1. As shown in Fig. 1, the scissors lift consists of two sets of cross members and two hydraulic cylinders, *DE*, symmetrically located on each side of the platform. The platform has a uniform mass of 60 kg, with a center of gravity at G_1. The load of 85 kg, with center of gravity at G_2, is centrally located between each side of the platform. Determine the force in each of the hydraulic cylinders for equilibrium. Rollers are located at *B* and *D*. (The solutions must include free-body diagrams.) (25%)

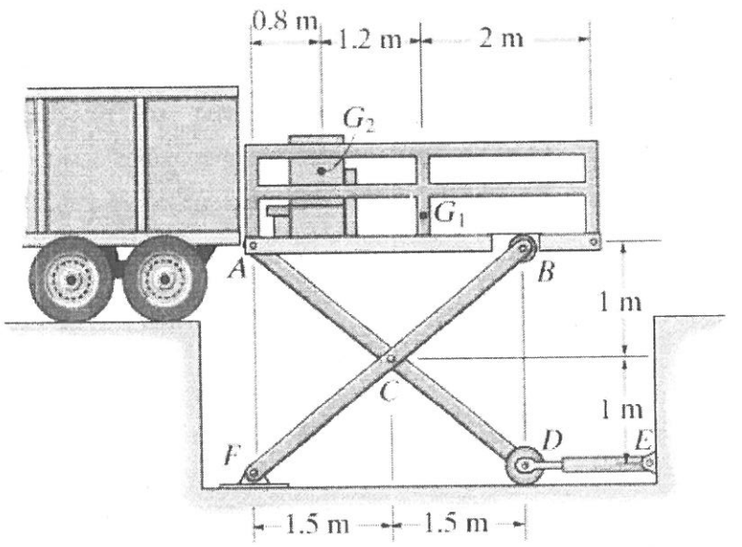

Fig. 1

2. As shown in Fig. 2, the rod has a weight *W* and rests against the floor and wall for which the coefficients of static friction are μ_A and μ_B, respectively. Determine the smallest value of θ for which the rod will not move. (The solutions must include free-body diagrams.) (25%)

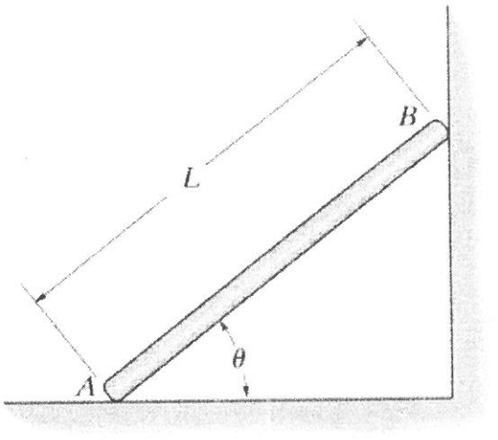

Fig. 2

3. The chain has a mass of $7\ kg/m$. If the coefficient of kinetic friction between the chain and plane is $\mu_k = 0.2$, determine the velocity at which the end A will pass point B when the chain is released from rest. (20%)
Note: the gravitational acceleration is $g = 10\ m/s^2$.

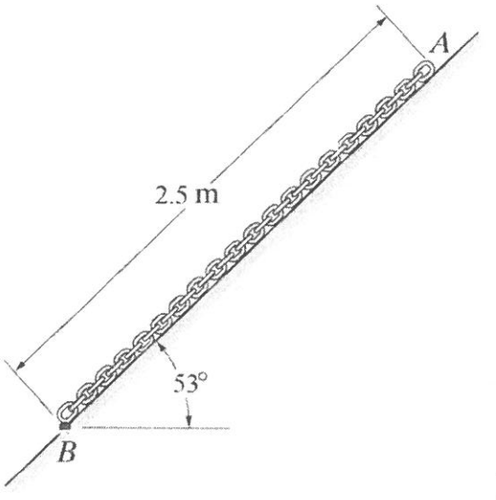

Fig. 3

4. The spool has a weight of $45\ lb$ and a radius of gyration $k_o = 0.6\ ft$. Neglect the mass of the pulley and cord.
(a) If a force of $60\ lb$ is applied to the cord at A, determine the angular velocity ω and linear velocity v of the spool and the tensile force T in each cord at $t = 2\ s$ starting from rest.
(b) If a block of $60\ lb$ is suspended from the cord at A, rather than applying the $60\ lb$ force, please solve the problem again.
Note: **Conservation of Momentum** should be used and the gravitational acceleration is $g = 10\ m/s^2$.
(30%)

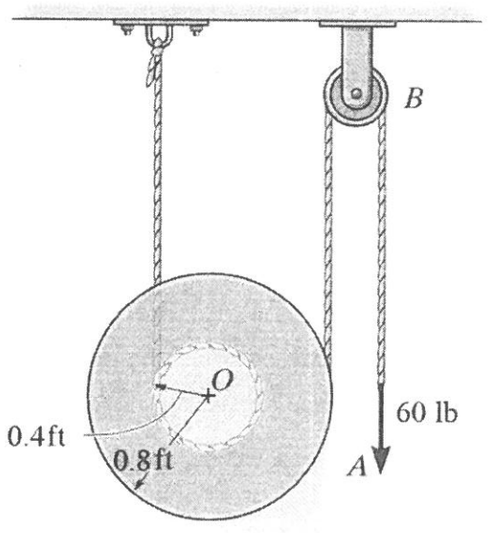

Fig. 4