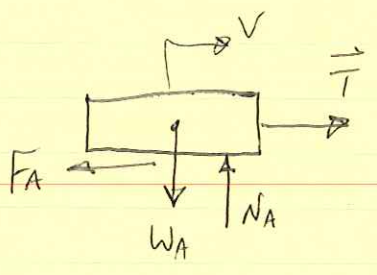


PROB. 8.13

a) $\mu_s = 0.4$, $\mu_k = 0.3$ FWD P_{min}

FBD BLOCK A:

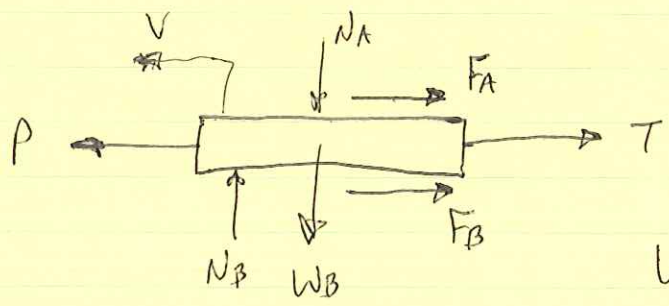


$$\sum F_x = 0: T = F_A$$

$$\sum F_y = 0: N_A = W_A$$

$$W_A = (20 \text{ kg})(9.81 \frac{\text{m}}{\text{s}^2}) = 196 \text{ N}$$

FBD BLOCK B:



$$\sum F_x = 0: F_A + F_B + T = P$$

$$\sum F_y = 0: N_B = N_A + W_B$$

$$W_B = (30)(9.81) = 294 \text{ N}$$

$$N_B = W_A + W_B$$

$$F_B = \mu_s N_B = \mu_s (W_A + W_B)$$

$$F_A = \mu_s N_A = \mu_s W_A \quad \boxed{= T \text{ FROM FBD A}}$$

$$P = F_A + F_B + T$$

$$= (\mu_s W_A) + [\mu_s (W_A + W_B)] + (\mu_s W_A)$$

$$= \mu_s (3W_A + W_B)$$

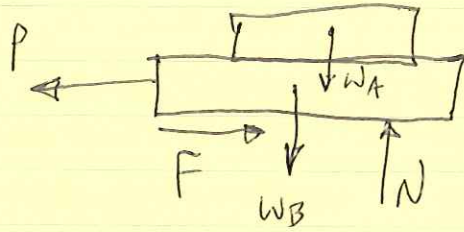
$$P = (0.4)[3(196 \text{ N}) + (294 \text{ N})]$$

$$\boxed{P = 353 \text{ N}}$$

8.13

b) NO CABLE

FBD:



$$\sum F_x = 0: P = F$$

$$\sum F_y = 0: N = W_A + W_B$$

$$P = F = \mu_s N = \mu_s (W_A + W_B)$$

$$\left[P = (0.4)(196 + 294) = 196 \text{ N} \right]$$