

1. Determine the magnitude and direction θ of the minimum force P needed to pull the 50-kg roller over the smooth step as shown in Figure 1. (20%)
2. Determine the force in each member of the truss loaded as shown in Figure 2. (20%)
3. Draw the shear and moment diagrams for the beam shown in Figure 3. (20%)
4. A uniform box of mass 20 kg is sitting on an incline surface as shown in Figure 4. If the coefficient of static friction between the box and the surface is 0.3, determine the maximum force P for which the box will be in equilibrium. Is impending motion by tipping? Or by slipping? (20%)
5. A 15° wedge is forced under a 30-kg pipe as shown in Figure 5. The coefficient of static friction at all surfaces is 0.3. (a) Show that slipping will occur between the pipe and the vertical wall. (b) Determine the force P required to move the wedge. (20%)

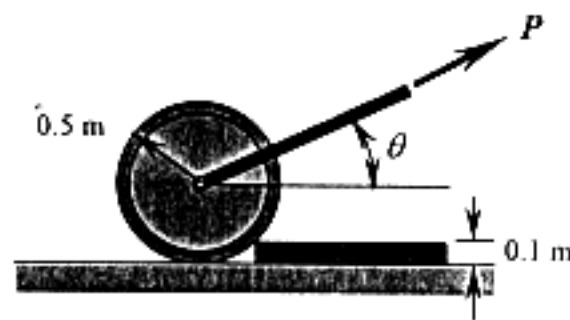


Fig. 1.

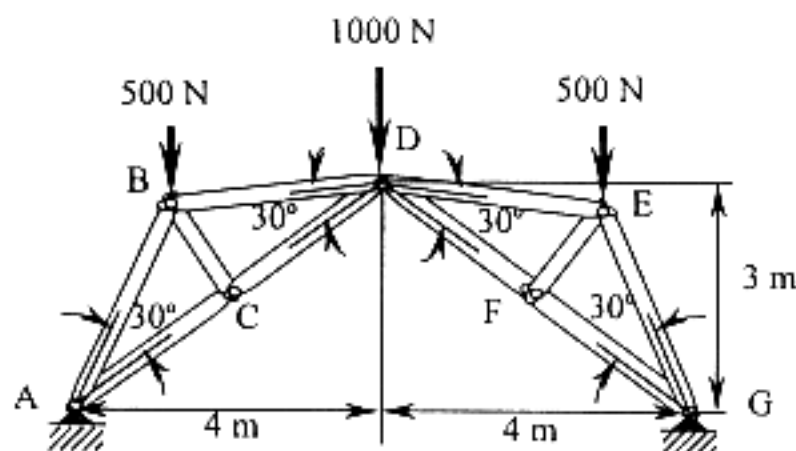


Fig. 2.

(背面仍有題目,請繼續作答)

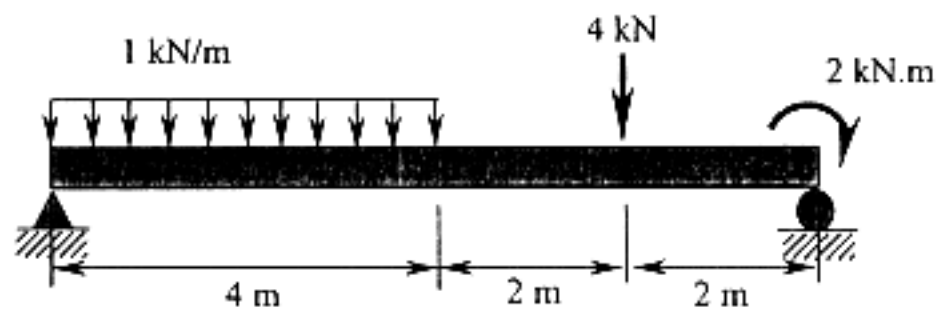


Fig. 3.

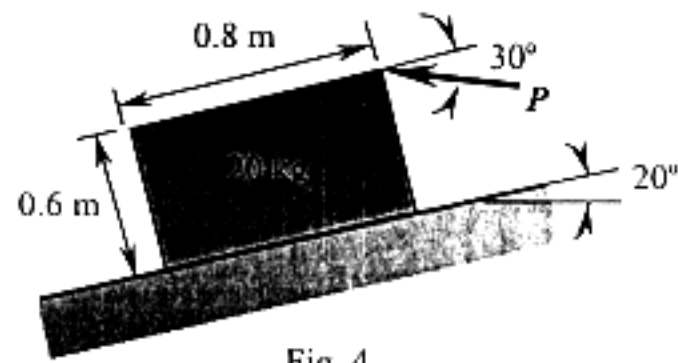


Fig. 4.

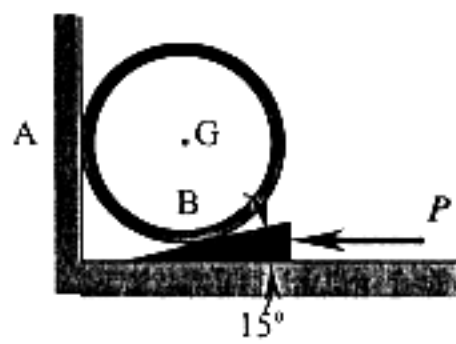


Fig. 5.