

15712

GROUP - 1

4.16 The frame, anvil, and the base of the forging hammer, shown in Fig. 4.37(a), have a total mass of m . The support elastic pad has a stiffness of k . If the force applied by the hammer is given by Fig. 4.37(b), find the response of the anvil over $[0, 5t_0[$. Assume zero initial conditions.

Use Duhamel's integral.

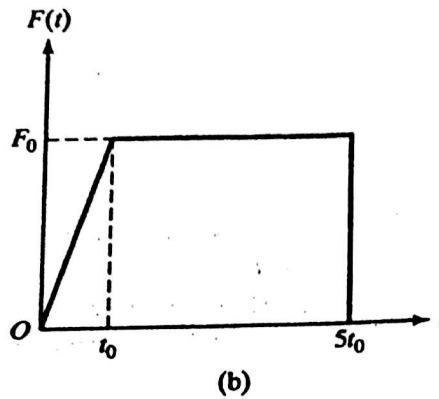
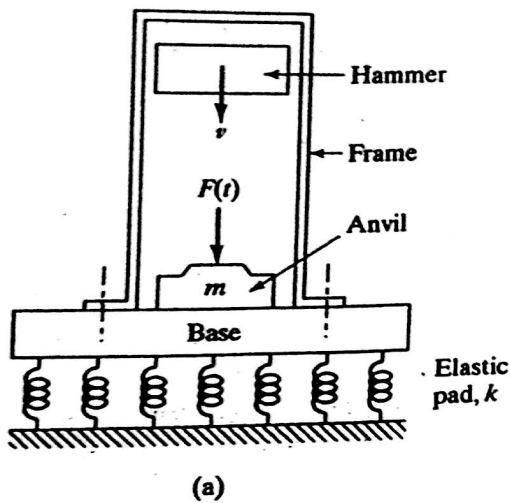


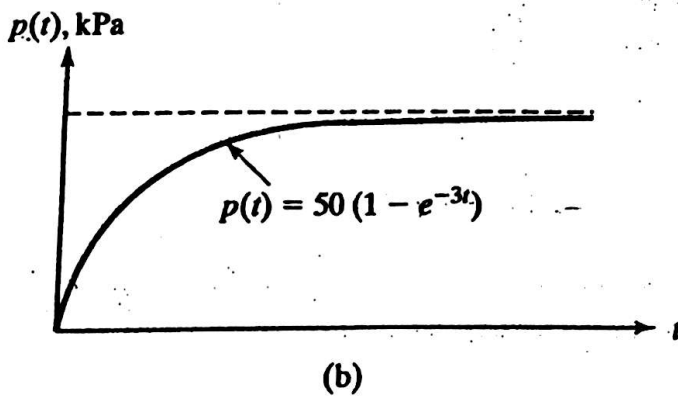
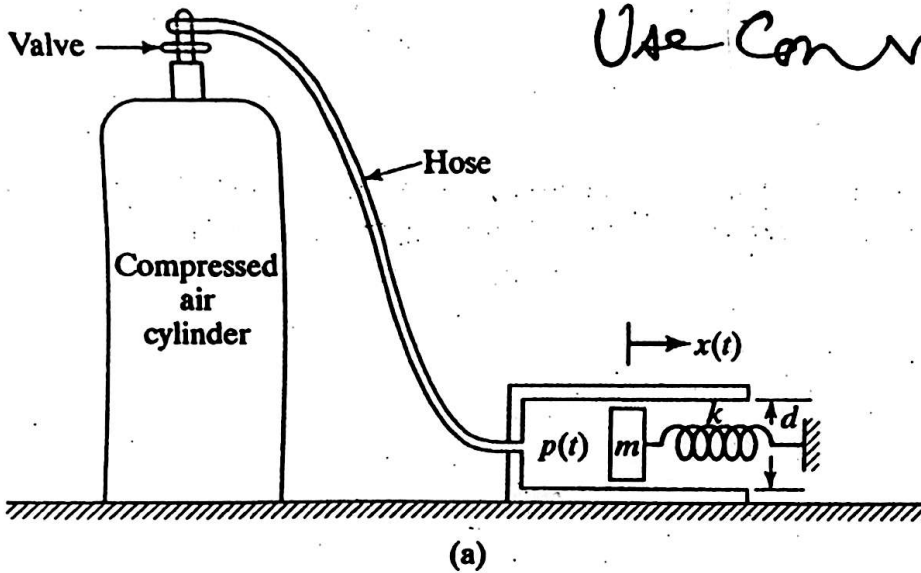
FIGURE 4.37

GROUP - 2

4.18 A compressed air cylinder is connected to the spring-mass system shown in Fig. 4.38(a). Due to a small leak in the valve, the pressure on the piston, $p(t)$, builds up as indicated in Fig. 4.38(b). Find the response of the piston for the following data: $m = 10$ kg, $k = 1000$ N/m, and $d = 0.1$ m.

Assume zero initial conditions.

Use convolution integral.



Group - 3

4.24 A vehicle traveling at a constant speed v in the horizontal direction encounters a triangular road bump, as shown in Fig. 4.41. Treating the vehicle as an undamped spring-mass system, determine the response of the vehicle in the vertical direction.

Use Convolution
integral.

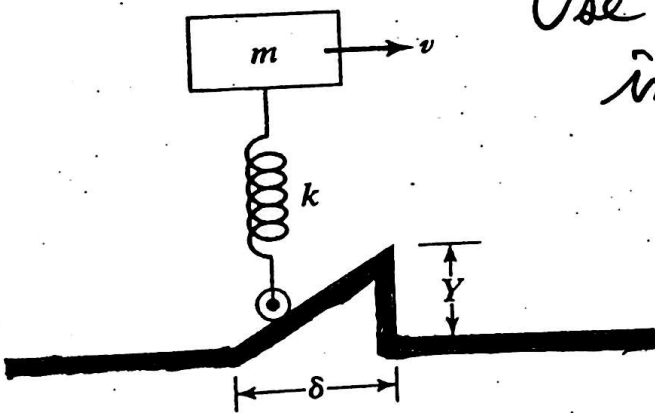


FIGURE 4.41

Group - 4

4.22 Use the Dahamel integral method to derive expressions for the response of an undamped system subjected to the forcing functions shown in Figs. 4.39

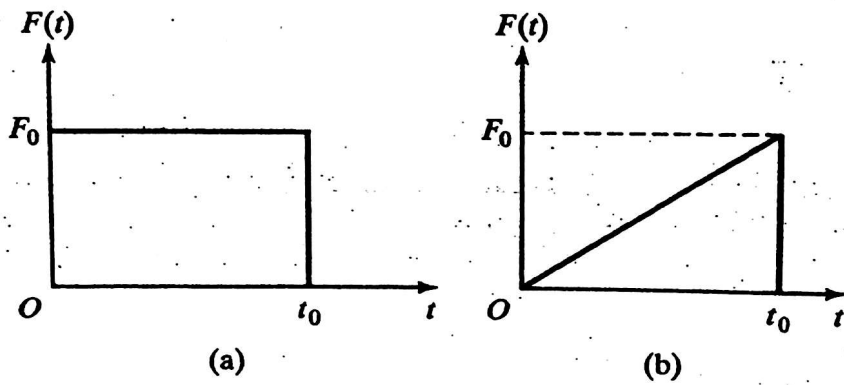


FIGURE 4.39