Working formula:

- To find velocity of sound at laboratory temperature (v_t):

$$v_t = 2f(l_2 - l_1)$$

- To find velocity at NTP (v_o):

$$v_o = \sqrt{\frac{T_o}{T_t}} \times v_t$$

PROCEDURE:

1. Pour water into the water reservoir so that it fills the resonance pipe completely (be sure that the resonance apparatus is perfectly vertical).
2. Take a tuning fork of known frequency.
3. Strike the tuning fork against a rubber and hold the vibrating tuning fork horizontally above (slightly above) the resonance pipe.
4. Repeat the step 3 by adjusting (lowering) the water level till loud sound is heard. This is the condition of first resonance. Note the resonating length of air column (first resonating length l_1).
5. Now lower the water level and obtain the second resonance (keeping the vibrating tuning fork above the pipe). Note the resonating length of air column (second resonating length l_2).
6. Repeat the step 4 and 5 for three other tuning forks of different known frequencies.
7. Use appropriate formula to find the velocity of sound in air at laboratory temperature.
8. Use appropriate formula to find the velocity of sound at NTP.

OBSERVATION:

Laboratory temperature, $t = \ldots\ldots\ {}^oC$

$$\therefore\ T_t = (t + 273)\ K$$

$$= \ldots\ldots\ldots K$$

Least count of meter scale = $\ldots\ldots\ldots$

Observation table:

S.N.	Frequency of tuning fork f (Hz)	Resonating lengths		Velocity of sound at laboratory temperature v_t (m/s) $v_t = 2f(l_2 - l_1)$	Mean v_t (m/s)
		First resonating length l_1 (m)	Second resonating length l_2 (m)		
1.					
2.					
3.					
4.					

CALCULATIONS:

From above table, the velocity of sound at $\ldots\ldots\ {}^oC = \ldots\ldots\ldots m/s$

Now velocity of sound at NTP is:

$$v_o = \sqrt{\frac{T_o}{T_t}} \times v_t$$