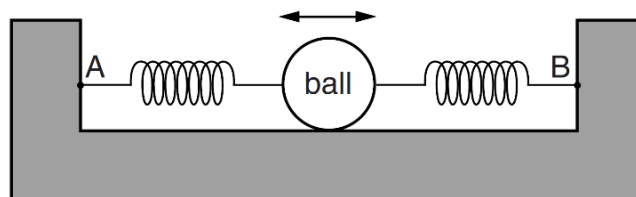


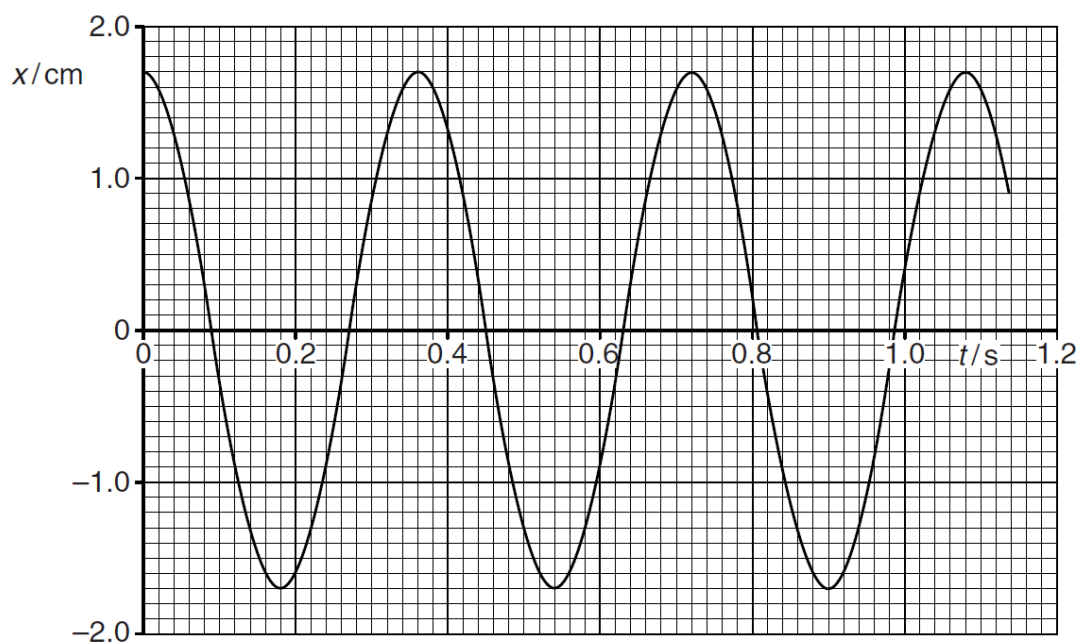
- 3 A ball is held between two fixed points A and B by means of two stretched springs, as shown in Fig. 3.1.



**Fig 3.1**

The ball is free to oscillate along the straight line AB. The springs remain stretched and the motion of the ball is simple harmonic.

The variation with time  $t$  of the displacement  $x$  of the ball from its equilibrium position is shown in Fig. 3.2.



**Fig 3.2**

**(a)** Calculate the maximum acceleration of the ball.

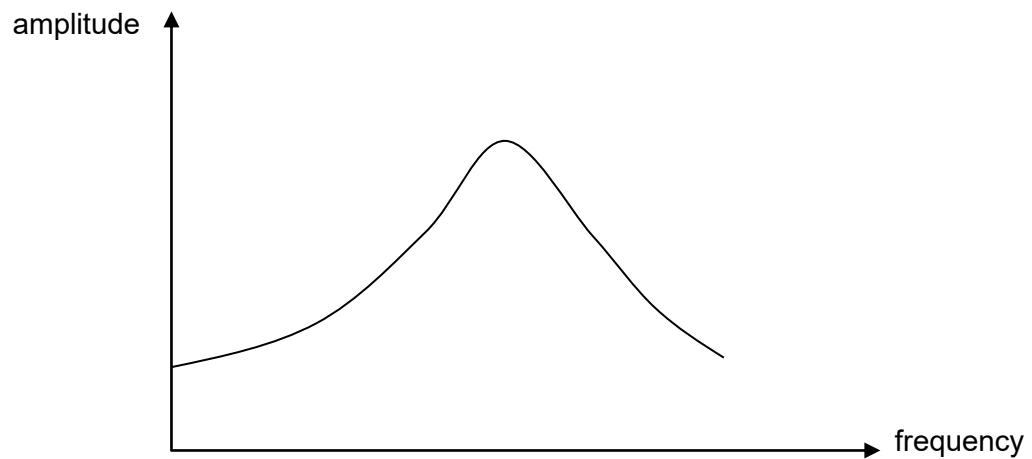
maximum acceleration = .....  $\text{m s}^{-2}$  [3]

**(b)** Calculate the displacement of the ball at which its kinetic energy is equal to half of the total energy of oscillation.

displacement = .....cm [3]

(c) The spring-mass system in Fig 3.1 is placed on a rough vibrating surface.

Fig. 3.3 shows how the amplitude of the ball varies with the frequency of the vibrating surface.



**Fig. 3.3**

The spring-mass system is then placed on a smoother vibrating surface.

On Fig. 3.3, sketch to show how the amplitude of the ball varies with the frequency of the vibrating surface.

[2]

[Total: 8]

