

7 Waves – Part 1 —Answers

Answers

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 λ that multiply to the same v .

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