**Carleton University**

**Laboratory Report**

**Course #:** PHYS1003-A **Experiment #: 01**

**Experiment Title**

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**Lab Period:** A5

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**Station #:** 14

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Purpose:

This experiment was performed in order to calculate the spring constant (k) of a spring using two methods.

Theory:

From Hooke’s law, an ideal spring has a linear relationship between force applied and the change in length of the spring.

(F = kΔx)

By adding mass to the spring

|  |
| --- |
| (Δ𝑀)𝑔=𝑘𝑠Δ𝑥 |

Apparatus:

-Spring

-Vernier Force Sensor (0.05N)

-Vernier Motion Sensor 2 (0.002m)

-Vernier Lab Quest Mini

-Set of Masses (1g)

Observations:

See attached tables.

Calculations:

Spring constant: Static method

From Hooke’s law (F = kΔx), K = Δx/F

1/ = 1/k

Results:

Discussion:

Both methods are expected to give the same answer.

They should also be statistically consistent.

Which technique is more precise?

Which method would you trust more? Why?

Can you make any conclusions regarding the accuracy of your final average spring constant?

How would you increase the precision and accuracy of each technique?

If there were no force and motion sensors available, the static method could be performed by measuring the displacement with a ruler. The dynamic part could be done by recording the time elapsed per cycle.