

# Experiment VW3 Barton's pendulums

## Aim

The aim of this experiment is to observe what happens when a system is made to vibrate at some frequency other than its own natural frequency of vibration.

## Apparatus

- paper cone pendulums of varying length
- pendulum with heavy bob
- string and suitable support

- 1 Set up the apparatus as shown in figure 1. The paper cones can be made from discs of paper or thin card of about 2 cm radius, cut along a radius and overlapped to form a cone. The system can be set up between two retort stands or in a frame as shown in figure 1.
- 2 Pull the driver pendulum to one side so that it vibrates in a direction perpendicular to the plane of the diagram.
- 3 Observe and describe what happens to the pendulums initially and after a period of time (e.g. 10-15 minutes).
- 4 What did you notice about the frequency and amplitude of the pendulums? Which pendulum had the largest amplitude? How did its effective length compare with the length of the driving pendulum?
- 5 Were all the pendulums in step, that is, did they all pass through the point of their maximum displacement (or the equilibrium position) at the same time? If not, what did you observe about the way in which the driver pendulum was vibrating compared to the pendulum with the largest amplitude? What was the approximate value of the phase difference and which was leading?
- 6 Investigate the effect of making the driven pendulums more massive, for example, by placing metal rings or washers on top of the paper cones, thus reducing the relative damping.

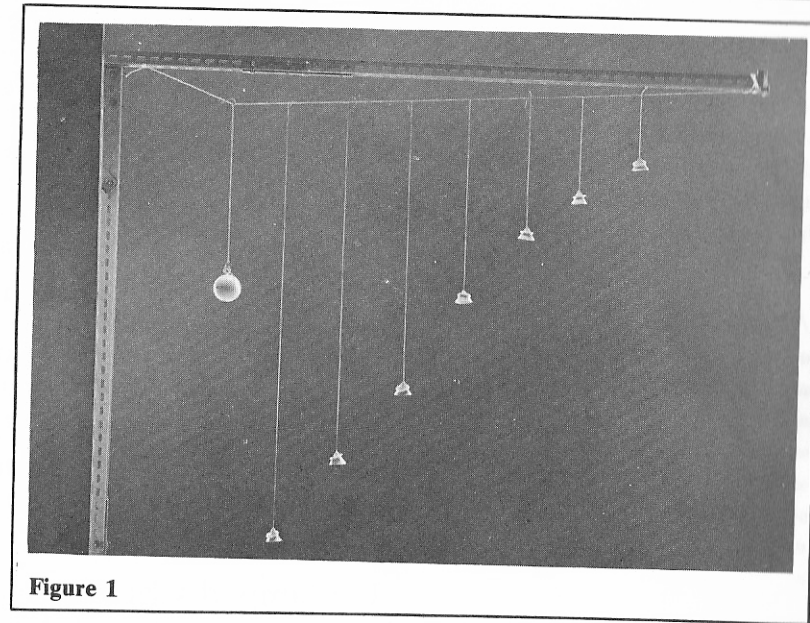


Figure 1