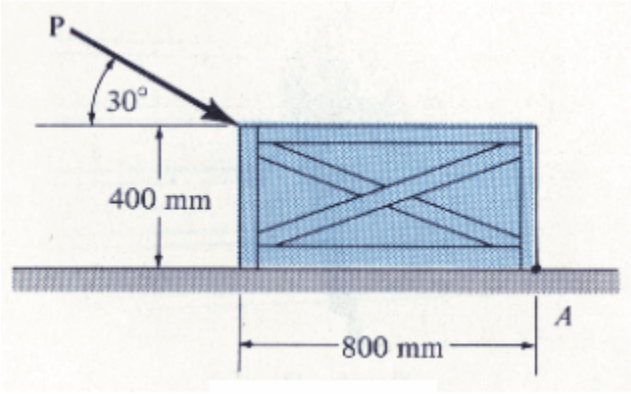
Engineering Statics
Homework 5

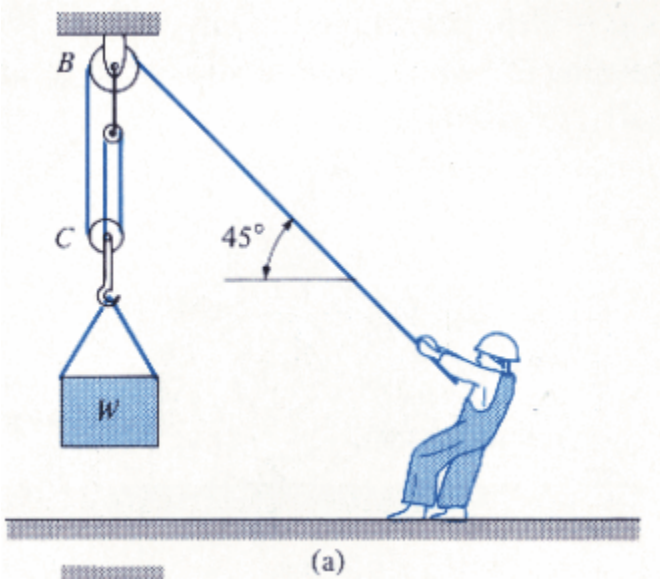
1.
Determine the magnitude of force **P** needed to start moving the 50-kg crate. Also determine the location of the resultant normal force acting on the crate, measured from point *A*. The crate is symmetric with uniform mass. $\mu = 0.3$



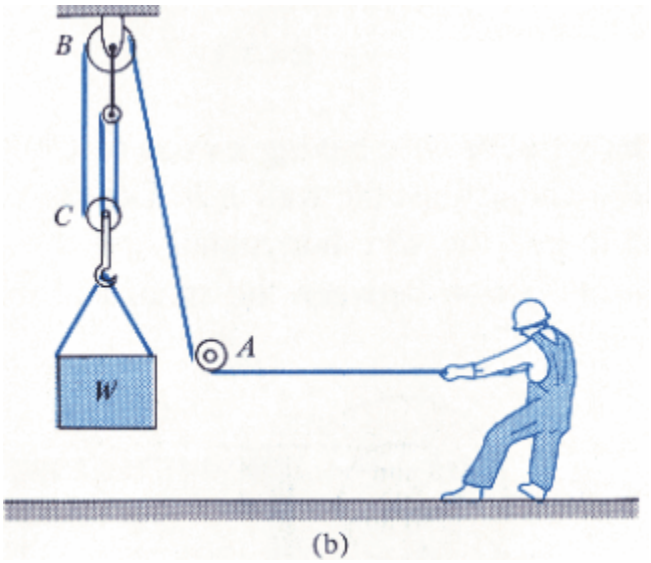
$|\mathbf{P}|$ = _____ N

d_N = _____ mm

2.
Determine the maximum weight W the man can lift using the pulley system, without and then with the "leading block" or pulley at A. The man has a weight of 230 lb and the coefficient of friction between his feet and the ground is μ=0.6 .

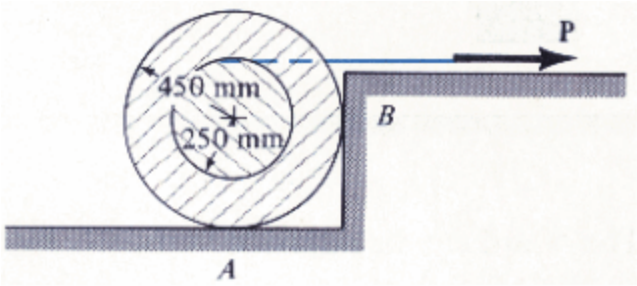


(Without pulley A) W_{max} = _____ lb



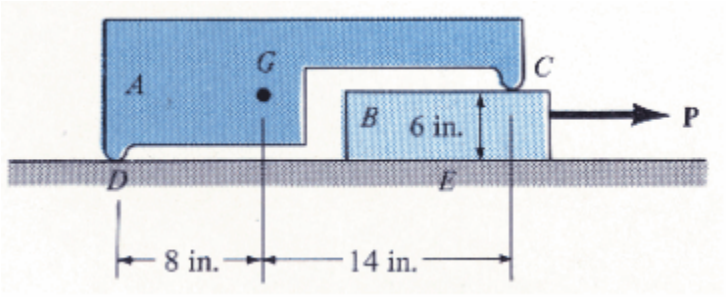
(With pulley A) W_{max} = _____ lb

3.
The spool of wire having a mass of 150 kg rests on the ground *A* and against the wall at *B*. Determine the force **P** required to pull the wire horizontally off the spool. The coefficient of friction between the spool and its points of contact is μ=0.25 .



