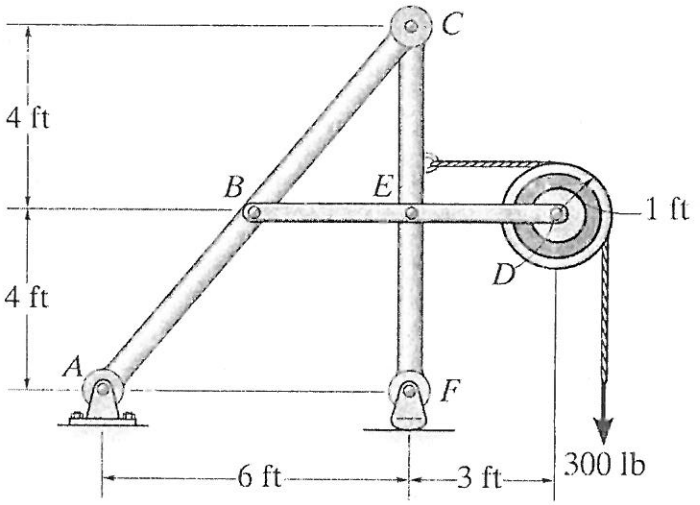
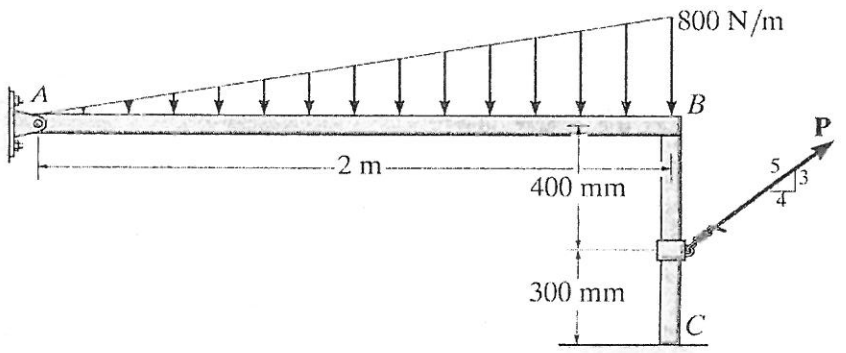
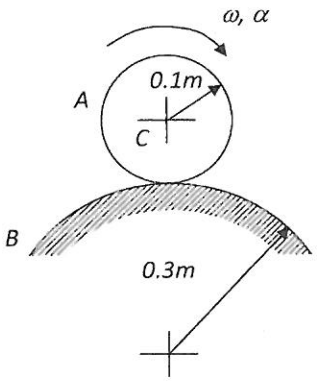
1. Determine the horizontal and vertical components of force at *C* which member *ABC* exerts on member *CEF*. Neglect the weight of the frame and roller. **(25%)**



2. The beam *AB* has a negligible mass and thickness and is subjected to a triangular distributed loading as shown in the figure. It is supported at one end by a pin and at the other end by a post having a mass of 50 kg and negligible thickness. Determine the two coefficients of static friction at *B* and at *C* so that when the magnitude of the applied force is increased to *P*=150 N, the post slips at both *B* and *C* simultaneously. **(25%)**



3. The cylinder A of radius 0.1 m rolls without slipping on the fixed cylinder B of radius 0.3 m with an angular velocity ω=10 rad/sec (c.w.) and an angular acceleration α=100 rad/sec^2 (c.w.). Determine the linear velocity and acceleration of the center C at the instant shown. **(25%)**



4. The 10-kg homogeneous disk is attached to a uniform 5-kg rod AB. If the assembly is released from rest when θ=60°, determine the angular velocity of the rod when θ=0°. Assume that the disk rolls without slipping. Neglect friction along the guide and the mass of the collar at B. **(25%)**