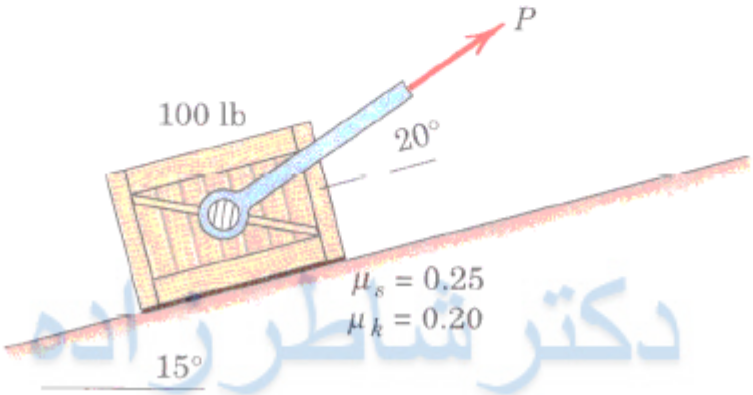
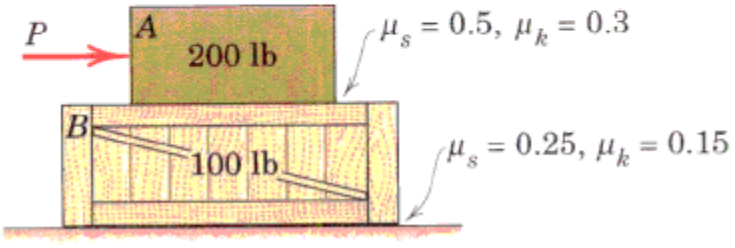
1

The force P is applied to the 100-lb block when it is at rest. Determine the magnitude and direction of the friction force exerted by the surface on the block if (*a*) $P = 0$, (*b*) $P = 40$ lb, and (*c*) $P = 60$ lb. (*d*) What value of P is required to initiate motion up the incline? The static and kinetic coefficients of friction between the block and the incline are $\mu_s = 0.25$ and $\mu_k = 0.20$, respectively.



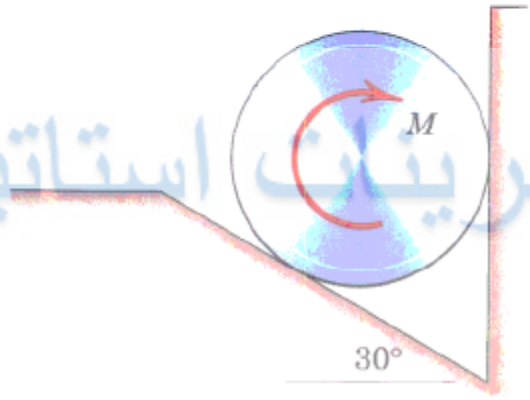
2

The force P is applied to the 200-lb block A which rests atop the 100-lb crate. The system is at rest when P is first applied. Determine what happens to each body if (*a*) $P = 60$ lb, (*b*) $P = 80$ lb, and (*c*) $P = 120$ lb.



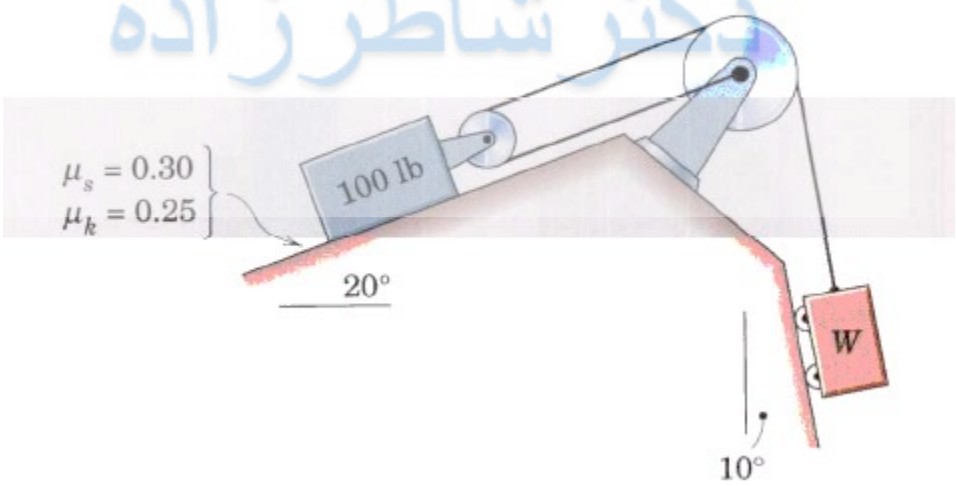
3

The 30-kg homogeneous cylinder of 400-mm diameter rests against the vertical and inclined surfaces as shown. If the coefficient of static friction between the cylinder and the surfaces is 0.30, calculate the applied clockwise couple M which would cause the cylinder to slip.

