3 **(a)** Fig. 3.1 and Fig. 3.2 are graphs drawn for the same wave. Fig. 3.1 is a graph of displacement against time and Fig. 3.2 is a graph of displacement against distance.

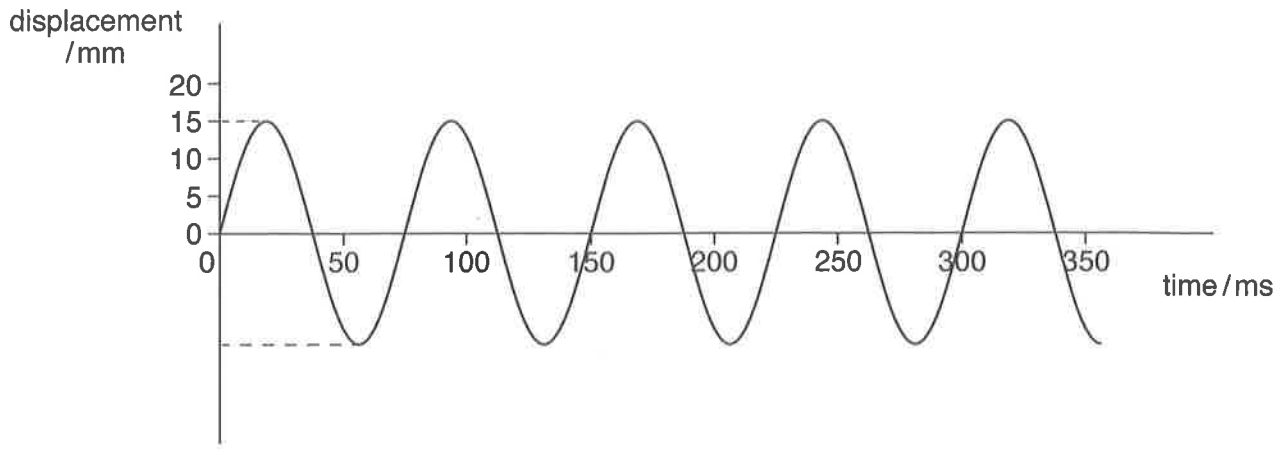


Fig. 3.1

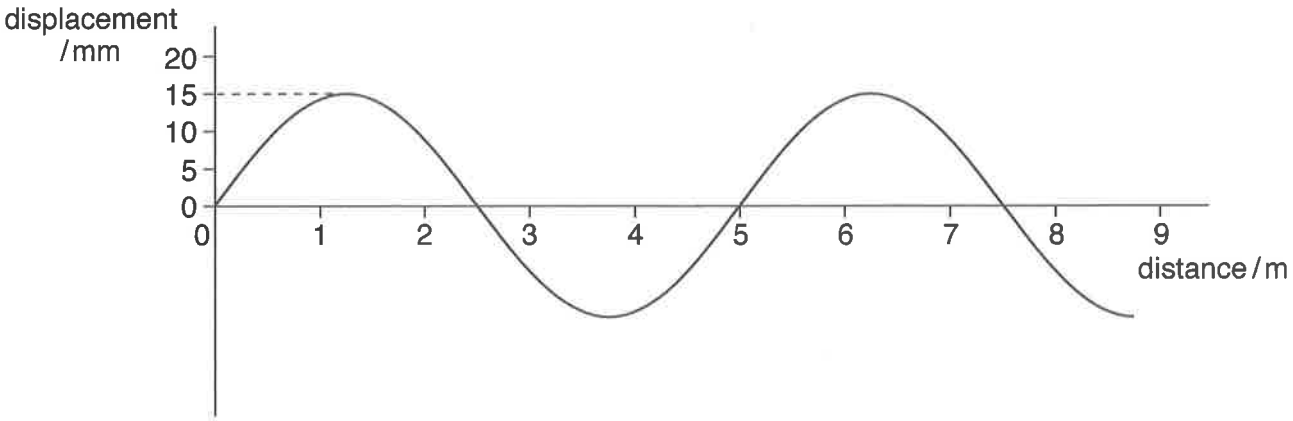


Fig. 3.2

Using the graphs in Fig. 3.1 and Fig. 3.2 deduce

(i) the amplitude of the wave,

amplitude = ... m [1]

(ii) the speed of the wave.

speed = ... $m\,s^{-1}$ [3]

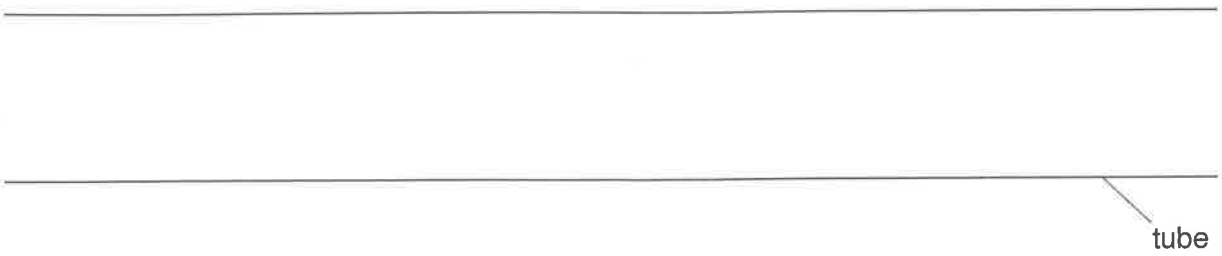
(b) (i) State how a stationary sound wave can be set up in a long tube open at both ends using a loudspeaker and a signal generator.

.....

.....

.....[1]

(ii) 1. Draw a diagram which represents a stationary sound wave formed inside the long tube shown in Fig. 3.3.



[1]

Fig. 3.3

2. Mark on your diagram the position of a node with an N and an antinode with an A. [1]

3. State the relationship between the length of tube L and the wavelength λ of the wave you have drawn.

L = ...[1]

4. At your marked antinode, show with a double-headed arrow (↔ or ↕) the direction of oscillation of individual air particles. [1]