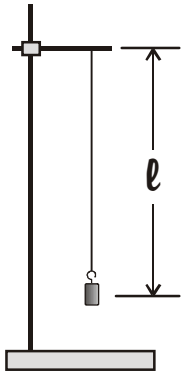
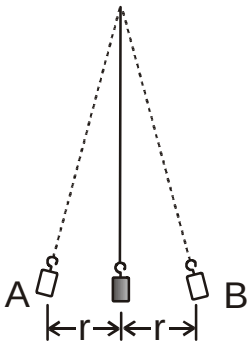
5M

Introduction to the study of Mechanical Oscillations

1. Make a Simple Pendulum as shown below.



mass of "bob" = m

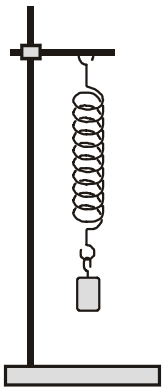


One oscillation is, for example, from A to B and back to A. In a) to d) below, r is the initial *amplitude* of the oscillation; this means the initial displacement of the "bob" from its equilibrium position.
Find the time period (the time for one oscillation) of the pendulum under the following conditions

a) ℓ = 30cm m = 20g r = (about) 2cm
b) ℓ = 30cm m = 20g r = (about) 4cm
c) ℓ = 30cm m = 50g (call this result T_1)
d) ℓ = 60cm (call this result T_2)

Calculate the ratio T_2/T_1.
How does the time period depend on i) ℓ ii) m iii) r ?

2. Measure the time period of a Mass/Spring Oscillator as shown below.



Try with masses of m and 2m and initial amplitudes of about 0·5 and 1cm.

Try first with a "weak" spring then with a stronger spring. How does the time period depend on i) m ii) r iii) the strength of the spring ?