5 A flat horizontal plate is made to oscillate in simple harmonic motion in a vertical direction as shown in Fig. 5.1. The plate starts its oscillation at its equilibrium position and moves downwards initially.
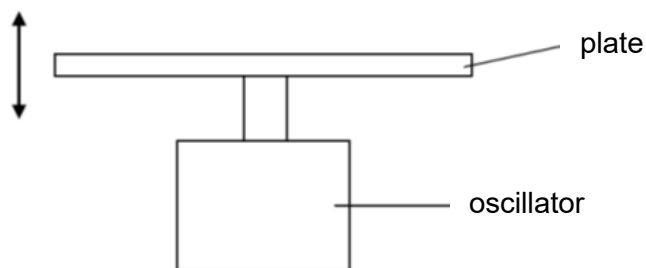

Fig. 5.1

The variation of velocity v with displacement x for this oscillation is shown in Fig. 5.2. Point S marks the start of the oscillation.
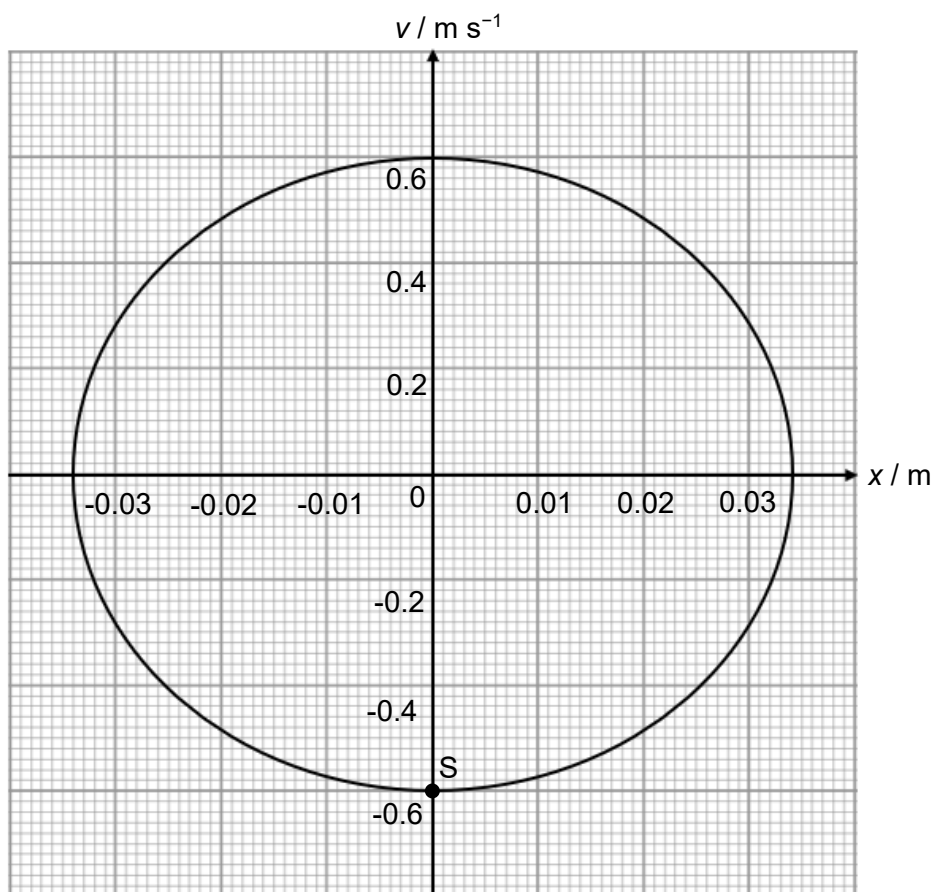

Fig. 5.2

(a) Define *simple harmonic motion*.

....

.... [2]

(b) Deduce, from Fig. 5.2,

    (i) the amplitude of the oscillation,

                               amplitude = ………………………………… m [1]

    (ii) the angular frequency ω of the oscillation.

                               ω = ………………………………… rad s^{-1} [2]

(c) A mass of 0.100 kg is placed on the plate before the plate starts to oscillate.

    (i) Determine the displacement of the plate when the mass just loses contact with the plate.

                               displacement = ………………………………… m [3]

    (ii) Mark on Fig. 5.2, the point **C** when the mass just loses contact.   [1]

[Total: 9]