5 (a) (i) State what is meant by a *longitudinal* wave.

.....

..... [1]

(ii) State and explain whether sound waves can be polarised.

.....

.....

.....

..... [2]

(b) A tube is fitted with a movable piston at one end and open at the other end, as shown in Fig. 5.1. This forms an air column in the tube of length *L*.

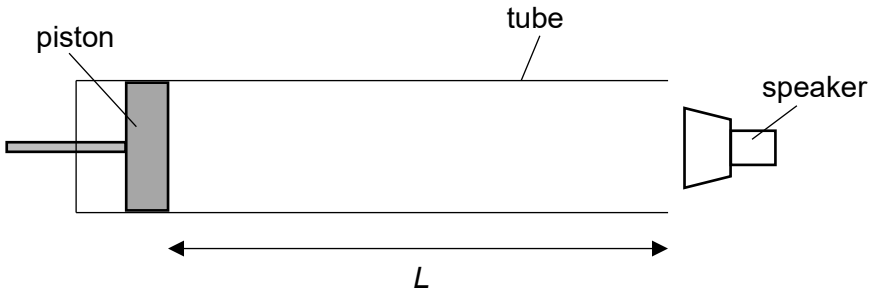

Fig. 5.1

A speaker emitting sound waves of velocity 330 m s^{-1} and frequency 440 Hz is placed near the open end of the tube. The piston is pushed rightwards such that *L* decreases. A total of two loud sounds are heard, indicating that stationary waves are formed at these two instances.

(i) Explain how stationary waves are formed in the tube.

.....

.....

..... [2]

(ii) At the value of *L* where the first loud sound is heard,

1. sketch a diagram representing the stationary sound wave in Fig. 5.1, [1]

2. determine L.

L = ... cm [2]

(iii) Explain why loud sounds are only heard at specific values of L.

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..... [2]