3 A mass of 78 g is suspended from a fixed point by means of a spring, as illustrated in Fig. 3.1.
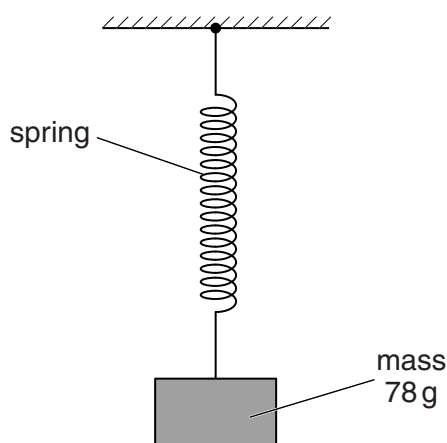
spring

mass 78 g

Fig. 3.1

The stationary mass is pulled vertically downwards through a distance of 2.1 cm and then released.
The mass is observed to perform simple harmonic motion with a period of 0.69 s.

(a) The mass is released at time $t = 0$.

For the oscillations of the mass,

(i) calculate the angular frequency ω,

ω = ... $rad\,s^{-1}$ [2]

(ii) determine numerical equations for the variation with time t of

1. the displacement x in cm,

....

.... [2]

2. the speed v in $m\,s^{-1}$.

....

.... [2]

(b) Calculate the total energy of oscillation of the mass.

energy = ...J [2]