4 A small metal ball is suspended from a fixed point by means of a string, as shown in Fig. 4.1.

For Examiner's Use

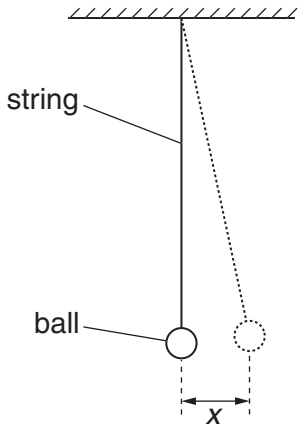

Fig. 4.1

The ball is pulled a small distance to one side and then released. The variation with time t of the horizontal displacement x of the ball is shown in Fig. 4.2.

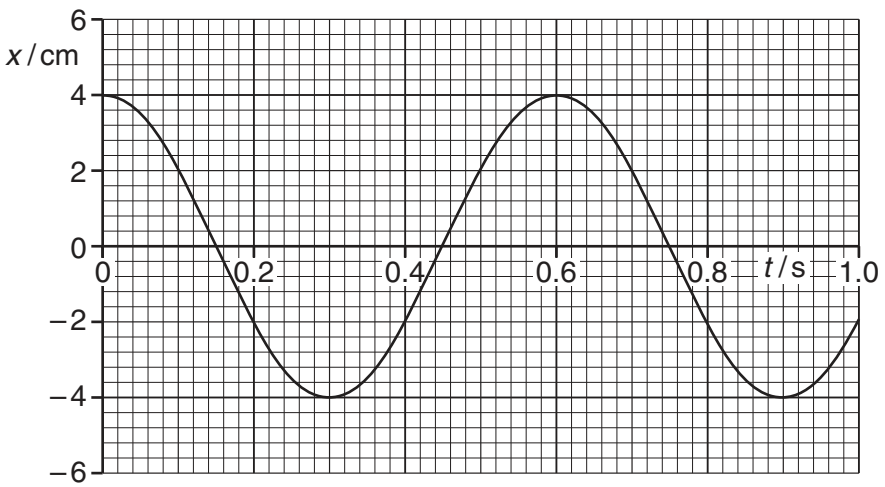

Fig. 4.2

The motion of the ball is simple harmonic.

(a) Use data from Fig. 4.2 to determine the horizontal acceleration of the ball for a displacement x of 2.0 cm.

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

(b) The maximum kinetic energy of the ball is E_K.
On the axes of Fig. 4.3, sketch a graph to show the variation with time t of the kinetic energy of the ball for the first 1.0 s of its motion.

For Examiner's Use

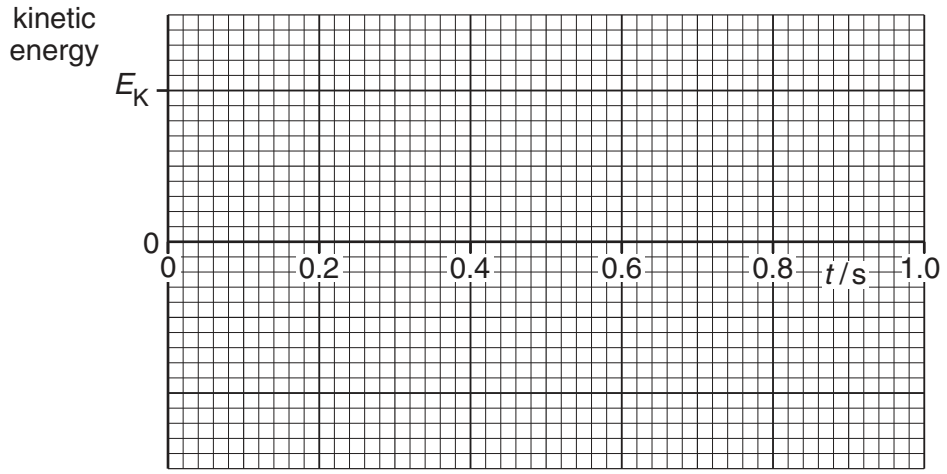

Fig. 4.3

[3]