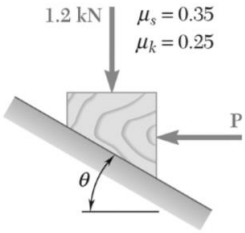
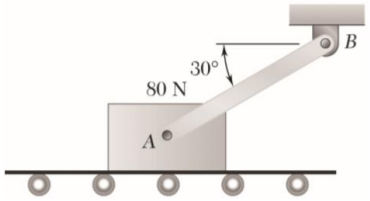


PROBLEM 8.1

Determine whether the block shown is in equilibrium and find the magnitude and direction of the friction force when $\theta = 25°$ and $P = 750$ N.

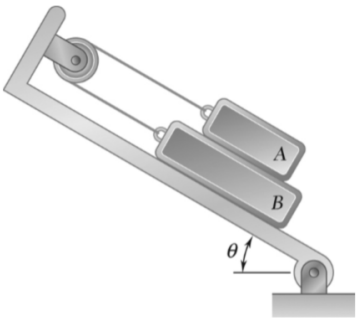
Ans. *block is in equilibrium*, $F = 172.6$ N $\measuredangle$ 25°



PROBLEM 8.7

The 80-N block is attached to link AB and rests on a moving belt. Knowing that $\mu_s = 0.25$ and $\mu_k = 0.20$, determine the magnitude of the horizontal force **P** that should be applied to the belt to maintain its motion (*a*) to the right, (*b*) to the left.

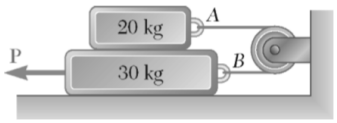
Ans. (*a*) $P = 18.1$ N, (*b*) $P = 14.3$ N



PROBLEM 8.12

The 20-N block A and the 30-N block B are supported by an incline that is held in the position shown. Knowing that the coefficient of static friction is 0.15 between all surfaces of contact, determine the value of θ for which motion is impending.

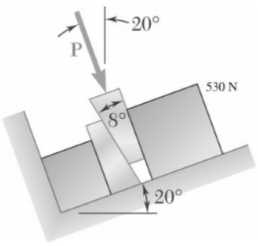
Ans. $\theta = 53.3^\circ$



PROBLEM 8.13

The coefficients of friction are $\mu_s = 0.40$ and $\mu_k = 0.30$ between all surfaces of contact. Determine the smallest force **P** required to start the 30-kg block moving if cable *AB* (*a*) is attached as shown, (*b*) is removed.

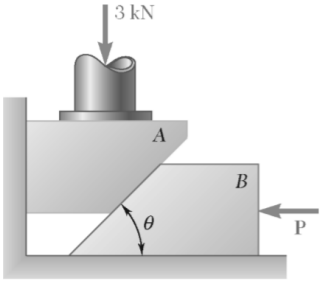
Ans. (*a*) $P = 353$ N, (*b*) $P = 196.2$ N



PROBLEM 8.52

Two 8° wedges of negligible weight are used to move and position a 530-N block. Knowing that the coefficient of static friction is 0.40 at all surfaces of contact, determine the magnitude of the force **P** for which motion of the block is impending.

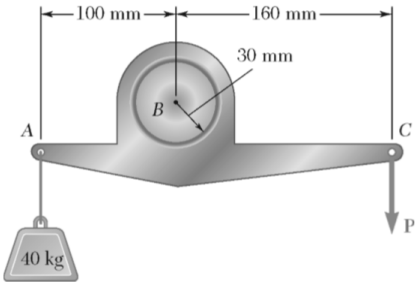
Ans. $P = 441$ N



PROBLEM 8.54

Block A supports a pipe column and rests as shown on wedge B. Knowing that the coefficient of static friction at all surfaces of contact is 0.25 and that $\theta = 45°$, determine the smallest force **P** required to raise block A.

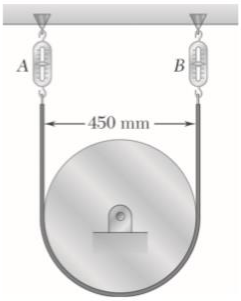
Ans. $P = 986$ kN



PROBLEM 8.77

A lever of negligible weight is loosely fitted onto a 30-mm-radius fixed shaft as shown. Knowing that a force **P** of magnitude 275 N will just start the lever rotating clockwise, determine (*a*) the coefficient of static friction between the shaft and the lever, (*b*) the smallest force **P** for which the lever does not start rotating counterclockwise.

Ans. (*a*) $\mu_s = 0.238$, $P = 218$ N



PROBLEM 8.110

The setup shown is used to measure the output of a small turbine. When the flywheel is at rest, the reading of each spring scale is 70 N. If a 12.60 N·m couple must be applied to the flywheel to keep it rotating clockwise at a constant speed, determine (*a*) the reading of each scale at that time, (*b*) the coefficient of kinetic friction. Assume that the length of the belt does not change.

Ans. (*a*) T_A= 42.0 N, T_B= 98.0 N, (*b*) μ_k = 0.27