

# OCR (A) Physics A-level

## PAG 05.2 - Determining the Speed of Sound Using a Resonant Tube

### Practical Flashcards

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What forms at the closed end of a tube when a stationary wave is formed?



What forms at the closed end of a tube when a stationary wave is formed?

When a stationary wave is formed in a tube, a node will form at the closed end.



# What is a node?



## What is a node?

A node is a point on a stationary wave where there is zero displacement.



What forms at the open end of a tube when a stationary wave is formed?



What forms at the open end of a tube when a stationary wave is formed?

When a stationary wave is formed in a tube, an antinode will form at the open end.



Describe the waveform of a stationary wave at its fundamental frequency in a tube with an open and closed end.





Describe the waveform of a stationary wave at its fundamental frequency in a tube with an open and closed end.

When oscillating at its fundamental frequency, there will be one node at the closed end and one antinode at the open end.



What must the length of the resonance tube be for it to resonate at the fundamental frequency?



What must the length of the resonance tube be for it to resonate at the fundamental frequency?

The length of the tube must be one quarter of the wavelength of the sound.



How can wave speed be calculated from frequency and wavelength?



How can wave speed be calculated from frequency and wavelength?

Wave Speed = Wavelength x Frequency



How do you know when the tube is resonating?



How do you know when the tube is resonating?

The sound will be at its loudest when the tube is undergoing resonance.



What is the general form of the tube length required for resonance to occur?





What is the general form of the tube length required for resonance to occur?

$$\frac{2n + 1}{4} \lambda$$

Where  $n = 0, 1, 2, 3 \dots$



# What is the speed of sound in air?



What is the speed of sound in air?

The speed of sound in air is around  
340m/s.



# How can the mean wavelength be calculated?



How can the mean wavelength be calculated?

Calculate the wavelength of the sound using as many resonant lengths as possible. Sum these values and divide by the number of wavelengths used to produce the mean wavelength.



Why must the external temperature remain constant in this experiment?



Why must the external temperature remain constant in this experiment?

The speed of sound can vary with the temperature of the air.

