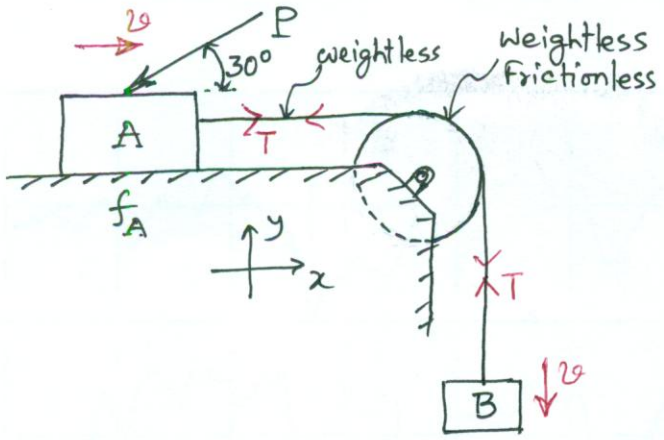
1135/P. 327



$W_A = 600$ lb

$W_B = 225$ lb

$f_A = 1/3$

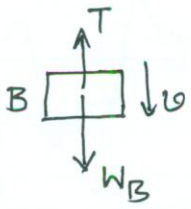
$v_0 = 20$ fps , $v_f = 0$

$S = 30$ ft

$P = ?$ $T = ?$

Sol^n

Considering the motion of body B



$$v_f^2 = v_0^2 + 2aS$$

$$\Rightarrow 0 = 20^2 + 2 \times a \times 30$$

$$\therefore a = -6.67 \text{ fps}^2$$

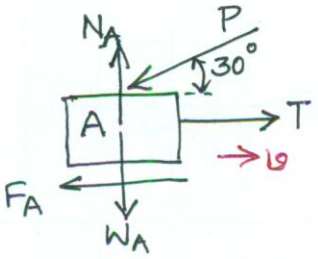
Now from the freebody of B, taking $\Sigma F_y = ma \downarrow$ +ve

$$W_B - T = \frac{W_B}{g} \cdot a$$

$$\Rightarrow 225 - T = \frac{225}{32.2} \times (-6.67)$$

$$\therefore T = 271.61 \text{ lb}$$ Ans.

Note: In the eq^n $R = \frac{W}{g}a$ the resultant force R and accl^n a are of same sense. -ve because retardat^n



For body A, taking $\Sigma F_y = 0$, $\uparrow$ +ve

$$-P \sin 30^\circ - W_A + N_A = 0$$

$$\therefore N_A = P \sin 30^\circ + 600$$

Again taking $\Sigma F_x = ma \rightarrow$ +ve

$$-P \cos 30^\circ - F_A + T = \frac{W_A}{g} \cdot a$$

$$\Rightarrow -P \cos 30^\circ - (P \sin 30^\circ + 600) \times \frac{1}{3} + 271.61 = \frac{600}{32.2} \times (-6.67)$$

$$\Rightarrow 1.032P = 195.89$$

$$\therefore P = 189.82 \text{ lb}$$ Ans.