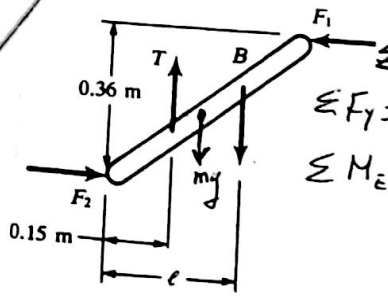
SOLUCIONES FISICA I - JULIO - 5-VII-16

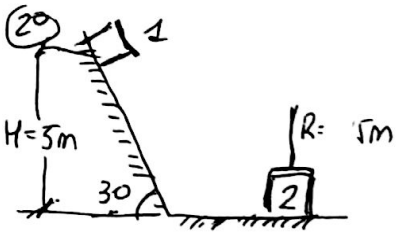


$\Sigma F_x = 0 \Rightarrow F_1 - F_2 = 0 \Rightarrow F_1 = F_2$

$\Sigma F_y = 0 \Rightarrow \boxed{T = m_b g + Mg = (m_b + M)g = (200+300)\,10 = 3500\ N}$

$\Sigma M_c = 0 \Rightarrow F_1 \cdot 0'5 - 3000 \cdot 0'75 - 500 \cdot 0'5 + 3500 \cdot 0'25 = 0$

$\frac{F_1}{2} = 3000 \cdot 0'75 + 500 \cdot 0'5 - 3500 \cdot 0'25 \rightarrow \boxed{F_1 = 3250\ N} \quad \boxed{F_2 = F_1 = 3250\ N}$



$M' = M_1 + M_2$

$F_c = m' \frac{v'^2}{R}$

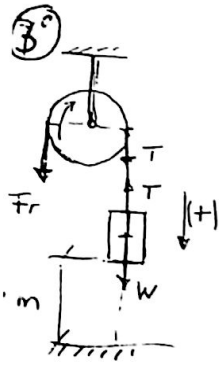
1) $m_1 g H = \frac{1}{2} m v_1^2 \Rightarrow v_1 = \sqrt{2gH} = \sqrt{2 \cdot 10 \cdot 5} = 10\ m/s$

2) $m_1 v_1 = (m_1 + m_2) v' \rightarrow v' = \frac{m_1}{m_1 + \frac{m_1}{2}} \cdot v_1 = \frac{2}{2+1} 10 \cdot \frac{2}{3} = 6'6\ (m/s)$

3) $\frac{1}{2} m' v'^2 = m' g h' \rightarrow h' = \frac{v'^2}{2g} = \frac{(20/3)^2}{2 \cdot 10} = \frac{20 \cdot 20}{9 \cdot 20} = 2'2\ m$

4) $m'g + F_c = \boxed{T = (2+1)10 + (2+1)\frac{(20/3)^2}{5} = 30 + \frac{170}{9} = \frac{420}{9} = 46'6\ (N)}$

$\boxed{56,6\ N.}$



$W - T = m \cdot a$

$T \cdot R - F_t \cdot R = I \alpha$

$a = \alpha \cdot R$

$I = \frac{1}{2} m_{polea} R^2$

$W - F_t = a\left(m + \frac{1}{2} m_p\right)$

Cabina $\boxed{E_c = \frac{1}{2} m v^2 = 16'8\ J}$

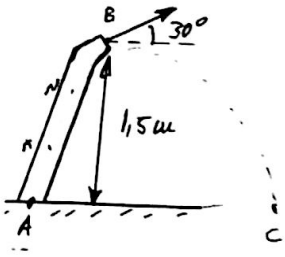
$v^2 = v_0^2 + 2as = 2 \cdot 4{,}07 \cdot 2 = 16{,}28\ (m/s)$

Polea $\boxed{E_c = \frac{1}{2} I \omega^2 = \frac{1}{2} \cdot \frac{1}{2} m_p R^2 \left(\frac{v}{R}\right)^2 = \frac{1}{4} m_p v^2}$

$= \frac{1}{4} \cdot 140 \cdot 16{,}28 = \boxed{569{,}8\ J}$

$\boxed{a = \frac{W - F_t}{m + \frac{1}{2} M_p} = \frac{200 \cdot 10 - 900}{200 + 140/2} = 4'07\ m/s^2}$ $\quad \boxed{T = W_p - m_p a = 140 \cdot 10 - 140 \cdot 4'07 = 140(10 - 4'07) \simeq 830\ (N)}$

4º



(a) $Q = v_B \cdot S_B \Rightarrow \boxed{v_B = \frac{Q}{S_B} = \frac{8 \times 10^{-3}/60}{0{,}8 \times 10^{-4}} = 1{,}66\ m/s}$

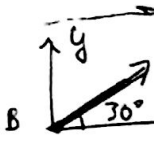
(b) Th. Bernoulli: $p_A + \frac{1}{2} \rho v_A^2 + \rho g z_A = p_B + \frac{1}{2} \rho v_B^2 + \rho g z_B$

$Q = cte \Rightarrow v_A \cdot S_A = v_B \cdot S_B \Rightarrow v_A = \frac{v_B}{4} = 0{,}4\ m/s$

$z_A = 0$, $z_B = 1.6\ m$, $p_B = 1\ atm \simeq 10^5\ Pa$

$\Rightarrow \boxed{p_A = 10^5 + \frac{1}{2} \times 10^3 \times (1{,}66^2 - 0{,}4^2) + 10^3 \times 10 \times 1{,}5 = 116{,}293\ KPa}$

(c)



$V_{oy} = V_o \cdot \text{Sen}(30°)$

$V_{ox} = V_o \cdot \text{Cos}(30°)$

$y = v_{oy} \cdot t - \frac{1}{2} g t^2 + y_0 \Rightarrow$ (Suelo)

$\Rightarrow 0 = 1{,}5 + 0{,}83 t - 5 \cdot t^2 \Rightarrow$

$\boxed{t = 0{,}63\ s}$

Alcance x: $\boxed{x = v_{ox} \cdot t = 1{,}63 \times \sqrt{3} \times 0{,}63 = 0{,}9\ m}$