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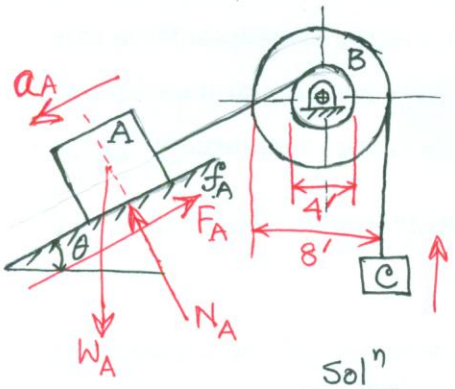


$W_B = 6440$ lb $W_A = 12880$ lb

$\bar{k}_B = 3$ ft $f_A = \frac{1}{4}$

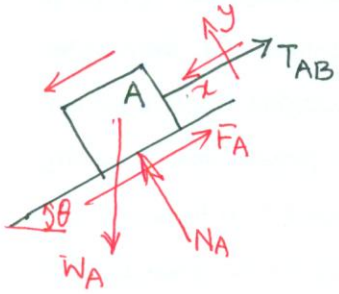
$\theta = 30^\circ$

$S_A = 100$ ft, $t = 40$ sec., $v_{0A} = 0$

Const. accel^n of A down the plane.

(a) $W_C = ?$ (b) $T_{AB} = ?$ (c) $T_{BC} = ?$

Sol^n



From the freebody of A, taking $\Sigma F_y = 0$

$N_A - W_A \cos\theta = 0$

$\therefore N_A = 12880 \times \cos 30^\circ = 11154.41$ lb

$\therefore F_A = N_A \cdot f_A = 11154.41 \times \frac{1}{4} = 2788.60$ lb

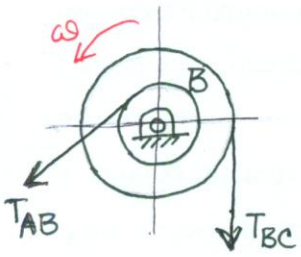
$S_A = \frac{1}{2} a_A t^2 \Rightarrow 100 = \frac{1}{2} \times a_A \times 40^2 \Rightarrow a_A = 0.125$ fps^2

$\Sigma F_x = ma$

$\Rightarrow W_A \sin\theta - T_{AB} - F_A = \frac{W_A}{g} \cdot a_A$

$\Rightarrow 12880 \sin 30^\circ - T_{AB} - 2788.6 = \frac{12880}{32.2} \times 0.125$

$\therefore T_{AB} =$ **3601.4 lb** Ans.



From the freebody of B, considering $\Sigma M = \bar{I}_B \alpha_B$ ↶ +ve

$T_{AB} \times 2 - T_{BC} \times 4 = \bar{I}_B \alpha_B$

$\Rightarrow T_{AB} \times 2 - T_{BC} \times 4 = \bar{k}_B^2 \times \frac{W_B}{g} \times \frac{a_A}{r_A}$

$\Rightarrow 3601.4 \times 2 - T_{BC} \times 4 = 3^2 \times \frac{6440}{32.2} \times \frac{0.125}{2}$

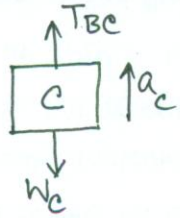
$\bar{I}_B = \bar{k}_B^2 m_B = \bar{k}_B^2 \times \frac{W_B}{g}$

$\alpha_B = \frac{a_A}{r_A}$

$\therefore T_{BC} =$ **1772.58 lb** Ans.

$\omega = \frac{v_A}{r_A} = \frac{v_C}{r_C} \Rightarrow \frac{a_A t}{r_A} = \frac{a_C t}{r_C} \Rightarrow a_C = \frac{r_C}{r_a} \times a_A = \frac{4}{2} \times 0.125$

$= 0.25$ fps^2



From the freebody of C, $\Sigma F_Y = m_C a_C$ ↑ +ve gives

$T_{BC} - W_C = \frac{W_C}{g} \times a_C$

$\Rightarrow 1772.58 - W_C = \frac{W_C}{32.2} \times 0.25$

$\therefore W_C =$ **1758.9 lb** Ans.