

5 A steel ball on the end of a thin string oscillates with small oscillations, as shown in Fig. 5.1.

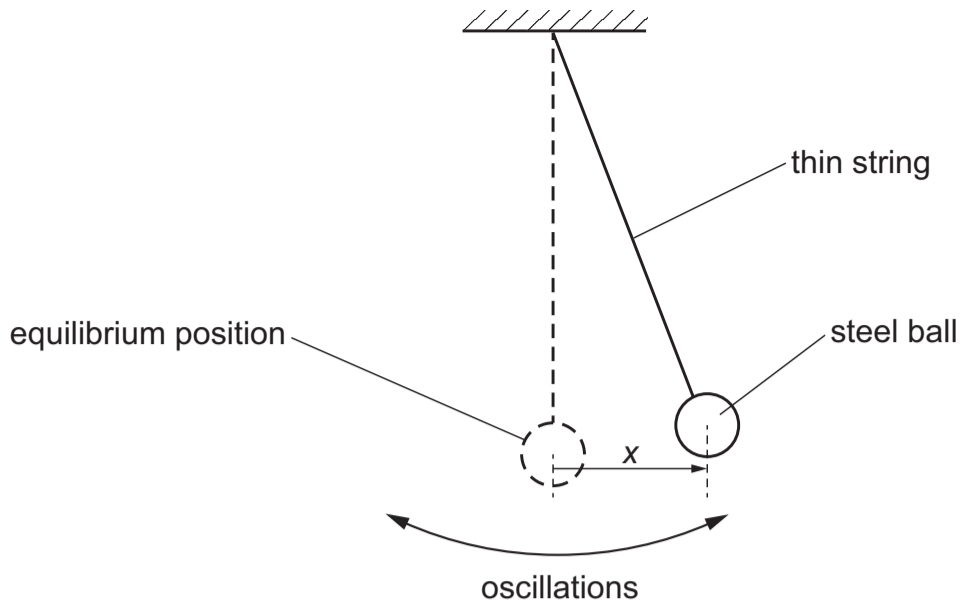


Fig. 5.1 (not to scale)

The displacement of the centre of the ball from its equilibrium position is x .

(a) Fig. 5.2 shows the variation with x of the acceleration a of the ball.

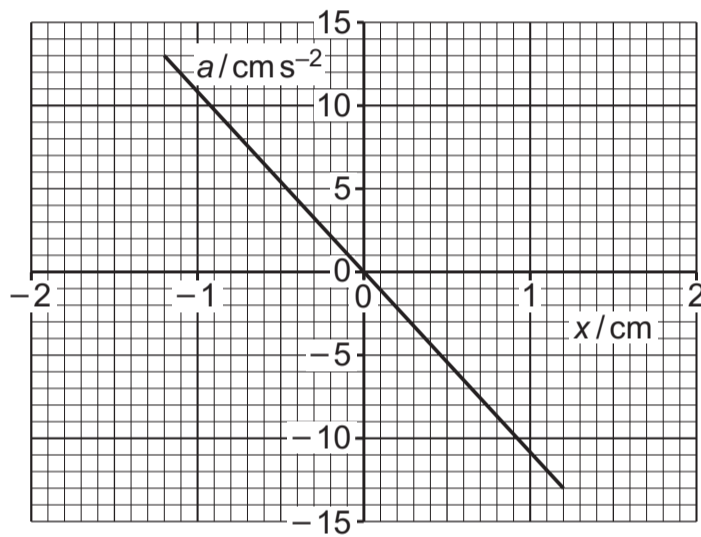


Fig. 5.2

(i) Explain how Fig. 5.2 shows that the oscillations of the ball are simple harmonic.

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 [2]

(ii) Determine the period T of the oscillations.

$T = \dots\dots\dots$ s [3]

(b) At time $t = 0$, when the displacement of the ball has its maximum value, the ball is immersed in a trough containing thick oil so that the ball is just below the surface of the oil. This results in the subsequent motion of the ball being heavily damped.

(i) State what is meant by damping.

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 [2]