

Second pendulum:

The simple pendulum whose time period is 2sec on the surface of earth is called as second pendulum.

- ✓ The effective length of simple pendulum is **99.4 cm** (for $g = 9.8 \text{ m/s}^2$).

Working formula:

- To find acceleration due to gravity (g):
 - ✓ The square of the time period of simple pendulum is:

$$T^2 = 4\pi^2 \frac{L}{g}$$

$$\therefore g = \frac{4\pi^2 L}{T^2}$$

- To find the effective length of seconds pendulum (L_s):
 - ✓ The effective length of simple pendulum is:

$$L = \frac{1}{4\pi^2} T^2 g$$

For second pendulum, time period, $T = 2 \text{ sec}$.

$$L_s = \frac{g}{\pi^2}$$

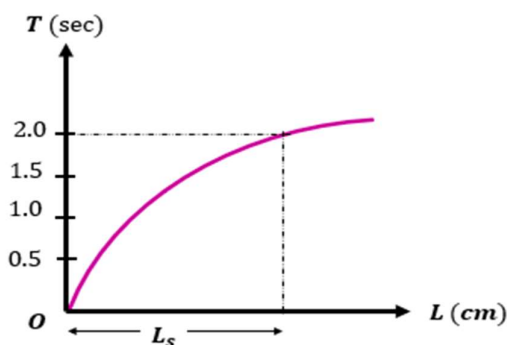


Fig: Graph of T Vs L .

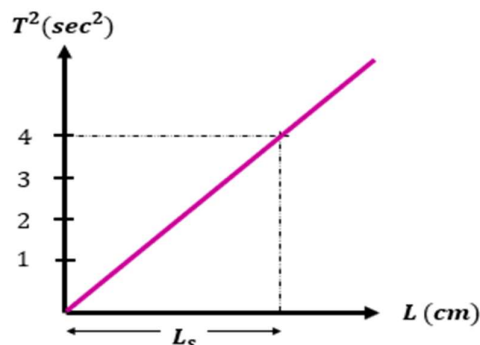


Fig: Graph of T^2 Vs L .

PROCEDURE:

To find acceleration due gravity:

1. Determine the vertical diameter of the bob by using vernier calliper and hence find its radius.
2. Attach the bob at one end of the string, the other end of the string to be fixed rigidly on the stand by the help of clamp.
3. Measure the length of the pendulum from point of suspension to lower edge of the bob and subtract vertical radius of the bob to get effective length of pendulum.

OR

Measure the length of the pendulum from point of suspension to upper edge of the bob and add vertical radius of the bob to get effective length of pendulum.

4. Displace the bob from its equilibrium position (mean position) through small vertical angle (about 4° to 6°) and release it. At the same time start the stop watch. Allow the pendulum to complete 20 oscillations and note the corresponding time.
5. Increase the effective length by 20cm and repeat step 4.
6. Repeat step 5 for different effective length increasing the length each time by 20cm .