Aim   : **To find the speed of sound in air at room temperature using a resonance tube apparatus**

Apparatus : **Resonance tube apparatus , tuning forks , rubber pad ,water.**

Theory   : **If l_1 and l_2 be the length of the first and second resonance respectively with the tuning fork of frequency 'υ' , we can write**

$$l_1 + e = \lambda / 4$$
$$l_2 + e = 3\lambda / 4 \quad \text{(where e is the end correction)}$$

Subtracting we get ,
$$l_2 - l_1 = \lambda / 2$$
$$\lambda = 2(l_2 - l_1)$$

Speed , $v = \upsilon\lambda$
$$= 2\upsilon (l_2 - l_1)$$

Procedure :
1. **Set the resonance tube apparatus vertical**
2. **Fill the tube with water**
3. **Select a tuning fork and strike it gently on a rubber cork.**
4. **Hold the vibrating prong horizontally over the mouth of the tube**
5. **While the tuning fork is vibrating, lower the reservoir.**
6. **Adjust the reservoir in such a position that a loud sound is heard.**
7. **This is the first resonance.**
8. **Note the level reading for the first resonance.**
9. **Lower the reservoir in the same way to obtain the second resonance.**
10. **Note the level reading for the second resonance.**
11. **The difference between the first resonance and the second resonance is $\lambda / 2$**
12. **Calculate the speed of sound using the formula.**

Result :   Speed of sound at room temperature = _____ m/s

Precautions:
1. **The resonance tube should be kept vertical**
2. **There should be no air bubbles in the tube**
3. **The tuning fork should be struck gently**
4. **Keep the stem and the prongs of the tuning fork horizontally**

Sources of error :
1. **The tuning forks may not have the correct frequency marked on them**
2. **The resonance tube may not be vertical**
3. **The tuning fork may not be held horizontal**

Eby P Kurien
mail@selltheshell.com

Observation and calculation :

Frequency υ (Hz)	First resonance l_1 (cm)	Second resonance l_2 (cm)	$\lambda = 2(l_2 - l_1)$ (cm)	Speed $V = υ\lambda$ (m/s)
480				
512				

Speed $= 2\,υ(l_2 - l_1)$

Eby P Kurien
mail@selltheshell.com