

NEATH PORT TALBOT COLLEGE COLEG CASTELL NEDD PORT TALBOT

School of Maths & Science Science Practical

To investigate the behaviour of a spring under increasing and decreasing load.

◆ Aim

To investigate Hooke's law. To determine the value of the spring constant.

◆ Introduction

You will gradually load and unload a spring and note its corresponding extension. The average extension is calculated. By plotting a graph of load against extension it can be determined whether or not Hooke's law is obeyed. The spring constant can be determined from the graph.

◆ Safety

Control Measures



- The wearing of **safety goggles** at all times will be sufficient to take account of most hazards and significant risks.
- You are reminded of the need of good laboratory practice in order to maintain a safe working environment.



Hazards

General Hazard.

Make sure that the retort stand is securely fastened to the bench using a G – clamp.

◆ **Apparatus Required**

Spring, retort stand and clamp x 2, mass holder, assorted masses, metre rule, adhesive tape, pointer.

Procedure

1. Support the spring using a retort stand and clamp.
2. Using another retort stand and clamp, place a metre rule alongside the spring.
3. Attach a 10g mass holder to the spring. Treat this as zero mass.
4. Read the position of the bottom of the mass holder to the metre rule. This will be your “initial reading”. A pointer would help to read the measurements from the metre rule.
5. Gradually load the spring in steps and record the extension. The extension is the new reading minus the initial reading.
6. Continue to do this until you have about 10 readings.
7. Now gradually begin to unload the spring, again noting the load and the extension. Calculate the mean extension for each load.

8. Plot a graph of load against extension.
9. Does the spring obey Hooke’s law? Explain your answer.

10. Have you exceeded the elastic limit? Explain your answer.

11. What is the value of the spring constant?

12. Determine the percentage uncertainty in the spring constant.

13. Determine the percentage difference between the experimental value of the spring constant k , and the manufacturer's value of 29Nm^{-1} .

14. Using the graphs and your answers to the two sections above comment on the accuracy and reliability of the experiment.
