

Physics 112 - Speed of Sound Lab

Names: _____

Purpose: To determine the speed of sound in air.

Equipment: Glass tubes, meter stick, 2 tuning forks of different frequencies, can full of water.

Procedure: Place the glass tube vertically, with one end in the water. Sound a tuning fork and hold it over the tube. Move the tube up and down until the sound from the tuning fork seems the loudest. Measure the length of the tube above water and place these values in the tables below. Do this five times with each tuning fork (a total of 10 values), using the long tube for the lower frequency and the short tube for the higher one. Multiply each value by four to get the wavelength and convert to meters. Since the frequencies are known, you can calculate the speed (velocity) of sound in air. Show your calculations and answer the questions on the back of the sheet

Tuning Fork #1 $f =$ _____			
	Tube Length (cm)	Wave Length (m)	Speed of Sound (m/s)
Measurement 1			
Measurement 2			
Measurement 3			
Measurement 4			
Measurement 5			

Tuning Fork #2 $f =$ _____			
	Tube Length (cm)	Wave Length (m)	Speed of Sound (m/s)
Measurement 1			
Measurement 2			
Measurement 3			
Measurement 4			
Measurement 5			

Questions:

1. Calculate the average speed of sound for each of the frequencies and the total average speed of sound using the data in the tables above. Are these values similar? Should they be?
2. What is the purpose of repeating the measurement five times?
3. Calculate the speed of sound using the formula ($v=331+0.6T$). Check the thermostat to determine the temperature in the room.
4. Calculate the percent difference between the experimental values and the theoretical value of the speed of sound.