InkPhysics

QUESTION WORKBOOK

Diffraction and the single slit

Waves · Year 12

AQA 3.3.2.2 · CIE 8.2 · OCR A 4.4.1

9 questions · 25 marks

PRINT EDITION

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SECTION A · Warm-up

A1 Describe what is meant by diffraction, and state when the spreading of a wave at a gap is greatest. [2]

A2 Sketch the intensity pattern produced when monochromatic light passes through a single narrow slit, and describe its main features. [2]

A3 State what happens to the single-slit diffraction pattern when the slit is made narrower. [2]

SECTION B · Standard

B1 Explain why sound is clearly diffracted through an open doorway but light passing through the same doorway is not noticeably diffracted. [3]

B2 Describe how the single-slit diffraction pattern changes when the light is switched from blue to red, for the same slit. [3]

B3 Describe the single-slit diffraction pattern produced with white light. [3]

B4 Explain why the central maximum of a single-slit pattern is both wider and brighter than the other fringes. [3]

SECTION C · Stretch

C1 Two single slits of different widths are each illuminated with the same monochromatic light. Explain which slit produces the wider central maximum, and what happens to the brightness. [4]

C2 Explain why a laser is well suited to demonstrating diffraction patterns. [3]