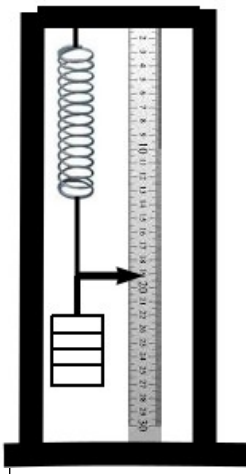
Helical Spring II

Aim:

1. To find the spring constant of the given Helical Spring using Oscillation method also to determine the mass of the given body.
2. To draw M-T^2 graph for a Helical Spring and to determine spring constant from the graph.

Apparatus:

Helical spring Apparatus, weight hanger with slotted weight, unknown mass etc.



Principle:

(For Aim 1)

Time period of the oscillation of a spring is given by $T = 2\pi\sqrt{\frac{M}{K}}$

Spring Constant $K = 4\pi^2(\frac{M}{T^2})$ where **M** is the mass suspended

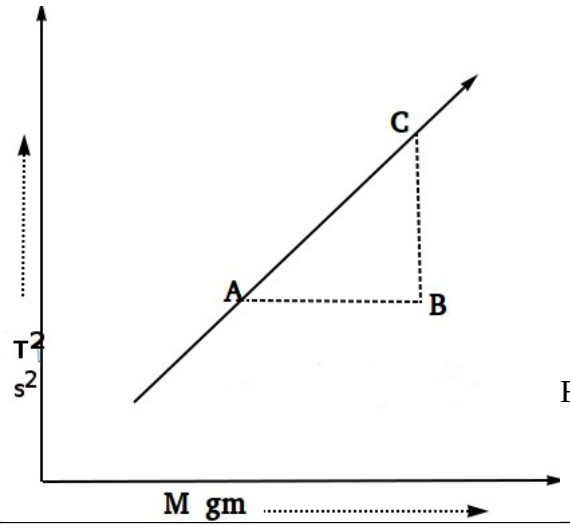
If ***t*** is the time period for the unknown mass **m,**

Unknown mass = $(\frac{M}{T^2})t^2$

(For Aim 2)

Time period of the oscillation of a spring is given by $T = 2\pi\sqrt{\frac{M}{K}}$

Spring Constant $K = 4\pi^2(\frac{M}{T^2})$ where **M** is the mass suspended, If ***t*** is the time period for the unknown mass **m,**



From graph $\frac{M}{T^2} = \frac{AB}{BC}$ g/s^2

Observations: *(For Aim 1)*

Sl No	Mass in the Helical Spring M gm	Time for 20 Oscillations (s)			Period T = $\frac{Time}{20}$	T^2 s^2	$\frac{M}{T^2}$ g/s^2
		1	2	Mean			
1							
2							
3							
4							
5							
6							
Unknown mass(m)					t = s	t^2= s^2	

Mean $\frac{M}{T^2}$ = g/s^2 = kg/s^2

Calculations: *(For Aim 1)*

Spring Constant $K = 4\pi^2\left(\frac{M}{T^2}\right)$ = N/m = N/m

Unknown Mass = $\left(\frac{M}{T^2}\right)t^2$ = kg = kg

Observations: *(For Aim 2)*

Sl No	Mass in the Helical Spring M gm	Time for 20 Oscillations (s)			Period T = $\frac{Time}{20}$	T^2 s^2
		1	2	Mean		
1						
2						
3						
4						
5						
6						

Calculations: *(For Aim 2)*

From graph $\frac{M}{T^2}$ = $\frac{AB}{BC}$ = g/s^2 = g/s^2

= kg/s^2

Spring Constant $K = 4\pi^2\left(\frac{M}{T^2}\right)$ = N/m = N/m

Results:

1. Mass of the given body = kg
2. Spring Constant of the Helical Spring = N/m
3. Spring Constant of the Helical Spring (from graph) = N/m