LAB REPORT # 5

Title:-

Tension in the string and SHM.

Experiment:-

Find coefficient of constant K in hooke law using a mass spring system.

Apparatus:-

A spring, A magnetic pole, three weights, a calculator, a board and a thread.

Procedure:-

1. Place the spring pole on the magnetic board.
2. Check for zero errors by attaching the holders with the spring using a thread.
3. Note down the zero error if any.
4. Place the first mass m_1 on the holder and note the distance in meters.
5. Repeat the same step for other two masses m_1 and m_2.
6. Now calculate the force F_1 F_2 F_2 for the three masses.

Now plot a graph using the forces and distance in meters.
Calcute the value of coefficient k using formula.

$$K = \text{Slope} = \frac{\Delta y}{\Delta x}$$

$$k = \frac{F_2 - F_1}{x_2 - x}$$

Zero - Error :-

$$Z.E = 13\ mm$$

$$Z.E = 13 \times 10^{-3}\ m$$

$$Z.E = 0.013m$$

For Mass m_1 :-

$m_1 = 20g$

$m_1 = 0.02\ kg$

$x_1 = 19mm$

$x_1 = 19 \times 10^{-3} m$

$x_1 = 0.019m - 0.013m$

$x_1 = 0.006\ m$

$F_1 = m_1 g$

$F_1 = 0.02 \times 9.8$

$F_1 = 0.196\ N$

For Mass m_2 :-

$m_2 = 50\ g$

$m_2 = 0.05\ kg$

$x_2 = 28mm$

$x_2 = 28 \times 10^{-3} m$

$x_2 = 0.028\ m - 0.013m$

$x_2 = 0.015m$

$F_2 = m_2 g$

$= 0.05 \times 9.8$

$F_2 = 0.49\ N$

For Mass m_3 :-

$m_3 = 10\ g$

$m_3 = 0.01\ kg$

$x_3 = 17mm$

$x_3 = 17 \times 10^{-3} m$

$x_3 = 0.017\ m - 0.013m$

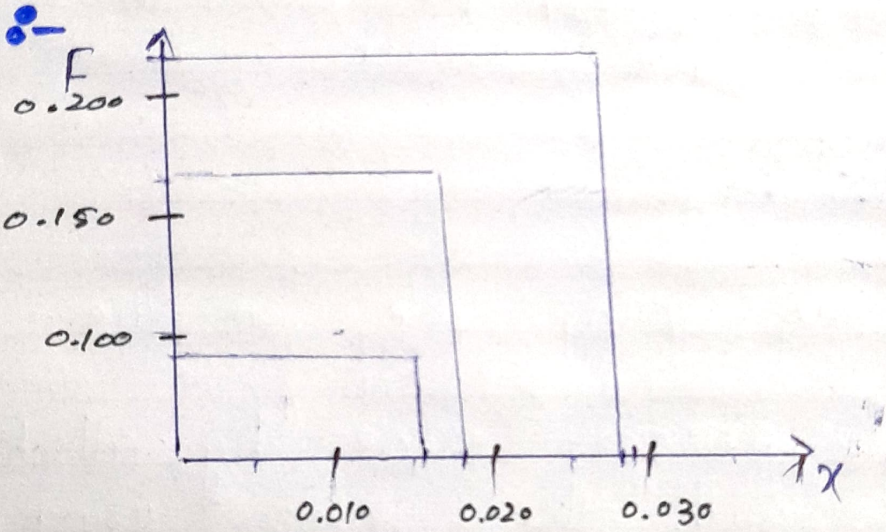
$x_3 = 0.004m$

$F_3 = m_3 g$

$F_3 = 0.01 \times 9.8$

$F_3 = 0.098N$

Graph:-



$$\text{Slope} = K = \frac{\Delta y}{\Delta x}$$

$$= \frac{F_2 - F_1}{x_2 - x}$$

$$= \frac{0.49 - 0.19}{0.015 - 0.006}$$

$$= \frac{0.3}{0.009}$$

$$\boxed{K = 33.3}$$