

- 4 (a) Sound waves are longitudinal waves. By reference to the direction of propagation of energy, state what is meant by a *longitudinal* wave.

.....
[1]

- (b) A stationary sound wave in air has amplitude A . In an experiment, a detector is used to determine A^2 . The variation of A^2 with distance x along the wave is shown in Fig. 4.1.

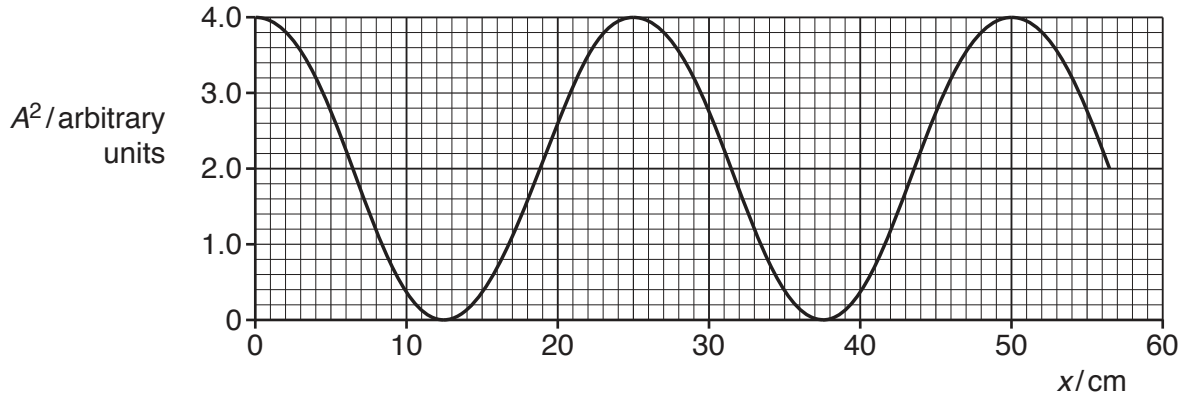


Fig. 4.1

- (i) State the phase difference between the vibrations of an air particle at $x = 25$ cm and the vibrations of an air particle at $x = 50$ cm.

phase difference = ° [1]

- (ii) The speed of the sound in the air is 330 ms^{-1} . Determine the frequency of the sound wave.

frequency = Hz [3]

- (iii) Determine the ratio

$$\frac{\text{amplitude } A \text{ of wave at } x = 20 \text{ cm}}{\text{amplitude } A \text{ of wave at } x = 25 \text{ cm}}$$

ratio = [2]

[Total: 7]