

- 3 A student sets up the apparatus illustrated in Fig. 3.1 in order to investigate the oscillations of a metal cube suspended on a spring.

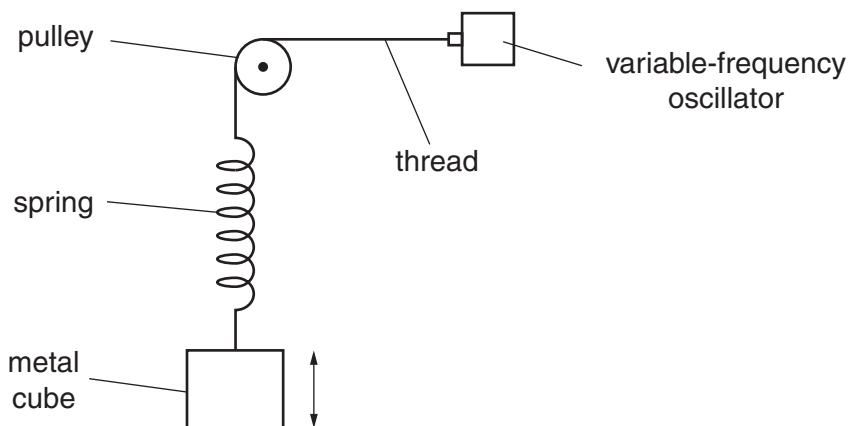


Fig. 3.1

The amplitude of the vibrations produced by the oscillator is constant.
The variation with frequency of the amplitude of the oscillations of the metal cube is shown in Fig. 3.2.

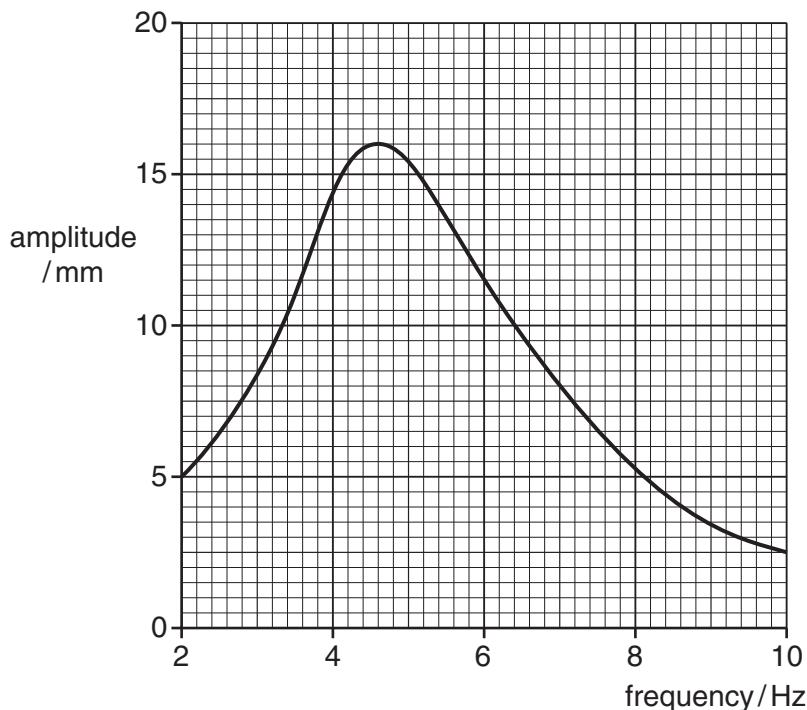


Fig. 3.2

- (a) (i) State the phenomenon illustrated in Fig. 3.2.

[1]

- (ii) For the maximum amplitude of vibration, state the magnitudes of the amplitude and the frequency.

amplitude = mm

frequency = Hz
[1]

- (b) The oscillations of the metal cube of mass 150g may be assumed to be simple harmonic.

Use your answers in (a)(ii) to determine, for the metal cube,

- (i) its maximum acceleration,

$$\text{acceleration} = \dots \text{ms}^{-2} [3]$$

- (ii) the maximum resultant force on the cube.

$$\text{force} = \dots \text{N} [2]$$

- (c) Some very light feathers are attached to the top surface of the cube so that the feathers extend outwards, beyond the vertical sides of the cube.

The investigation is now repeated.

On Fig. 3.2, draw a line to show the new variation with frequency of the amplitude of vibration for frequencies between 2Hz and 10Hz. [2]