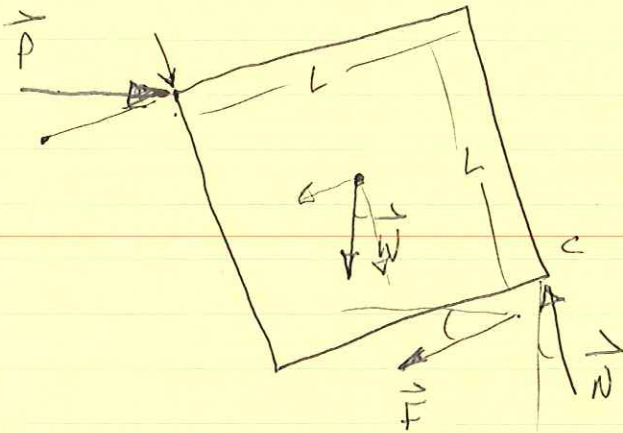


PROB. 8.17

FBD:



$$W = (9.8)(30) = 294 \text{ N}$$

FIND  $\mu_{s, \max}$ ,  $P$

WITHOUT TIPPING

$$\Sigma F_x = 0: P - F \cos 15^\circ - N \sin 15^\circ = 0$$

$$P - 0.966F - 0.259N = 0 \quad (1)$$

$$\Sigma F_y = 0: -F \sin 15^\circ + N \cos 15^\circ - 294 = 0$$

$$-0.259F + 0.966N - 294 = 0 \quad (2)$$

$$\Sigma M_c = 0 \quad (+\curvearrowright):$$

$$\left(\frac{1}{2}L\right)(294 \sin 15^\circ) + \left(\frac{1}{2}L\right)(294 \cos 15^\circ)$$

$$+ (L)(P \sin 15^\circ) - (L)(P \cos 15^\circ) = 0$$

$$180 + (0.259 - 0.966)P = 0$$

$$P = 255 \text{ N} \quad \left\{ \begin{array}{l} 2 \text{ EQNS.}, \\ 2 \text{ UNKNOWN}, \end{array} \right.$$

$$F = 170 \text{ N}, \quad N = 352 \text{ N}$$

$$F = \mu_s N, \quad \left[ \mu_s = \frac{F}{N} = \frac{170}{352} = 0.482 \right]$$