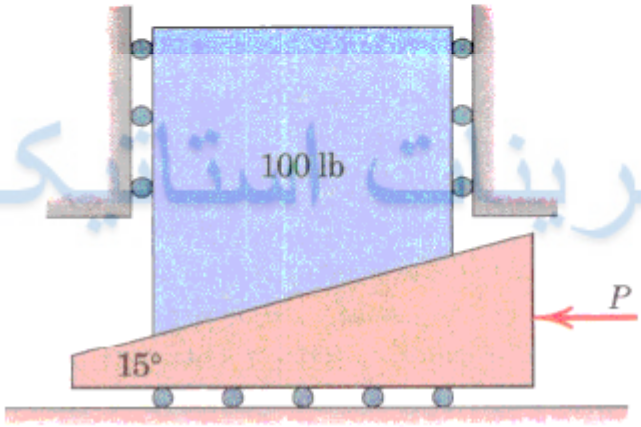
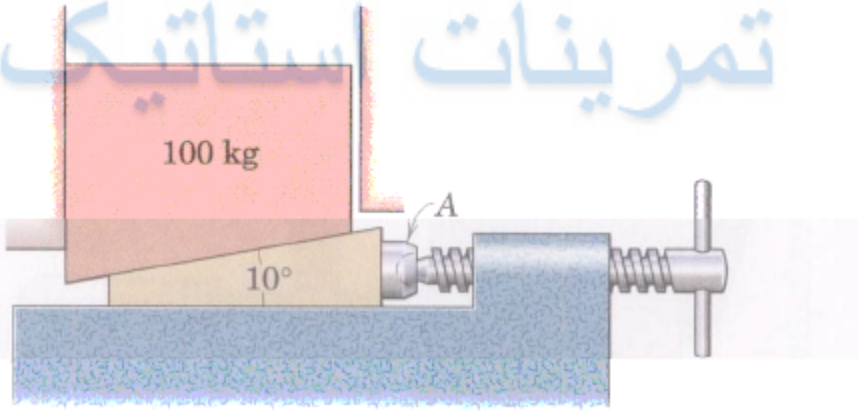
1 If the coefficient of friction between the steel wedge and the moist fibers of the newly cut stump is 0.20, determine the maximum angle α which the wedge may have and not pop out of the wood after being driven by the sledge.

The coefficient of static friction μ_s between the 100-lb body and the 15° wedge is 0.20. Determine the magnitude of the force P required to raise the 100-lb body if (a) rollers of negligible friction are present under the wedge, as illustrated, and (b) the rollers are removed and the coefficient of static friction $\mu_s = 0.20$ applies at this surface as well.



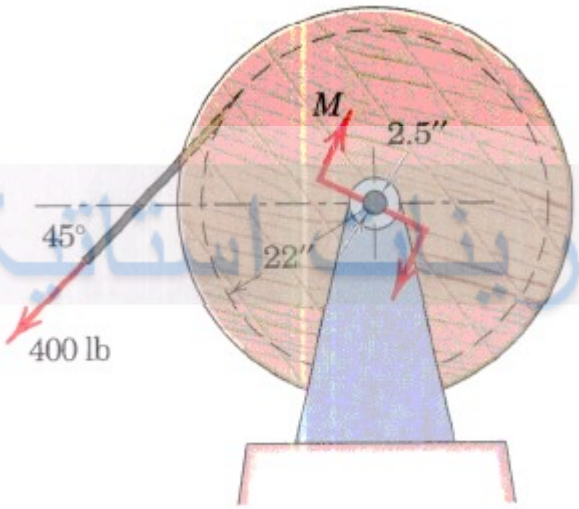
3

The vertical position of the 100-kg block is adjusted by the screw-activated wedge. Calculate the moment M which must be applied to the handle of the screw to raise the block. The single-thread screw has square threads with a mean diameter of 30 mm and advances 10 mm for each complete turn. The coefficient of friction for the screw threads is 0.25, and the coefficient of friction for all mating surfaces of the block and wedge is 0.40. Neglect friction at the ball joint A.



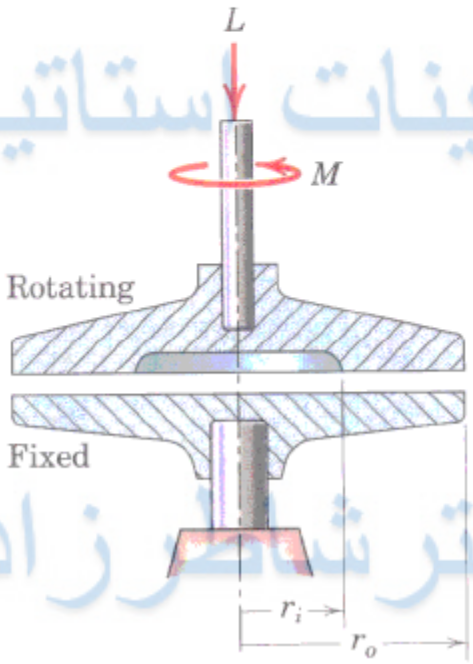
4

Calculate the torque M required to rotate the 540-lb reel of telephone cable clockwise against the 400-lb tension in the cable. The diameter of the bearing is 2.50 in., and the coefficient of friction for the bearing is 0.30.



