

- 4 A child sits on the ground next to a remote-controlled toy car. At time $t = 0$, the car begins to move in a straight line directly away from the child. The variation with time t of the velocity of the car along this line is shown in Fig. 4.1.

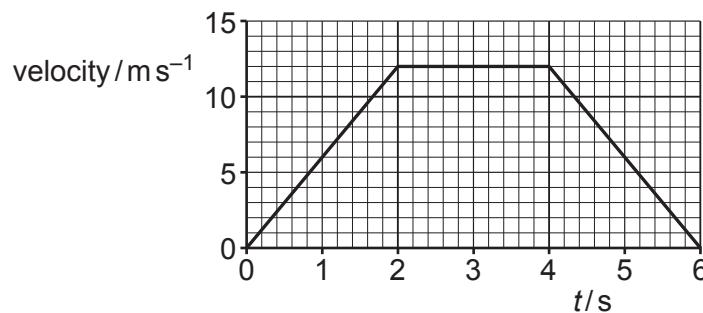


Fig. 4.1

The car's horn continually emits sound of frequency 925 Hz between time $t = 0$ and time $t = 6.0\text{ s}$. The speed of the sound in the air is 338 m s^{-1} .

- (a) Describe qualitatively the variation, if any, in the frequency of the sound heard, by the child, that was emitted from the car horn:

- (i) from time $t = 0$ to time $t = 2.0\text{ s}$

..... [1]

- (ii) from time $t = 4.0\text{ s}$ to time $t = 6.0\text{ s}$.

..... [1]

- (b) Determine the frequency, to three significant figures, of the sound heard, by the child, that was emitted from the car horn at time $t = 3.0\text{ s}$.

$$\text{frequency} = \dots \text{Hz} \quad [2]$$

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- (c) Determine the time taken for the sound emitted at time $t = 4.0\text{ s}$ to travel to the child.

time taken = s [2]

[Total: 6]