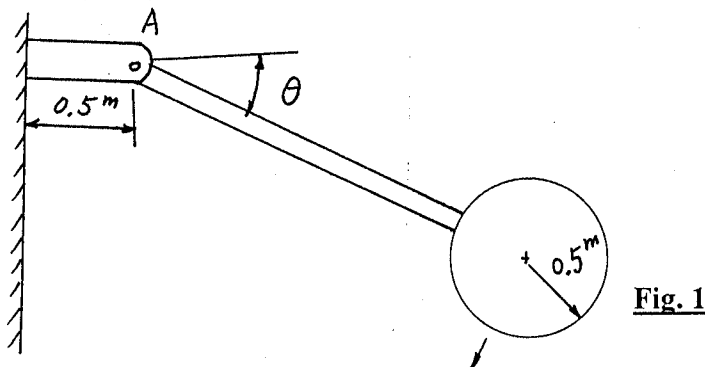1. The pendulum consists of a 20-kg solid ball and 10-kg rod.   If it is released from rest when $\theta_1 = 0^\circ$, determine the rebounding angle θ_2 that the pendulum can reach after the ball strikes the wall. Take e = 0.8.   (25%)


Fig. 1

2. The car-like assembly consists of a rod and two 20-kg disks.   Its original speed is 10 m/s and both the disks roll without slipping. Assuming the front disk does not slip or rebound when it rolls over the obstruction at A and the mass of the rod is negligible, determine the kinetic energy loss of the car-like assembly at the instant when its front disk just collides the obstruction. (25%)

Fig. 2
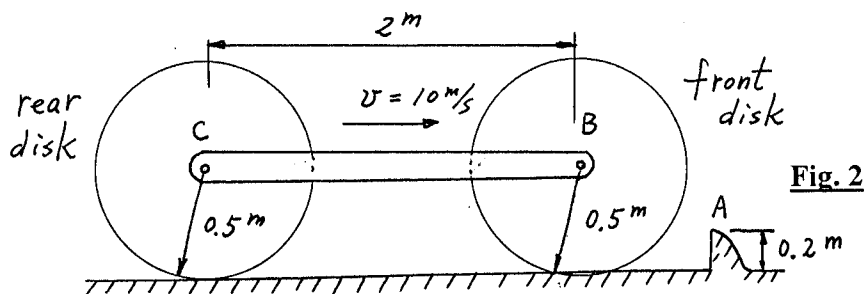
3. Block A has a weight of W lb and is placed on the smooth triangular block B
(25%) having a weight of 6W lb. If the system is released from rest, determine the distance B moves from point O when A reaches the bottom. Neglect the size of block A.
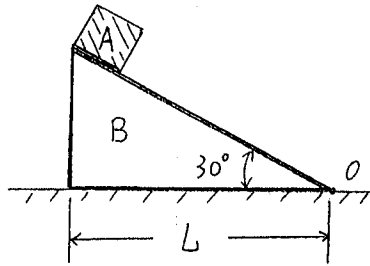
4. The assembly consists of two 10-lb disks which are pin-connected to the two 8-lb
(25%) bars. If the bars are released from rest when $\theta = 60°$, determine the angular velocities of the disks at the instant $\theta = 30°$. Assume the disks roll without slipping.