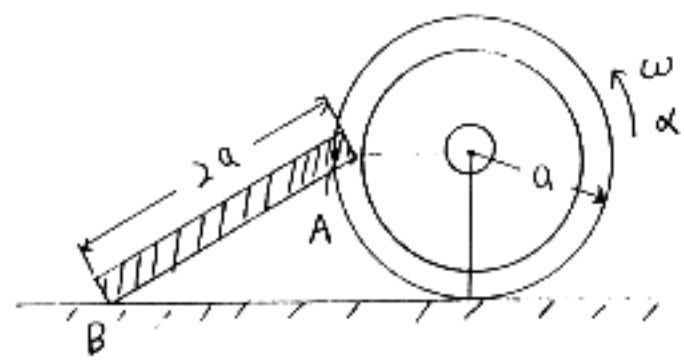1. The wheel rolls without slipping such that at the instant shown it has an angular velocity ω and angular acceleration α. Determine the angular velocity and angular acceleration of the rod at the instant.

25%.

2. The rod of length L and mass m is released from the rest when $\alpha = 0°$. If the coefficient of static friction at A is μ, determine as a function of α the forces which are exerted on the ledge at A as it falls downward.
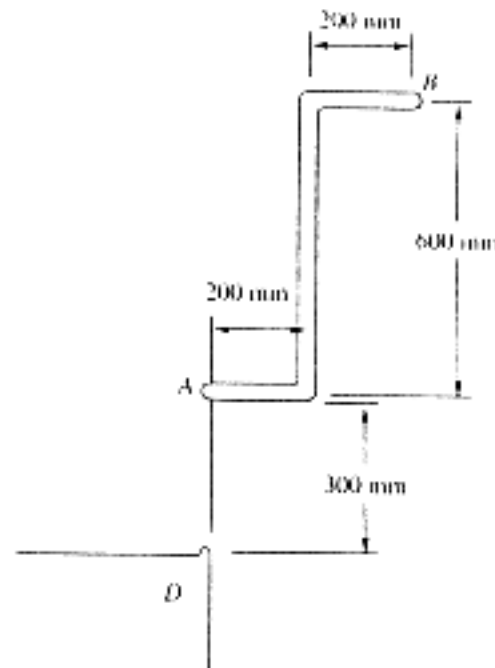
25%.
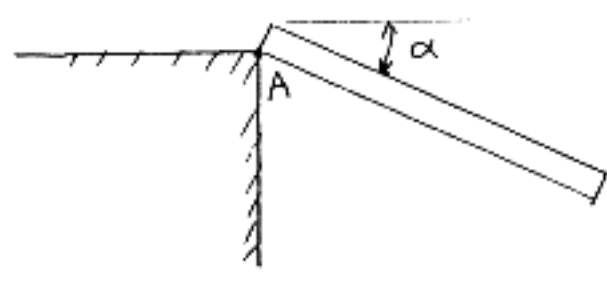
3. The slender 150-lb bar is supported by two cords AB and AC. If cord AC suddenly breaks, determine the initial angular acceleration of the bar and the tension in cord AB. (15%)
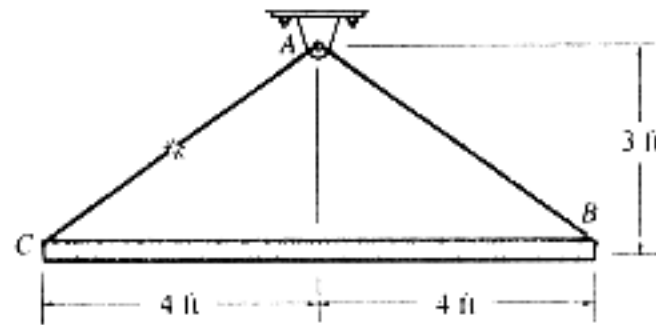
4. A stiff bend rod is dropped so that end A strikes a heavy table D. If the impact is plastic and there is no sliding at A, what is the postimpact speed of end B? The rod weighs per unit length 3 kg/m. (15%)

5. As shown in the figure, the disk has a mass of 5 kg, a center of gravity at G, and a radius of gyration about point O of $k_o = 80$ mm. A cord is placed over the rim of the disk, and the attached blocks A and B are released from rest when the disk is in the position shown. If the cord does not slip on the rim, determine the angular velocity of the disk when it has rotated 180°. Block A and B have a mass of 4 kg and 10 kg, respectively. (20%)