

- 3 A light helical spring is suspended vertically from a fixed point as shown in Fig. 3.1.

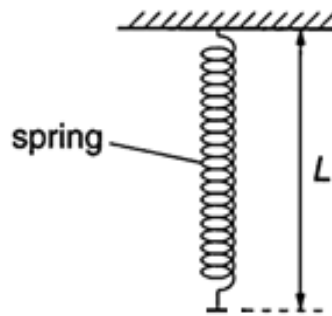


Fig. 3.1

A mass of weight 5.0 N is suspended from the spring of unstretched length 4.0 cm and then released from rest. The mass oscillates vertically.

The variation with resultant force F on the mass when L is between 4.0 cm and 8.0 cm is shown in Fig. 3.2 below.

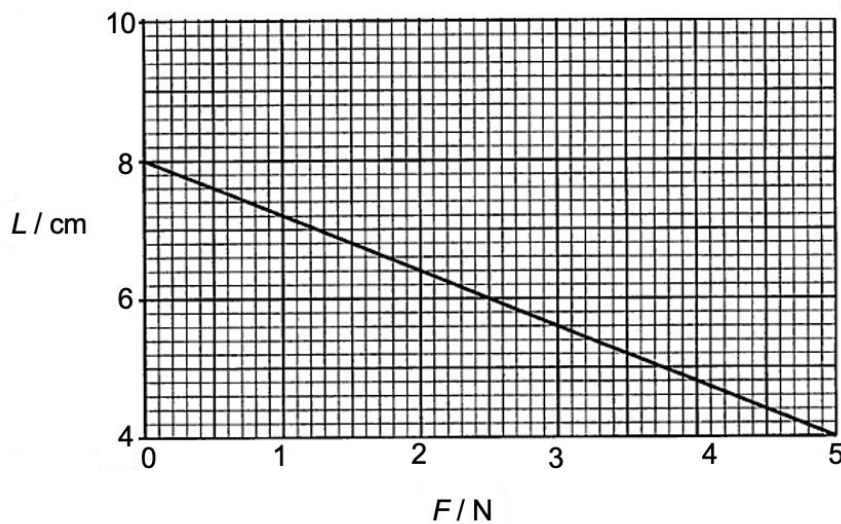


Fig. 3.2

- (a) Explain why, as shown in Fig. 3.2, the resultant force on the mass increases as the length of the spring decreases from $L = 8.0$ cm to $L = 4.0$ cm.

[2]

- (b) Calculate the force constant of the spring.

force constant = N m^{-1} [3]

- (c) On Fig. 3.2, shade clearly the area of the graph that represents net work done on the mass when the mass has travelled from $L = 8.0 \text{ cm}$ to $L = 6.0 \text{ cm}$. [1]
- (d) Describe the energy changes in the spring-mass system when the mass moves from $L = 8.0 \text{ cm}$ to $L = 6.0 \text{ cm}$.

[2]

[Total: 8]