4 The apparatus shown in Fig. 4.1 may be used to demonstrate a stationary wave.

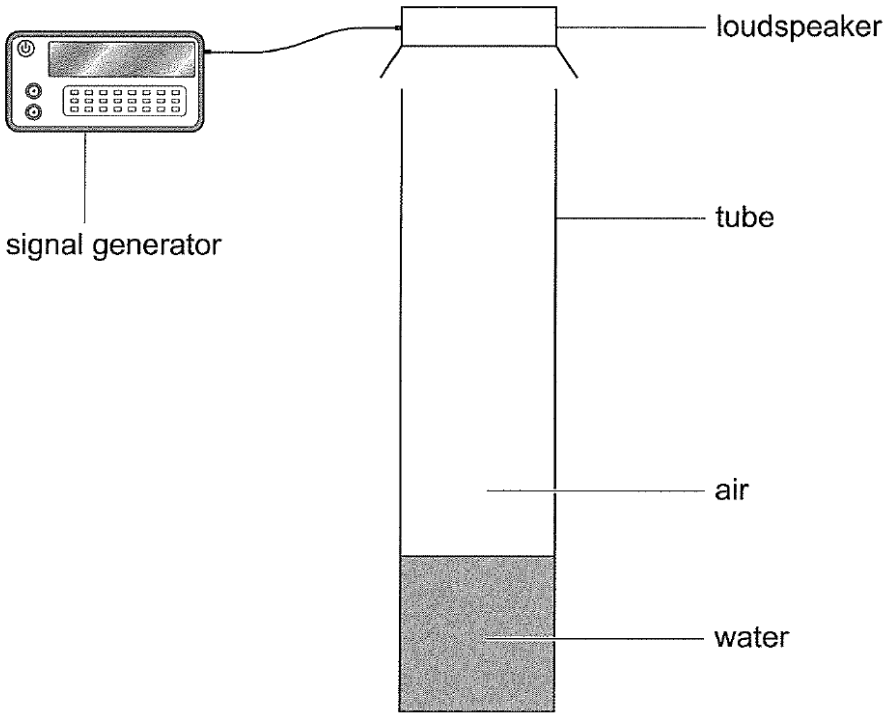

Fig. 4.1

(a) Apart from changing the frequency, state how the apparatus shown in Fig. 4.1 may be adjusted to allow a stationary wave to form.

……..

…….....[1]

(b) When the loudspeaker is emitting sound of frequency 480 Hz, the minimum length of the column of air is 18 cm for a stationary wave to be produced.

Calculate the speed of sound in the air column.

speed of sound = …….m s^{-1} [2]

(c) The frequency of the sound from the loudspeaker in Fig. 4.1 is increased until the next stationary wave is produced.

(i) On Fig. 4.2, draw a representation of the stationary wave that is produced. Label any nodes N and any antinodes A.

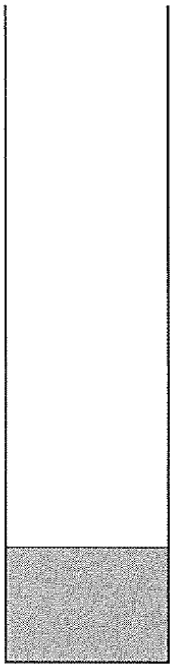

Fig. 4.2

[3]

(ii) Describe the movement of the air particles at the open top of the air column.

……

……

…… [2]

(iii) Determine the frequency of the sound.

frequency = ……Hz [2]

[Total: 10]