4 A sound wave passes through some air particles. The vertical lines in Fig. 4.1 show positions of the air particles at an instant in time.

Fig. 4.1

The sound is then captured by a microphone connected to a cathode-ray oscilloscope (CRO). The time-base setting of the CRO is 2.0 ms per division. A portion of the image of the CRO is shown in Fig. 4.2.

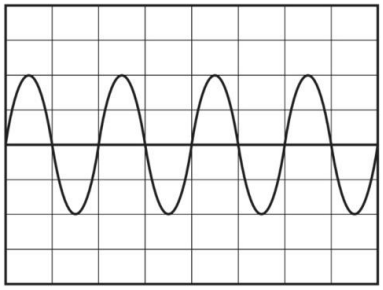

Fig. 4.2

(a) **(i)** Determine the frequency of the sound.

frequency = ... Hz [1]

(ii) Take the speed of the sound to be 300 m s^{-1}.

Determine the wavelength of the sound.

wavelength = ... m [1]

(b) **(i)** On Fig. 4.1, mark a region of wave which shows centre of compression with 'C' and a region of wave which shows centre of rarefaction with 'R'. [1]

(ii) Use your answer in **(a)(ii)** to determine the distance between C and R you have marked on Fig. 4.1.

distance between C and R = ... m [1]

(c) With reference to the frequency you have determined in **(a)(i)**, describe the motion of the particle P labelled in Fig. 4.1.

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..... [3]