2 A flat horizontal plate is made to vibrate in a vertical plane as shown in Fig. 2.1.

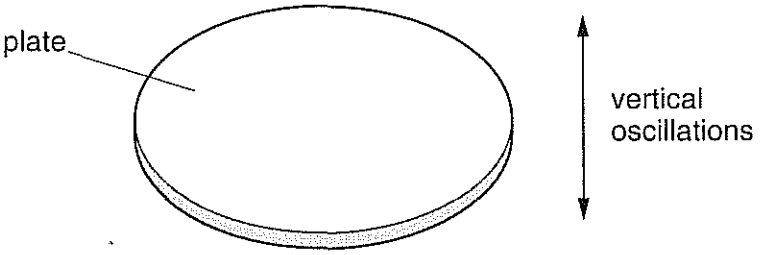

Fig. 2.1

The variation with displacement x of the acceleration a of the plate is shown in Fig. 2.2.

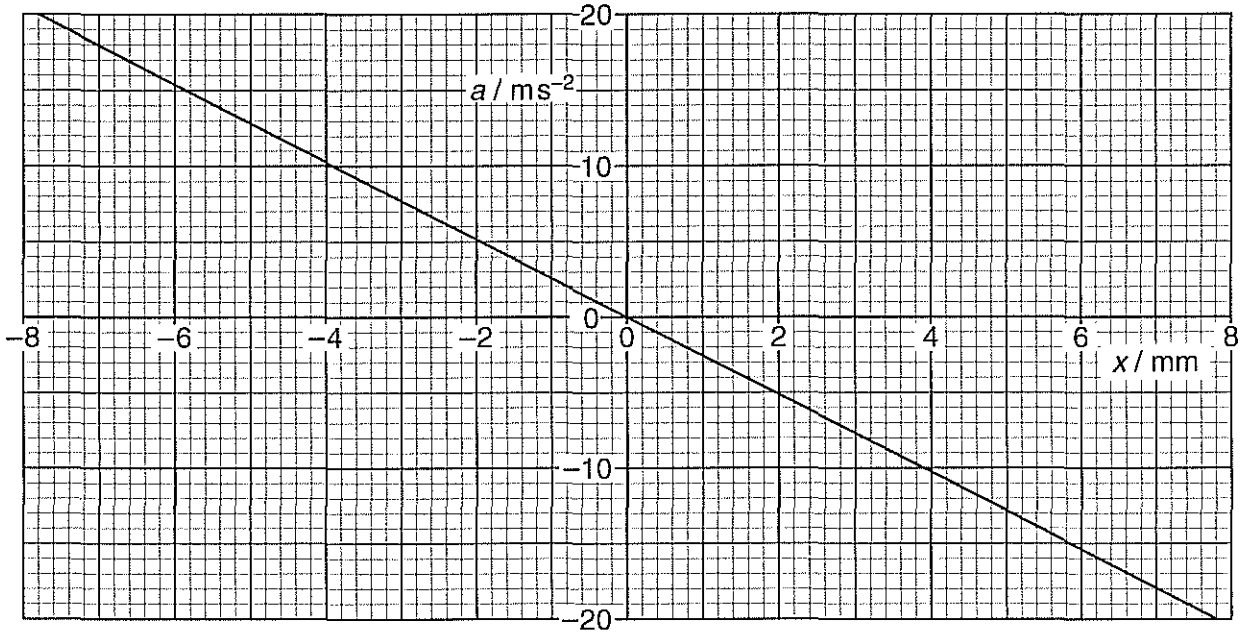

Fig. 2.2

(a) Explain how it may be deduced that the oscillations of the plate are simple harmonic.

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.....[3]

(b) Some sand is sprinkled on to the plate. The amplitude of vibration of the plate is gradually increased from zero. At one particular amplitude, the sand is seen to lose contact with the plate.

(i) State the acceleration of the plate at which the sand first loses contact with the plate. Explain your reasoning.

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.....[3]

(ii) Use Fig. 2.2 to determine the amplitude of vibration of the plate at which the sand first loses contact.

amplitude = ... mm [1]