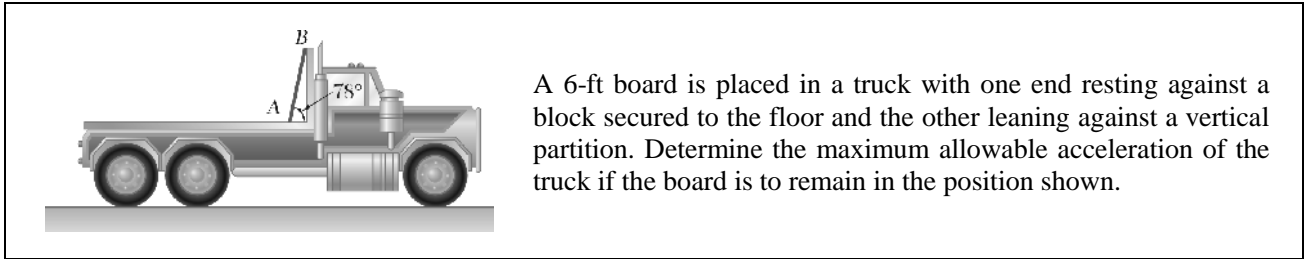


ME 104: Homework 8

Prof. Karl Hedrick: University of California, Berkeley

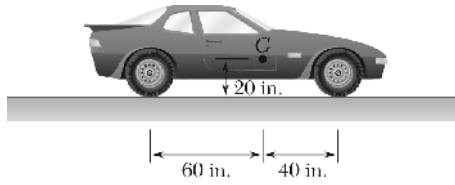
Due Monday, November 16th

Chapter 16, Problem 3



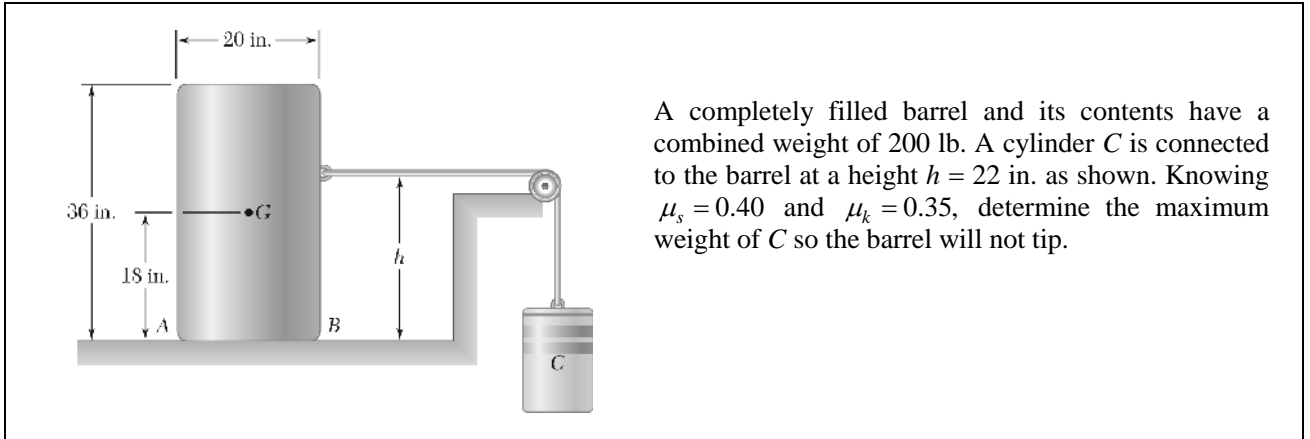
A 6-ft board is placed in a truck with one end resting against a block secured to the floor and the other leaning against a vertical partition. Determine the maximum allowable acceleration of the truck if the board is to remain in the position shown.

Chapter 16, Problem 5



Knowing that the coefficient of static friction between the tires and the road is 0.80 for the automobile shown, determine the maximum possible acceleration on a level road, assuming (a) four-wheel drive, (b) rear-wheel drive, (c) front-wheel drive.

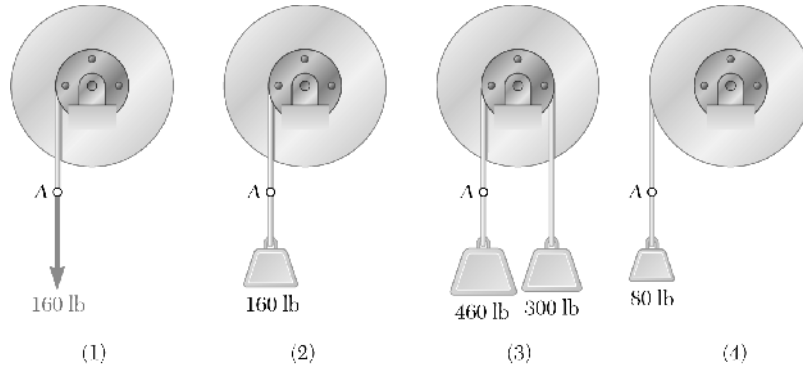
Chapter 16, Problem 13



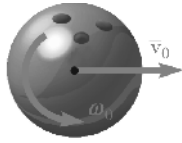
A completely filled barrel and its contents have a combined weight of 200 lb. A cylinder C is connected to the barrel at a height $h = 22$ in. as shown. Knowing $\mu_s = 0.40$ and $\mu_k = 0.35$, determine the maximum weight of C so the barrel will not tip.

