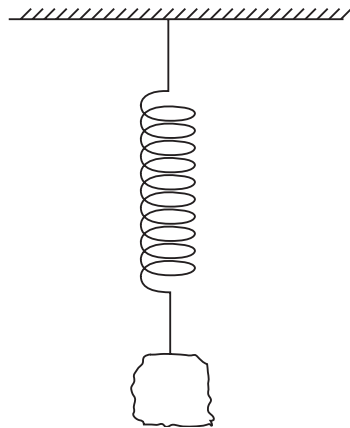
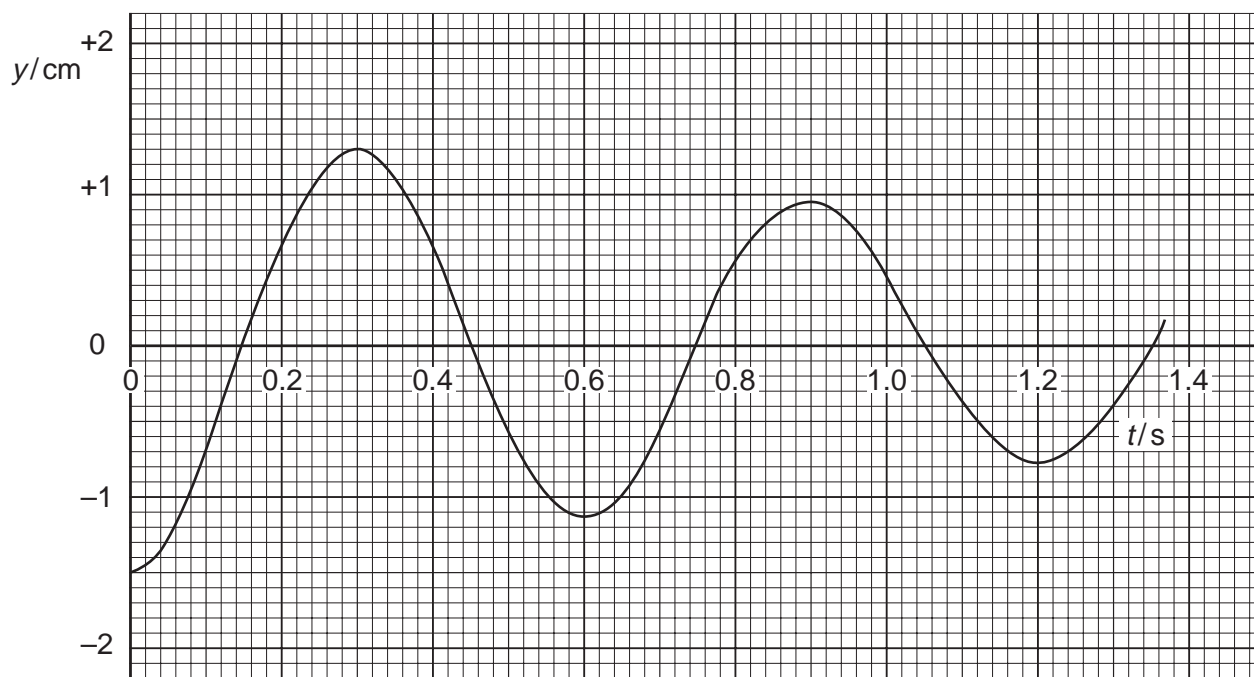


- 4 A vertical spring supports a mass, as shown in Fig. 4.1.



**Fig. 4.1**

The mass is displaced vertically then released. The variation with time  $t$  of the displacement  $y$  from its mean position is shown in Fig. 4.2.



**Fig. 4.2**

A student claims that the motion of the mass may be represented by the equation

$$y = y_0 \sin \omega t.$$

**(a)** Give two reasons why the use of this equation is inappropriate.

1. ....  
.....
2. ....  
..... [2]

**(b)** Determine the angular frequency  $\omega$  of the oscillations.

angular frequency = .....  $\text{rad s}^{-1}$  [2]

**(c)** The mass is a lump of plasticine. The plasticine is now flattened so that its surface area is increased. The mass of the lump remains constant and the large surface area is horizontal.

The plasticine is displaced downwards by 1.5 cm and then released.

On Fig. 4.2, sketch a graph to show the subsequent oscillations of the plasticine. [3]