

- 2 A long strip of springy steel is clamped at one end so that the strip is vertical. A mass of 65 g is attached to the free end of the strip, as shown in Fig. 2.1.

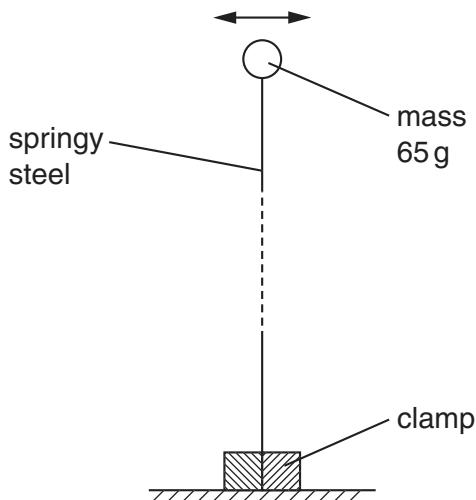


Fig. 2.1

The mass is pulled to one side and then released. The variation with time  $t$  of the horizontal displacement of the mass is shown in Fig. 2.2.

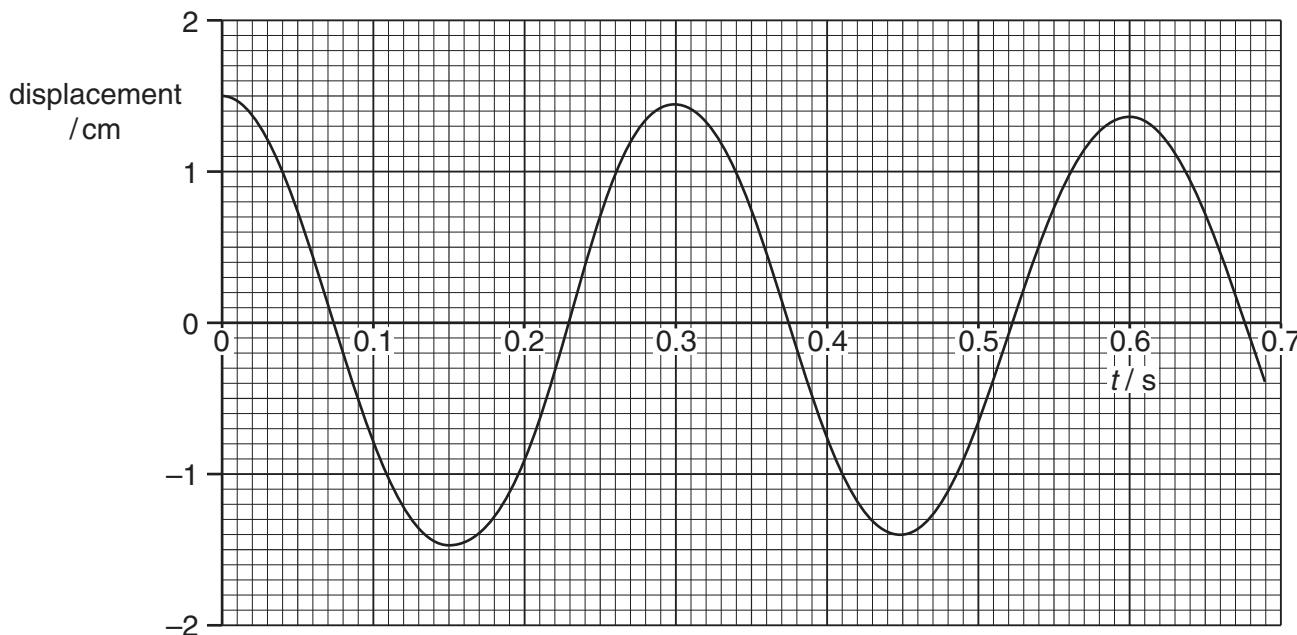


Fig. 2.2

The mass undergoes damped simple harmonic motion.

- (a) (i) Explain what is meant by *damping*.

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- (ii) Suggest, with a reason, whether the damping is light, critical or heavy.

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[2]

- (b) (i) Use Fig. 2.2 to determine the frequency of vibration of the mass.

frequency = ..... Hz [1]

- (ii) Hence show that the initial energy stored in the steel strip before the mass is released is approximately 3.2 mJ.

[2]

- (c) After eight complete oscillations of the mass, the amplitude of vibration is reduced from 1.5 cm to 1.1 cm. State and explain whether, after a further eight complete oscillations, the amplitude will be 0.7 cm.

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[2]