ELSEWEDY UNIVERSITY OF TECHNOLOGY
- POLYTECHNIC OF EGYPT -

Principle of Physics

Lab 1: Sonometer Experiment

© Spring 2024 - **Eng. Reem Ahmed Mostafa**
Building, office No.
Reem.ahmed@sut.edu.eg

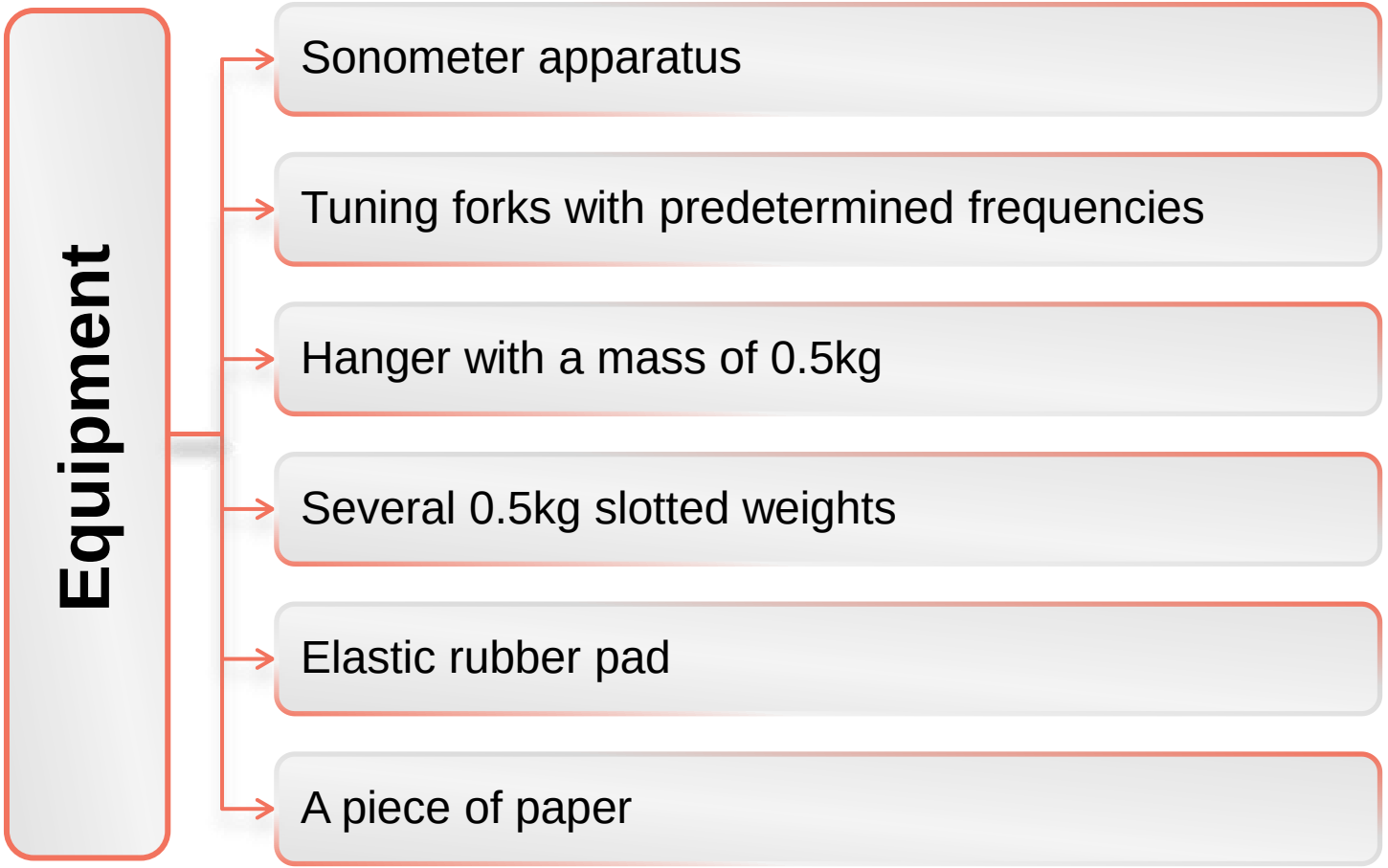
Table of Contents

Objective

Deduce the frequency of multiple tuning forks.

Plot a graph to illustrate the correlation between the frequency f and the wire length l.

Find the relationship between the frequency f and length of a specific wire l while maintaining constant tension.


Equipment
Sonometer apparatus
Tuning forks with predetermined frequencies
Hanger with a mass of 0.5kg
Several 0.5kg slotted weights
Elastic rubber pad
A piece of paper

Theoritical Analysis

$$f = \frac{1}{2\,l}\sqrt{\frac{T}{m}}$$

- f: vibration frequency (Hz)
- l: string length (m)
- T: applied tension (N)
- m: string mass per unit length (kg/m)

$$T = M * g$$

- M: total mass of weights & hanger (kg)
- g : acceleration of gravity (m/sec^2)

Experiment Procedure

Position the sonometer on a table.

Apply an appropriate load to the hanger to stretch the wire.

Attach an inverted V-shaped paper rider to the middle of the wire.

Vibrate the tuning fork and touch its lower end to the sonometer. The wire vibrates & the paper falls.

Observation: Constant tension on the wire, T= 2.5 kg

No.	Tuning Fork Frequency (Hz)	Resonant Length of the Wire			$1/l\ (cm^{-1})$
		Length decreasing $l_1(cm)$	Length increasing $l_2(cm)$	Mean $l = \frac{l_1 + l_2}{2}$	
1	60				
2	90				
3	120				

ELSEWEDY UNIVERSITY OF TECHNOLOGY
- POLYTECHNIC OF EGYPT -

Conclusion

Conclusion

The square of the length against tension forms a linear relationship, revealing that tension is directly proportional to the square of the resonant length.

ELSEWEDY UNIVERSITY OF TECHNOLOGY
- POLYTECHNIC OF EGYPT -

Thank You