white light is used instead. [4]

- C3** Explain why a stable interference pattern is not seen when light from two separate lamps overlaps. [3]