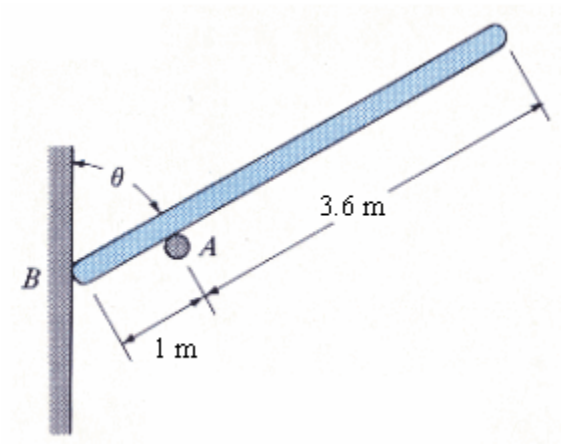
|**P**| = _____ kN

4.
Block B has a weight of 6 lb and A weighs 10 lb. If A has a center of gravity at G, determine the greatest horizontal force **P** which may be applied to B without causing movement of B. The coefficients of friction at C, D, and E are $\mu_C = 0.42$, $\mu_D = 0.2$, and $\mu_E = 0.59$.



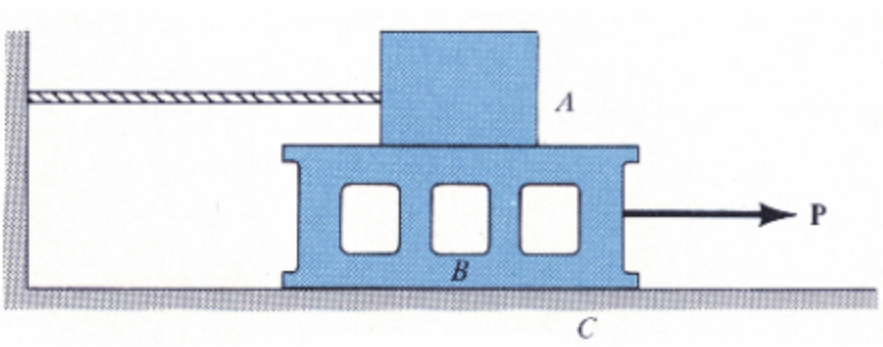
|**P**| = _____ lb

5.
The uniform rod has a weight W and rests on a smooth peg at A and against a wall at B for which μ=0.22 . Determine the greatest angle θ for placement of the rod so that it does not slip.



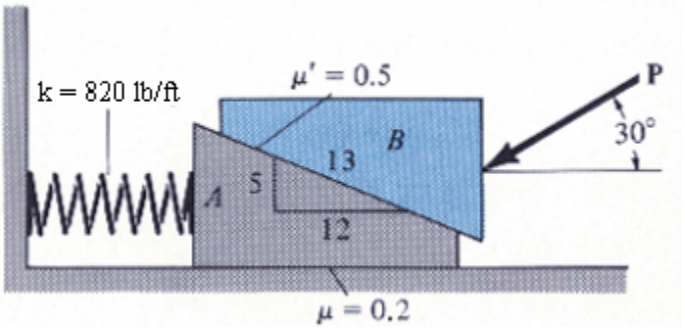
θ =_____ deg

6.
Blocks A and B weight 10 lb and 25 lb, respectively. If the coefficient of friction between A and B is $\mu_{AB} = 0.6$ and between B and the floor C, $\mu_{BC} = 0.5$ determine the maximum horizontal force **P** that can be applied without causing motion.



|**P**| = _____ lb

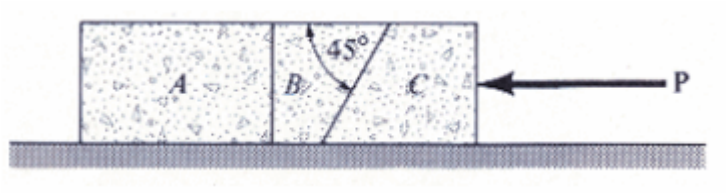
7.
Each wedge has a weight of 440 lb. Determine how far the force **P** can compress the spring until wedge *B* slips on wedge *A*. What is the magnitude of **P** for this to occur?



d = _____ ft

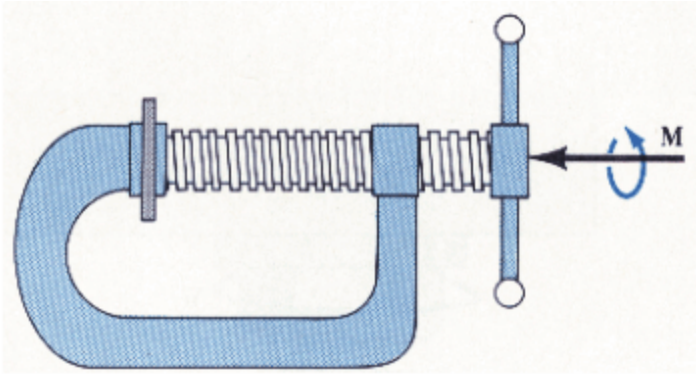
|**P** | = _____ lb

8.
The three stone blocks have weights of W_A = 580 lb, W_B = 180 lb, and W_C = 470 lb. Determine the smallest horizontal force **P** that must be applied to block *C* in order to move this block. The coefficient of friction between the blocks is μ= 0.3 and between the floor and each block μ= 0.5 .



|**P** | = _____ lb

9.
Determine the clamping force on the block of wood if the screw on the "C" clamp is tightened with a twist of **M** = 7 Nm. The single square-threaded screw has a mean radius of 10 mm, a pitch of 3 mm, and the coefficient of friction is μ= 0.2 .



F_{clamp} = _____ N