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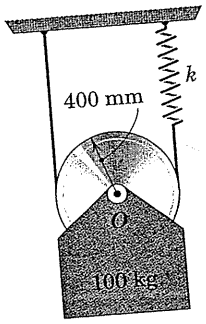
6/140 The sheave of 400-mm radius has a mass of 50 kg and a radius of gyration of 300 mm. The sheave and its 100-kg load are suspended by the cable and the spring, which has a stiffness of 1.5 kN/m. If the system is released from rest with the spring initially stretched 100 mm, determine the velocity of O after it has dropped 50 mm.



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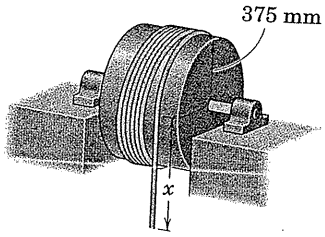
6/127 The drum of 375-mm radius and its shaft have a mass of 41 kg and a radius of gyration of 300 mm about the axis of rotation. A total of 18 m of flexible steel cable with a mass of 3.08 kg per meter of length is wrapped around the drum with one end secured to the surface of the drum. The free end of the cable has an initial overhang $x = 0.6$ m as the drum is released from rest. Determine the angular velocity ω of the drum for the instant when $x = 6$ m. Assume that the center of mass of the portion of cable remaining on the drum lies on the shaft axis when $x = 6$ m. Neglect friction.

Ans. $\omega = 9.68$ rad/s



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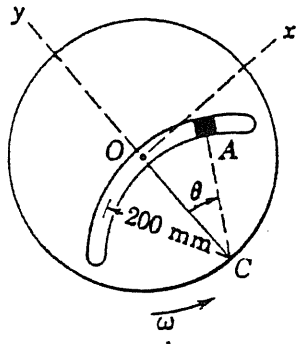
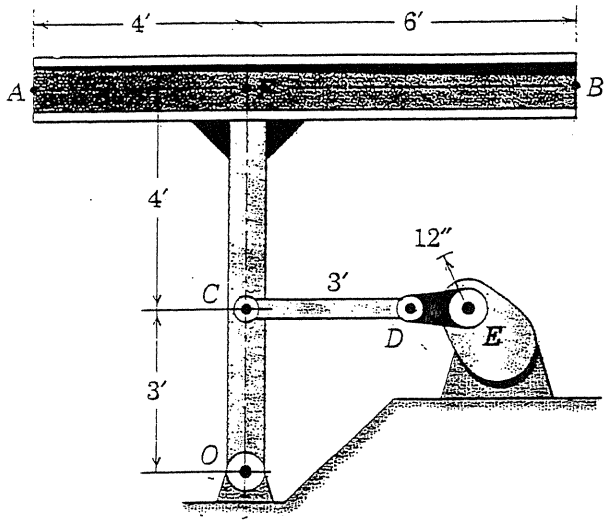
Name_____

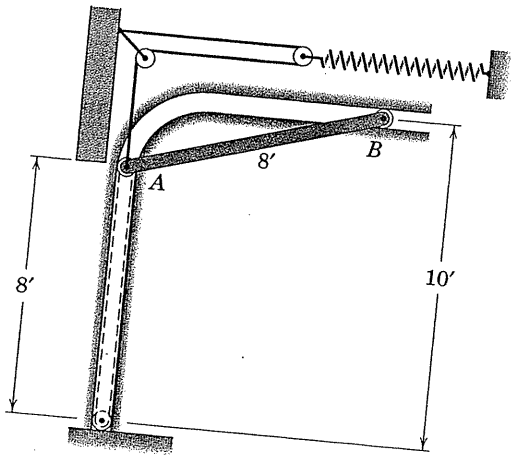
1. The disk with the circular slot of 200-mm radius rotates about O with a constant angular velocity ω = 15 rad/s. Determine the force between the slider A and the circular slot at the instant when it passes the center of the disk, at that moment, $\dot{\theta}$ = 12 rad/s and $\ddot{\theta}$ = 0. The slider has a mass of 0.3 kg and the disk is in the horizontal plane.



2 The revolving crank ED and connecting link CD cause the rigid frame ABO to oscillate about O. For the instant represented ED and CD are both perpendicular to FO, and the crank ED has an angular velocity of 0.4 rad/sec and an angular acceleration of 0.06 rad/sec^2, both counterclockwise. For this instant determine the acceleration of point A with respect to point B.



6/148 The figure shows the cross section of a garage door which is a uniform rectangular panel 8 by 8 ft and weighing 200 lb. The door carries two spring assemblies, one on each side of the door, like the one shown. Each spring has a stiffness of 50 lb/ft and is unstretched when the door is in the open position shown. If the door is released from rest in this position, calculate the velocity of the edge at A as it strikes the garage floor.



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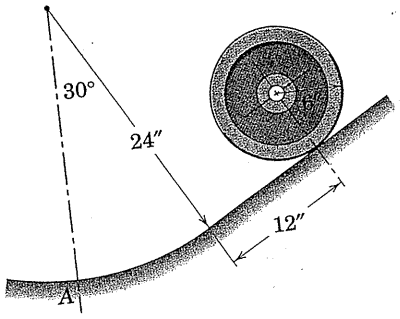
6/136 The center of the 200-lb wheel with centroidal radius of gyration of 4 in. has a velocity of 2 ft/sec down the incline in the position shown. Calculate the normal reaction N under the wheel as it rolls past position A. Assume that no slipping occurs.



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