

# 7 Waves — Part 1 — Answers

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## Answers

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**7.1**  $v = f\lambda = 200 \times 1.7 = 340 \text{ m s}^{-1}$ .

**7.2**  $T = 1/f = 1/25 = 0.040 \text{ s}$ .

**7.3**  $\lambda = v/f = (3.0 \times 10^8)/(5.0 \times 10^{14}) = 6.0 \times 10^{-7} \text{ m}$ .

**7.4** (a) longitudinal (b) transverse.

**7.5** Polarisation needs oscillations across the direction of travel. Light is transverse (it has these), but sound is longitudinal (it oscillates along the travel direction), so sound cannot be polarised.

**7.6** In  $v = f\lambda$  the speed  $v$  is fixed (the same for all colours in a vacuum). So a higher frequency must go with a shorter wavelength, and a lower frequency with a longer one — different colours simply pair different  $f$  and  $\lambda$  that multiply to the same  $v$ .

**7.7** The light dims, reaching (almost) zero at  $90^\circ$ . The first filter passes one plane of oscillation; as the second filter turns towards "crossed", it blocks more of that plane, until at  $90^\circ$  it blocks it completely.