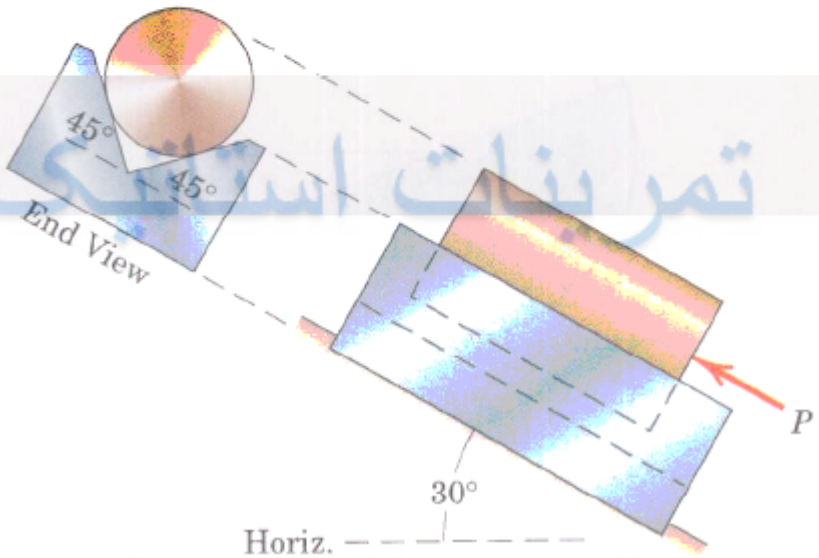


4

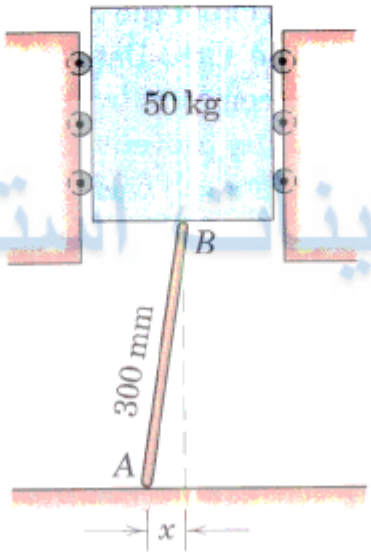
Determine the range of weights W for which the 100-lb block is in equilibrium. All wheels and pulleys have negligible friction.



The 10-kg solid cylinder is resting in the inclined V-block. If the coefficient of static friction between the cylinder and the block is 0.50, determine (*a*) the friction force F acting on the cylinder at each side before force P is applied and (*b*) the value of P required to start sliding the cylinder up the incline.

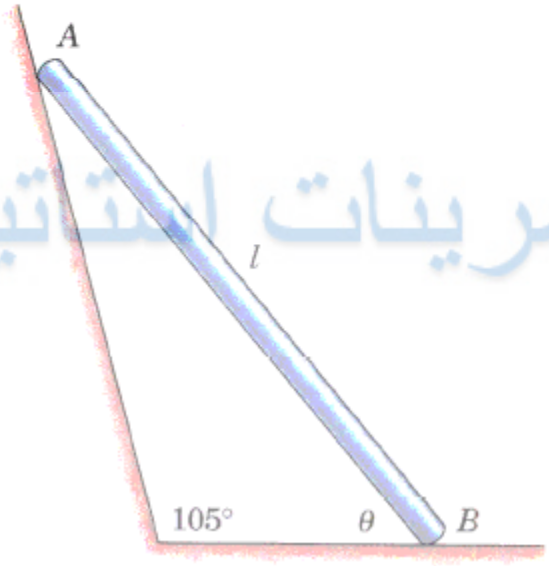


The light bar is used to support the 50-kg block in its vertical guides. If the coefficient of static friction is 0.30 at the upper end of the bar and 0.40 at the lower end of the bar, find the friction force acting at each end for $x = 75$ mm. Also find the maximum value of x for which the bar will not slip.



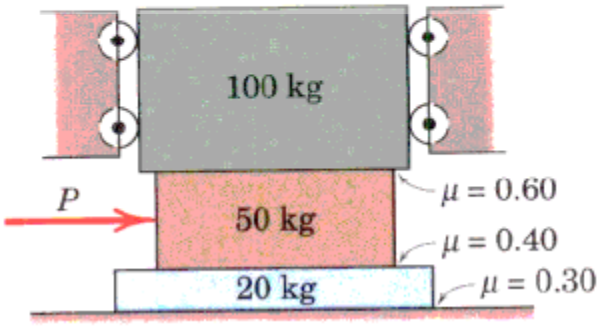
7

The uniform pole of length l and mass m is placed against the supporting surfaces shown. If the coefficient of static friction is $\mu_s = 0.25$ at both A and B, determine the maximum angle θ at which the pole can be placed before it begins to slip.

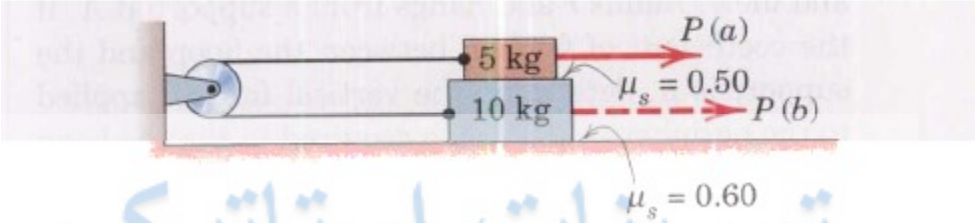


8

Determine the horizontal force P required to cause slippage to occur. The friction coefficients for the three pairs of mating surfaces are indicated. The top block is free to move vertically.



The system of two blocks, cable, and fixed pulley is initially at rest. Determine the horizontal force P necessary to cause motion when (a) P is applied to the 5-kg block and (b) P is applied to the 10-kg block. Determine the corresponding tension T in the cable for each case.



10

A block of mass m_0 is placed between the vertical wall and the upper end A of the uniform slender bar of mass m. If the coefficient of static friction is μ_s between the block and the wall and also between the block and the bar, determine a general expression for the minimum value $\theta_{\min}$ of the angle θ for which the block will remain in equilibrium. Evaluate your expression for the conditions $\mu_s = 0.5$ and

(a) $\frac{m}{m_0} = 0.1$,

(b) $\frac{m}{m_0} = 1$, and

(c) $\frac{m}{m_0} = 10$.

For each case, state the minimum coefficient of static friction $(\mu_s)_B$ necessary to prevent slippage at B.