NEATH PORT TALBOT COLLEGE
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School of Maths & Science
Science Practical

Oscillating Cotton Reels

◆ Aim

You are to investigate the oscillations of a cotton reel on a curved track.

◆ Introduction

The curvature of the track is adjusted by moving a pair of wooden blocks symmetrically along the base board. The height of the edges of the track are altered by moving the blocks. The period of oscillation is determined for different values of height.

◆ Safety

Control Measures

- You are reminded of the need of good laboratory practice in order to maintain a safe working environment.

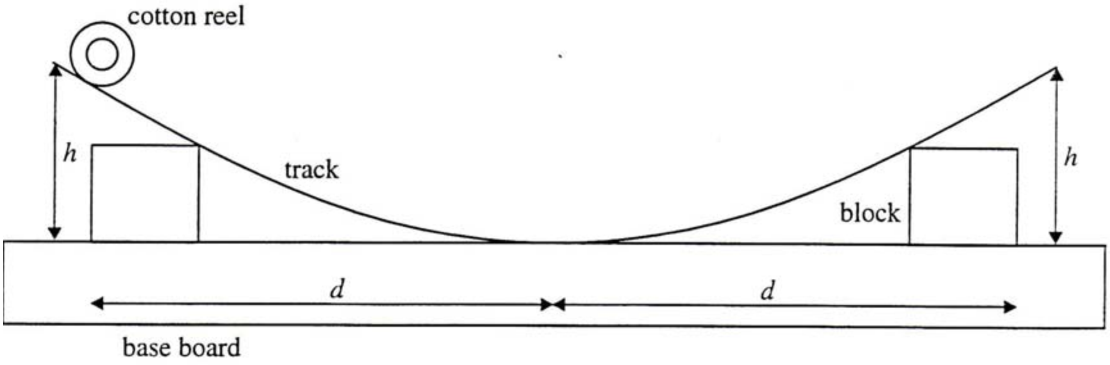
◆ Apparatus Required

Curved track, wooden blocks, stopwatch, cotton reel, metre rule.

◆ Procedure

Note: the edges of the blocks should be kept parallel to the ends of the base board. The base board is covered with graph paper to help you to position the blocks accurately.

1. Set up the apparatus as shown in the diagram below.



2. Adjust the blocks until the outer edges are a distance *d* = 140mm from the centre of the base board. Measure and record the height *h* (in mm) of the top surface of the track above the top surface of the base board at the ends of the track. Determine an average value for *h*.

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3. State how you ensured that your measurements were as accurate as possible.

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4. Take appropriate measurements to allow you to determine the period of oscillation *T* of the cotton reel when it is released from one end of the track.

5. Adjust the position of each block by changing *d* to allow you to determine a further **four** values of *h* and the corresponding values of *T*.

6. Record all your results in the table along with the corresponding values of $\log_{10}(h/\mathrm{m})$ and $\log_{10}(T/\mathrm{s})$.

h	**T_1 / s**	**T_2 /s**	**T_{av} / s**	**T_{av} /s (one oscillation)**	**$\log_{10}$ (T /s)**	**$\log_{10}$ (h/m)**

7. Plot a graph of $\log_{10}(T/\mathrm{s})$ (y – axis) against $\log_{10}(h/\mathrm{m})$ (x – axis).

8. Draw the best straight line through your plotted points.

9. A suggested relationship between T and h may be written in the form:

$$T = k\,h^{n}$$

Where k and n are constants for the particular track/ cotton reel system.

Use your straight line graph to determine a value for n.

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10. Comment on whether or not your results support the suggested relationship.

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