2024 Sec 4 Physics Assignment Answers
Assignment 13 Sound

***Note**: Show all formulae & working steps! Express answers to 2 or 3 s.f.*

1 C (compression to compression = 1 wavelength)

2(a) $v = \frac{d}{t} = \frac{300}{0.90}$ = 330 m s^{-1} (2 s.f.)

(b) The flash travels instantaneously from shooter to him; the time taken for flash to travel from shooter to him is negligible.

Assumptions:

- *sound is produced at the same time as the flash seen by the student*
- *this is not about human reaction time!*

3(a) Light from lightning reaches the eye much faster than the sound from the thunder because light travels much faster than sound in air.

(b) $340 = \frac{d}{5.0}$ ➔ d = 1700 m (2 s.f.)

(c) d = v t = 340 x 3.0 = 1020 m = 1000 m (2 s.f.)

(d) $v = \frac{(1700 - 1020)}{20x60}$ = 0.567 ≈ 0.57 m s^{-1} (2 s.f.)

OR 34 m/min or 2.0 km/h

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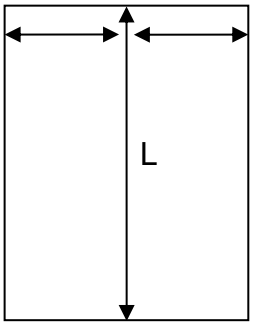
(a) $v = \frac{2d}{t} = \frac{2x(17/2)}{50x10^{-3}}$ ≈ 340 m s^{-1}

(b) $v = \frac{2L}{t}$ ➔ 2L = vt => $L = \frac{vt}{2} = \frac{340x160x10^{-3}}{2}$

= 27.2 ≈ 27 m



***Note**: echo, need to take into account twice the distance travelled to and fro*

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(a) $v = \frac{2d}{t}$ ➔ d = 1500 x 0.20 / 2 = 150 m

(b) v = fλ ➔ $\lambda = \frac{v}{f} = \frac{1500}{15 \times 10^3}$ = 0.10 m

6	Diagram	Reason
(a) sound of lower pitch	Fig. 6.1	It has a lower frequency
(b) louder sound	Fig. 6.1	It has a larger amplitude

***Note**: on CRO display, horizontal time axis: longer period T means lower frequency f*