Chapter 10
Short answer question

This question is about the motion of a mass suspended from a spring.

The spring shown in Figures 2 and 3 obeys the Hooke law. The mass is displaced from its equilibrium position, as shown in Figure 3 and then released, causing it to oscillate about its equilibrium position with a periodic time *T*.

At time $t = 0$ the mass is at its highest position and has a positive displacement *A* from its rest position.

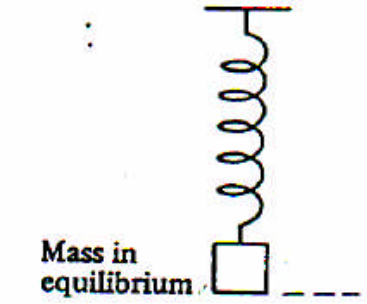


Fig. 1

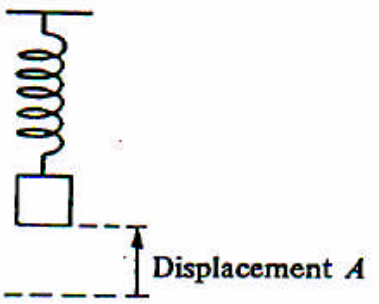


Fig. 2

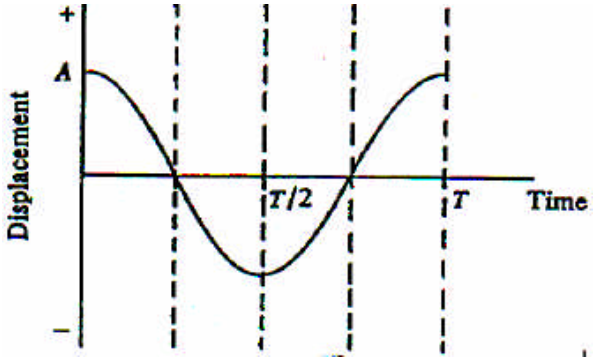
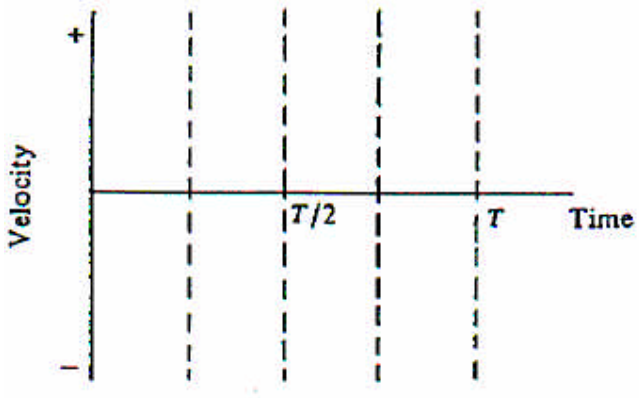


Fig. 3

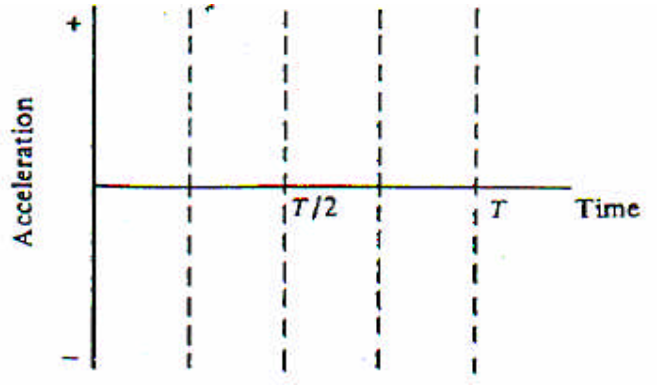
The graph above (Fig. 3) shows the displacement of mass against time.

On the axes below sketch graphs of:

(i) velocity of the mass against time



(ii) acceleration of the mass against time



The mass is now made to oscillate with twice the previous amplitude. Assuming that the spring still obeys the Hooke law, state with reason(s), the effect on:

(i) the maximum energy stored in the spring

(ii) the maximum kinetic energy of the mass

(iii) the average speed of the mass during one oscillation