Sonometer - II

AIM: To verify the relation between the tension of a wire and resonating length. Also to find the mass of the given body.

APPARATUS: Sonometer apparatus, tuning forks, slotted weight, rubber hammer ,body etc

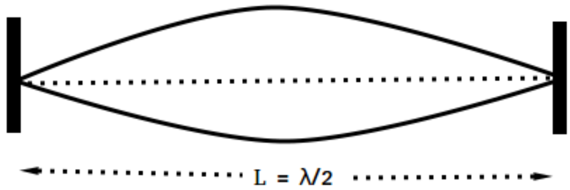
THEORY:

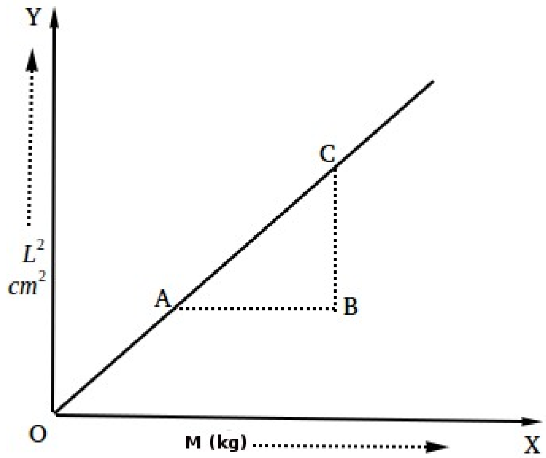
Every object has a natural frequency. If the rate of energy is applied to the object matches the natural frequency, the object vibrate with maximum amplitude, then the resonance occurs.

The frequency **F** = $\frac{v}{\lambda} = \frac{1}{2L}\sqrt{\frac{T}{\mu}}$

where **T = Mg** is the tension of the string.

And **μ** is the mass per unit length (linear density) of the wire and **m** is the mass which produce tension.





If frequency **F** remains constant, we find that $\frac{M}{L^2}$ is a constant

If **l** is the resonating length for an unknown mass (**m**),

we can write $\frac{m}{l^2} = \frac{M}{L^2}$

Therefore unknown mass **m**= $\frac{M}{L^2} l^2$

From the graph $\frac{M}{L^2} = \frac{AB}{BC}$

OBSERVATIONS:

Trial No	Mass suspended on the sonometer wire (M) kg	Resonating Length of Sonometer wire (L) cm			L^2 cm^2	$\frac{M}{L^2}$ Kg/cm^2
		1	2	Mean		
1 2 3						
Unknown Mass (**m**)				**l** =	Mean $\frac{M}{L^2}$ =	

CALCULATIONS:

From the graph, $\frac{M}{L^2} = \frac{AB}{BC} =$ kg/cm^2 Mean $\frac{M}{L^2} =$ kg/cm^2

Unknown Mass **m** = $\frac{M}{L^2}$ l^2 = = kg

RESULTS:

1. $\frac{M}{L^2}$ is found to be a constant. The relation between tension of the wire and resonating length is verified
2. Mass of the given mass = kg