Chapter 16, Problem 34

Each of the double pulleys shown has a mass moment of inertia of $15 \text{ lb} \cdot \text{ft} \cdot \text{s}^2$ and is initially at rest. The outside radius is 18 in., and the inner radius is 9 in. Determine (a) the angular acceleration of each pulley, (b) the angular velocity of each pulley after Point A on the cord has moved 10 ft.

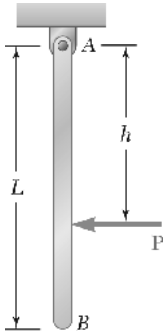


Chapter 16, Problem 69



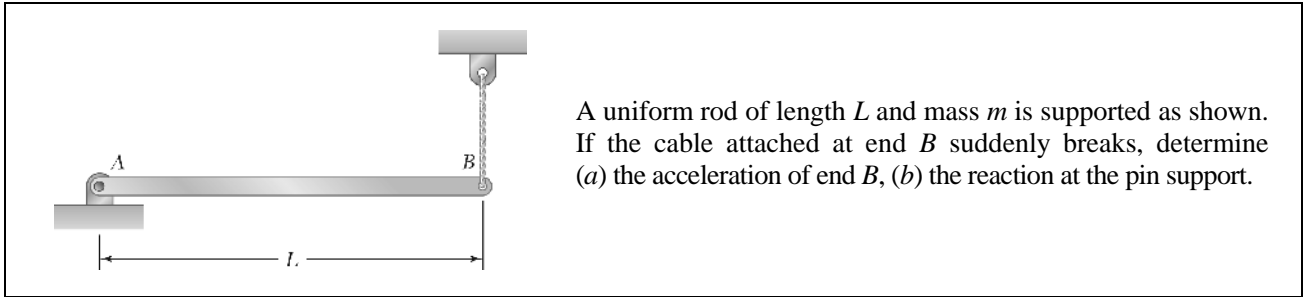
A bowler projects an 8-in.-diameter ball weighing 12 lb along an alley with a forward velocity \mathbf{v}_0 of 15 ft/s and a backspin ω_0 of 9 rad/s. Knowing that the coefficient of kinetic friction between the ball and the alley is 0.10, determine (a) the time t_1 at which the ball will start rolling without sliding, (b) the speed of the ball at time t_1 , (c) the distance the ball will have traveled at time t_1 .

Chapter 16, Problem 76



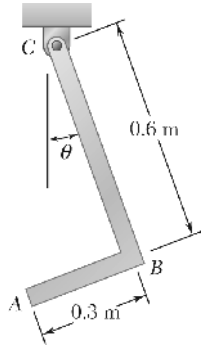
A uniform slender rod of length $L = 36$ in. and weight $W = 4$ lb hangs freely from a hinge at A . If a force \mathbf{P} of magnitude 1.5 lb is applied at B horizontally to the left ($h = L$), determine (a) the angular acceleration of the rod, (b) the components of the reaction at A .

Chapter 16, Problem 84



A uniform rod of length L and mass m is supported as shown. If the cable attached at end B suddenly breaks, determine (a) the acceleration of end B , (b) the reaction at the pin support.

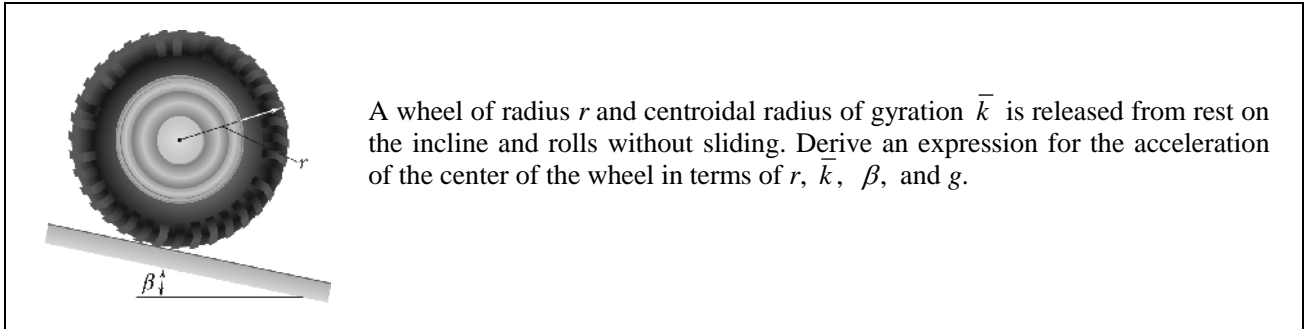
Chapter 16, Problem 87



The diagram shows a bent rod ABC pivoted at point C. The rod consists of two segments: BC and AB. Segment BC is 0.6 m long and is at an angle θ to the vertical. Segment AB is 0.3 m long and is horizontal. The pivot is at point C, and the rod is shown in a vertical plane.

The object ABC consists of two slender rods welded together at Point B . Rod AB has a mass of 1 kg and bar BC has a mass of 2 kg. Knowing the magnitude of the angular velocity of ABC is 10 rad/s when $\theta = 0$, determine the components of the reaction at Point C when $\theta = 0$.

Chapter 16, Problem 94



A wheel of radius r and centroidal radius of gyration \bar{k} is released from rest on the incline and rolls without sliding. Derive an expression for the acceleration of the center of the wheel in terms of r , \bar{k} , β , and g .

Chapter 16, Problem 141

