مدونة المناهج السعودية

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الموقع التعليمي لجميع المراحل الدراسية

في المملكة العربية السعودية

تجربة هوك

Hook's Law Experiment

1 Objective:

To investigate Hook's law (the relation force stretch for a spring) and determine the spring constants of elastic spring

2 Theoretical Background

Hooke's Law is stating that "the restoring force acting on an object is proportional to the negative of the displacement (deformation) of the object" as the following:

$F = -k \Delta x$

where

F is The restoring force (comeression).

k is the spring constant.

Δx is the displacement of thing.

Unit of F is (N) Newton

Unit of k is (N/m) Newton/meter

Unit of Δx is (m.) meter

3 Equipment

Spiral spring with attached by plasticine at is end, rigid stand, clamp, meter ruler, Scale pan, weights, and stop-watch

4 Method

1. The spring, with scale-pan attached, is firmly clamped and meter scale placed vertically so that the pointer moves lightly over it.

2. The scale readings are also taken when unloading the spring and the means extension thus obtained.

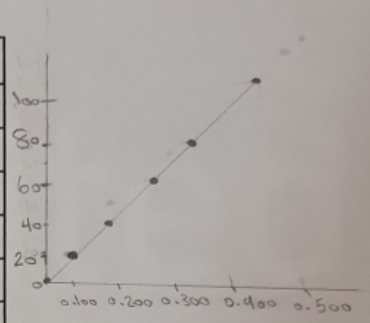
3. Weight is added to the scale-pan and the corresponding extensions of the spring are recorded. This is repeated with different weights.

4. A graph of extension against applied force is plotted from which the spring constant can calculated.

5 Results

At a spring constant of 200 N/m

F (N)	Δx (m)
0	0.000 m
20	0.100 m
40	0.200 m
60	0.300 m
80	0.400 m
100	0.500 m



6 Graph

Plot the relation between Δx (on x axis) and F(on y axis) in sperate squares paper sheet.

7 Calculations

$$\text{Slope} = \frac{(20-0)}{(0.100-0)} = 200\ \text{N/m}$$

slope = 200 N/m

k = $\frac{F}{x} = \frac{N}{m}$ = 200 N/m

The true value (which used in your experiment), k_T = **200 N/m**

Errors Analysis:

$$\%\ Error(k) = \frac{|k - k_T|}{k_T} \times 100\%$$

$$K = \frac{|200-200|}{200} \times 100\% \qquad K = 0\%$$

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