InkPhysics

QUESTION WORKBOOK

Longitudinal, transverse and polarisation

Waves · Year 12

AQA 3.3.1.2 · CIE 7.2, 7.5 · OCR A 4.4.1, 4.4.2

9 questions · 25 marks

NAVY SCREEN EDITION

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SECTION A · Warm-up

A1 Explain the difference between a transverse and a longitudinal wave, in terms of the direction of particle oscillation. [2]

A2 A sound wave of frequency 170 Hz travels through air at 340 m s^{-1}. Calculate its wavelength. [2]

A3 Give one example of a transverse wave and one example of a longitudinal wave. [2]

SECTION B · Standard

B1 State what is meant by plane-polarised light, and explain why only transverse waves can be polarised. [3]

B2 Unpolarised light passes through a single polarising filter, which is then slowly rotated in its own plane. Describe what happens to the brightness of the transmitted light, and contrast this with rotating a filter placed in front of already-polarised light. [3]

B3 Microwaves of frequency 3.0×10^{9} Hz travel at 3.0×10^{8} m s^{-1}. Calculate their wavelength, and state one way to show that microwaves are polarised. [3]

SECTION C · Stretch

C1 Two polarising filters are arranged with their axes crossed (at 90°), so no light passes. A third filter is then inserted between them with its axis at 45°. Explain why light now emerges from the arrangement. [4]

C2 Explain why polarising sunglasses reduce glare from reflective surfaces such as water or a wet road. [3]

C3 Explain why sound waves cannot be polarised. [3]