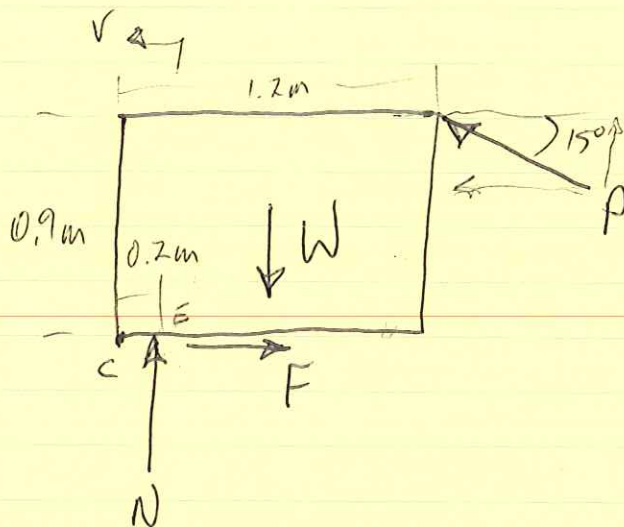


PROB. 8.18

FBD



$$W = (50 \text{ kg})(9.81 \frac{\text{m}}{\text{s}^2}) = 490 \text{ N}$$

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

$$F = 0.966 P \quad (1)$$

$$\Sigma F_y = 0: N - W + P \sin 15^\circ = 0$$

$$N + 0.259 P = 490 \quad (2)$$

$$\Sigma M_E = 0 \quad \curvearrowright:$$

$$-(0.4 \text{ m})(490 \text{ N}) + (0.9 \text{ m})(P \cos 15^\circ) + (1.0 \text{ m})(P \sin 15^\circ) = 0$$

$$P = 174 \text{ [N]}$$

$$F = 0.966(174) = 168 \text{ [N]}$$

$$N = 490 - 0.259(174) = 445 \text{ [N]}$$

$$\mu_k = \frac{F}{N} = \frac{(168)}{(445)} = 0.377$$