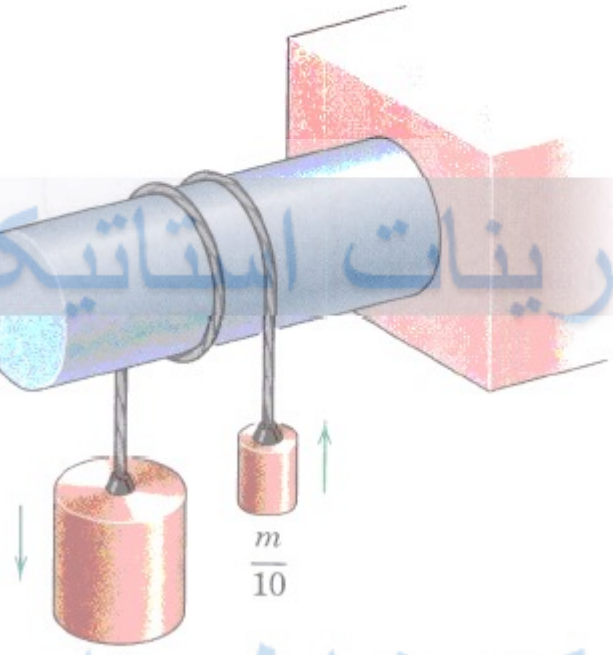
5

The axial section of the two mating circular disks is shown. Derive the expression for the torque M required to turn the upper disk on the fixed lower one if the pressure p between the disks follows the relation $p = k/r^2$, where k is a constant to be determined. The coefficient of friction μ is constant over the entire surface.



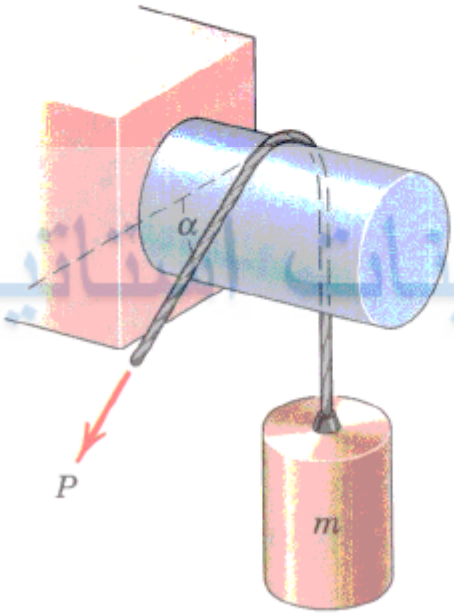
6

It is observed that the two cylinders will remain in slow steady motion as indicated in the drawing. Determine the coefficient of friction μ between the cord and the fixed shaft.



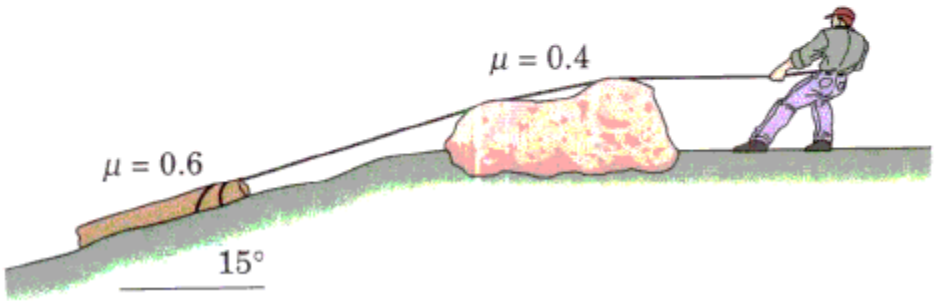
7

For a certain coefficient of friction μ and a certain angle α, the force P required to raise m is 4 kN and that required to lower m at a constant slow speed is 1.6 kN. Calculate the mass m.



8

With what horizontal force P must the worker pull in order to move the 35-kg log up the 15° incline? The coefficient of friction between the log and the incline is 0.6 and that between the rope and the boulder is 0.4.



Determine the range of cylinder mass m over which the system is in equilibrium. Consider the two cases in which the coefficient of friction between the cord and its supporting fixed surface is (a) 0 and (b) 0.3. In both cases, include the indicated friction between the 100-kg body and the incline.