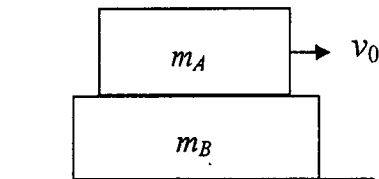
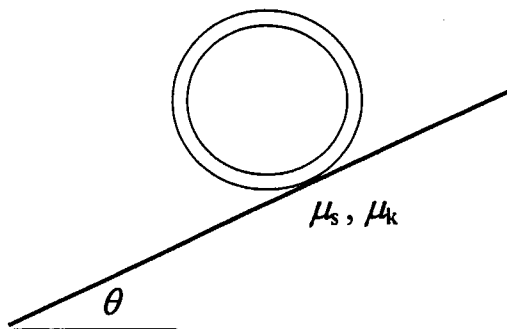


1. (15%) Block  $A$  can slide relative to block  $B$ , which can slide on a perfectly smooth horizontal plane as shown. If block  $A$  is given an initial velocity  $v_0$ , find the final velocities of the two blocks and the distance that  $A$  slides relative to  $B$ . Assume that the coefficient of sliding friction between  $A$  and  $B$  is  $\mu$  and  $A$  always stays on  $B$ .

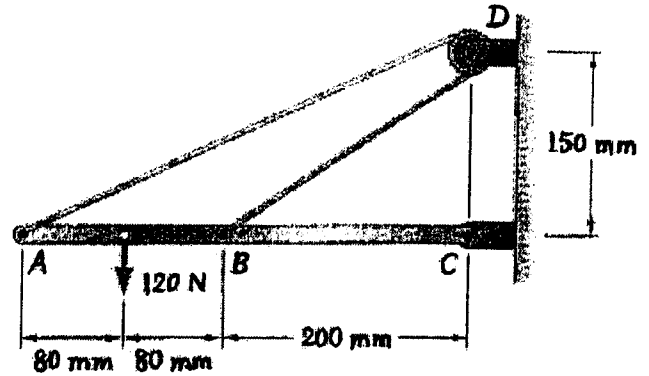


2. (15%) Masses  $m_2$  and  $m_3$  are initially at rest and connected by an unstressed spring of length  $l_0$ . Then mass  $m_1$ , traveling with velocity  $v_0$  in a direction perpendicular to the spring, hits  $m_2$  inelastically and sticks to it. In the ensuing motion, the spring stretches to a maximum length  $3l_0$ . Solve for  $v_0$  assuming that the masses are equal and can be considered as particles.
3. (20%) A ring of mass  $m$  and radius  $r$  is released from rest on a slope with an inclined angle  $\theta$  from the horizontal surface. If the coefficients of static and kinetic friction are  $\mu_s$  and  $\mu_k$  respectively, determine the angular acceleration  $\alpha$  of the ring.

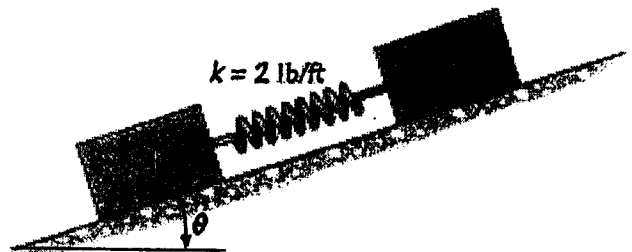


(背面仍有題目,請繼續作答)

4. (15%) Neglecting friction and the radius of the pulley, determine (a) the tension in cable  $ADB$ , (b) the reaction at  $C$ .



5. (20%) Two blocks  $A$  and  $B$  have a weight of 10 lb and 6 lb, respectively. They are resting on the incline for which the coefficients of static friction are  $\mu_A = 0.15$  and  $\mu_B = 0.25$ . The spring has a stiffness of  $k = 2$  lb/ft. Determine the incline angle  $\theta$  for which both blocks begin to slide.



6. (15%) Determine the force in each member of the truss and state if the members are in tension or compression.

