



2024 Sec 4 Advanced Physics Exercise 1

General Wave Properties: Superposition

Name: _____ () Class: 4/ ___ Date: _____

Given two formulae:

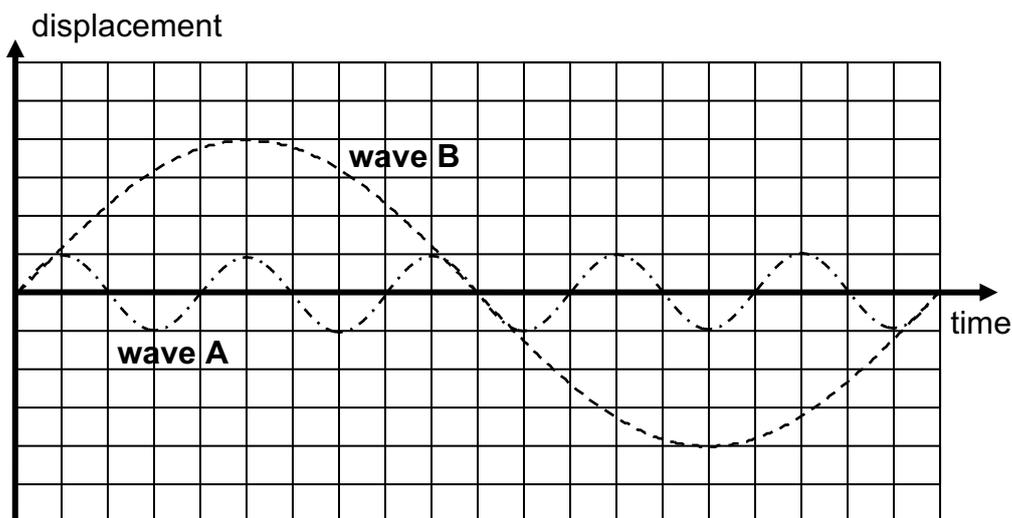
Open pipes and stretched strings: $f_n = \frac{nv}{2L}$

Closed pipes (for only odd n): $f_n = \frac{nv}{4L}$

For relevant calculations, take the speed of sound in air to be 330 m s⁻¹.

- 1 Two waves, A and B meet at point P. The displacement-time graphs due to each individual wave at P is as shown.

Sketch the displacement-time graph of the resultant wave at P.



- 2 The frequency of the fundamental mode of transverse wave vibration of a stretched wire 1.000 m long is 256 Hz.

When the wire is shortened to 0.400 m at the same tension, what is the new fundamental frequency?

new fundamental frequency =

3 To produce a fundamental note of 256 Hz, calculate the required length of

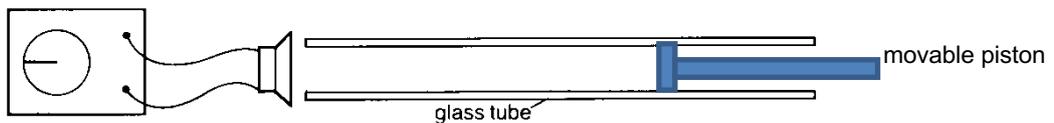
(a) a closed pipe,

length of closed pipe =

(b) and an open pipe.

length of open pipe =

4 An air column in a glass tube is open at one end and closed at the other by a movable piston.



With a speaker placed at the open end emitting a note of 384 Hz, resonance is first heard when the piston is 22.8 cm from the open end and again when it is 68.4 cm from the open end.

How far from the open end will the piston be when the next resonance is heard?

distance from the end =

Answers:	2. 640 Hz	3(a). 0.32 m	3(b). 0.64 m	4. 114 cm
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