Sonometer - I

AIM: To verify the relation between the frequency and resonating length. Also to find the frequency of the given tuning fork.

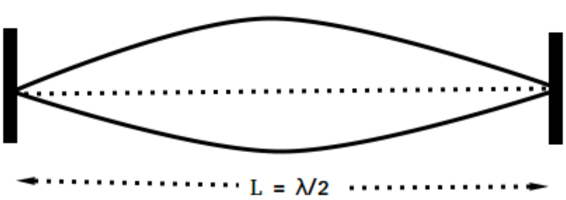
APPARATUS: Sonometer apparatus, tuning forks, slotted weight, rubber hammer etc

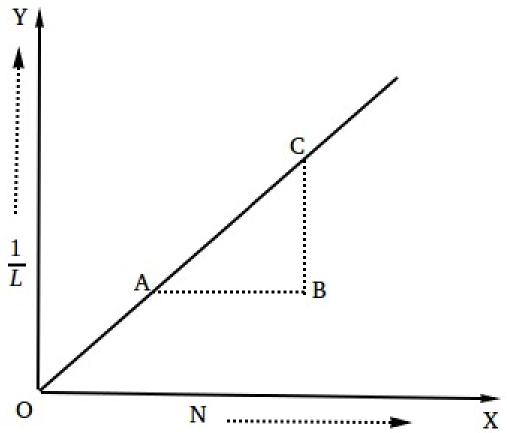
THEORY:

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, the resonance occurs.

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

where T is the tension of the string and μ is the mass per unit length (linear density) of the wire. Which are constants.





Then **(F x L) = a constant**

If **l** is the resonating length for an unknown frequency (**f**),

we can write **f x l = F x L**

Therefore unknown frequency **f** = $\frac{F\,x\,L}{l}$

From the graph **F x L** = $\frac{AB}{BC}$

OBSERVATIONS:

Trial No	Frequency of the tuning fork (**F**) Hz	Resonating Length of Sonometer wire (**L**) cm			$\frac{1}{L}$ cm^{-1}	**F x L** Hz cm
		1	2	Mean		
1						
2						
3						
Unknown Frequency (**f**)				**l** =	Mean (**F x L**) =	

CALCULATIONS:

From the graph, **F x L** = $\frac{AB}{BC}$ = = Hz cm

Mean (**F x L**) = = Hz cm

Unknown Frequency **f** = $\frac{Mean(F\,x\,L)}{l}$ = = Hz

RESULTS:

1. **F x L** is found to be a constant. The relation between frequency and resonating length is verified
2. Frequency of the given tuning fork = Hz