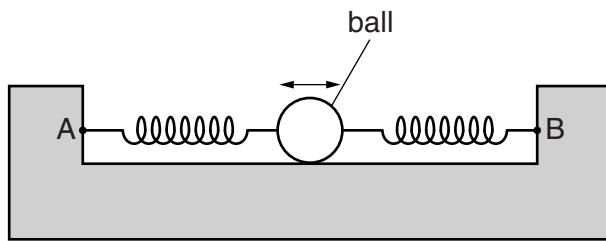


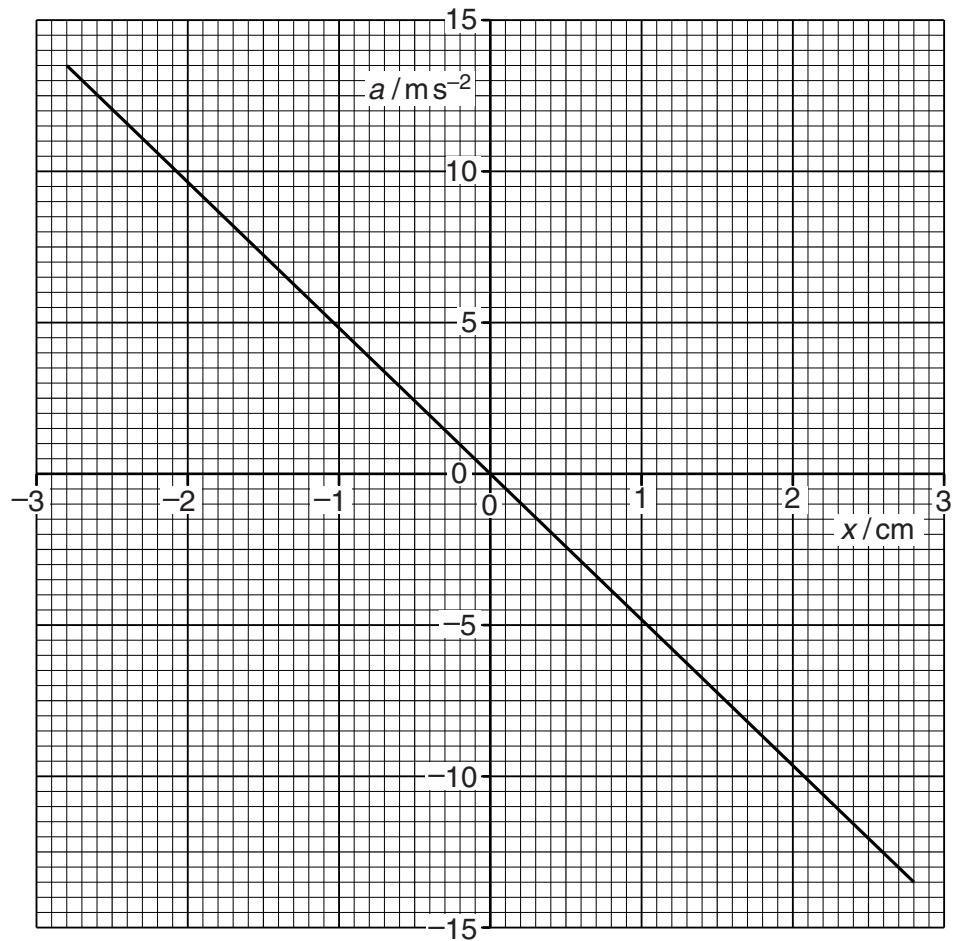
- 4 A ball is held between two fixed points A and B by means of two stretched springs, as shown in Fig. 4.1.



**Fig. 4.1**

The ball is free to oscillate horizontally along the line AB. During the oscillations, the springs remain stretched and do not exceed their limits of proportionality.

The variation of the acceleration  $a$  of the ball with its displacement  $x$  from its equilibrium position is shown in Fig. 4.2.



**Fig. 4.2**

- (a) State and explain the features of Fig. 4.2 that indicate that the motion of the ball is simple harmonic.

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.....  
.....

[4]

- (b) Use Fig. 4.2 to determine, for the oscillations of the ball,

- (i) the amplitude,

amplitude = ..... cm [1]

- (ii) the frequency.

frequency = ..... Hz [3]

- (c) The arrangement in Fig. 4.1 is now rotated through  $90^\circ$  so that the line AB is vertical. The ball now oscillates in a vertical plane.

Suggest one reason why the oscillations may no longer be simple harmonic.

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[1]