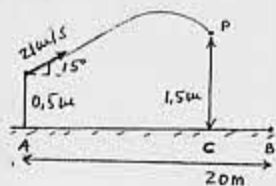


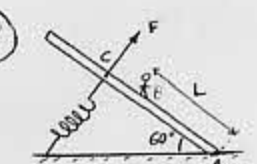
10



a) $V_{0x} = V_0 \cos(15^\circ) = 20,28 \text{ m/s}$
 $V_{0y} = V_0 \sin(15^\circ) = 5,43 \text{ m/s}$
 $y = V_{0y}t - \frac{1}{2}gt^2 \Rightarrow 1 = 5,43t - 5t^2$
 $t = \frac{5,43 \pm \sqrt{5,43^2 - 20}}{10} = \frac{5,43 \pm 1,23}{10} \Rightarrow t = 0,235 \text{ (No en el punto P)}$
 $t = 0,85 \text{ s}$

b) $x = V_{0x}t = 20,28 \times 0,85 = 17,23 \text{ m}$
 $\overline{V} = \frac{AB - x}{t} = \frac{20 - 17,23}{0,85} = 3,25 \text{ m/s}$

c) $E_m = E_c + E_p = cte \Rightarrow \frac{1}{2}mV_0^2 + mgh_0 = \frac{1}{2}mV_P^2 + mgh$
 $V_P^2 = V_0^2 - 2gh \Rightarrow \overline{V_P} = \sqrt{20^2 - 20 \times 1} = 20,51 \text{ m/s}$



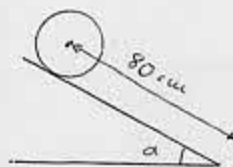
a) $\sum \vec{N}_A = 0$
 $F \cdot AC - W_{\text{muro}} \cdot L \cdot \cos(60^\circ) - W_{\text{tabla}} \cdot \frac{L}{2} \cdot \cos(60^\circ) = 0$
 $F = \frac{W_{\text{muro}} \cdot L \cdot \cos(60^\circ) + W_{\text{tabla}} \cdot \frac{L}{2} \cdot \cos(60^\circ)}{AC}$
 $\overline{F} = \frac{300 \cdot \frac{L}{2} + 60 \cdot 1 \cdot \frac{1}{2}}{1,5} = \frac{20 + 100L}{1,5} \text{ (N)}$

b) $F = 200 + 100 \times 1 = 120 \text{ N}$
 $F = -Kx \Rightarrow \overline{x} = \frac{120}{2000} = 0,06 \text{ m}$

c) $\sum F_x = 0 \Rightarrow R_x - F \cdot \sin(60^\circ) = 0$
 $L = 1 \text{ m}, \quad \overline{R_x} = F \cdot \sin(60^\circ) = 103,9 \text{ N}$
 $\sum F_y = 0 \Rightarrow R_y + F \cdot \cos(60^\circ) - (W_{\text{muro}} + W_{\text{tabla}}) = 0$
 $\overline{R_y} = 300 + 60 - 120 \times \frac{1}{2} = 300 \text{ N}$

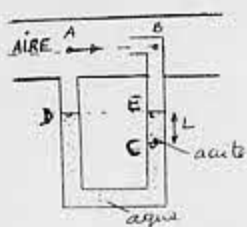
a) $\sum \vec{F} = m \vec{a}_{cm} \Rightarrow$
 $W_x - F_r \cdot e = m a_{cm}$
 $\sum M_{cm} = I \cdot \alpha \Rightarrow F_r \cdot e = I \cdot \alpha$
 $a_{cm} = \alpha R$
 $\Rightarrow W_x = \frac{7}{5} m a_{cm}$

$m \cdot g \cdot \sin \alpha = \frac{7}{5} m a_{cm}$
 $W_{\text{ur. del cm. (u.R.V.A):}} \quad s = \frac{v_f^2}{2a} = \frac{1,6^2}{2 \cdot 1,6} = 0,8 \text{ m}$
 $\overline{a_{cm}} = \frac{2s}{t^2} = \frac{2 \times 0,8}{1} = 1,6 \text{ m/s}^2$
 $\Rightarrow \sin \alpha = \frac{7 \times 1,6}{5 \times 10} \Rightarrow \alpha = 12,9^\circ$



b) $F_r \cdot e = \frac{2}{5} m a_{cm} = 0,96 \text{ N}$
 $\sum \vec{F} = m \vec{a}_{cm}$
 $W_x = m a_{cm} \Rightarrow a_{cm} = g \sin(30^\circ)$
 $\overline{t} = \sqrt{\frac{2s}{a_{cm}}} = \sqrt{\frac{2 \times 0,8}{5}} = 0,56 \text{ s}$

40



a) $P_B = P_E$ al ser aire libre <<< f6cil >>> PRESION IGUAL EN TODOS LOS PUNTOS
 $P_C - P_B = P_C - P_E = \rho_{\text{ac}} g L = 750 \cdot 9,81 \cdot 5 \cdot 10^{-2} = 367,85 \text{ Pa}$

b) $P_D = P_B + \rho_{\text{ag}} g L \quad P_D + \rho_{\text{ag}} g L = P_E + \rho_{\text{ac}} g L \Rightarrow$
 $P_C = P_E + \rho_{\text{ac}} g L \quad P_D - P_E = \rho_{\text{ac}} g L - \rho_{\text{ag}} g L = (\rho_{\text{ac}} - \rho_{\text{ag}}) g L$
 $P_D - P_E = (750 - 1000) \cdot 9,81 \cdot 5 \cdot 10^{-2} = -122,6 \text{ Pa}$

c) $P_A' = P_B'$
 $P_A' = P_A + \rho_{\text{aire}} g y + \rho_{\text{H}_2\text{O}} g L$
 $P_B' = P_B + \rho_{\text{aire}} g y + \rho_{\text{H}_2\text{O}} g L$
 $\Rightarrow P_B - P_A = (\rho_{\text{H}_2\text{O}} - \rho_{\text{aire}}) g L$
 $P_B - P_A = (1 - 0,75) \times 10^3 \cdot 9,81 \cdot 5 \times 10^{-2} = 1,22 \times 10^2 \text{ Pa}$
 $P_A - P_B = -1,22 \times 10^2 \text{ Pa}$

d) $P_A + \frac{1}{2} \rho V_A^2 + \rho g z_A = P_B + \frac{1}{2} \rho V_B^2 + \rho g z_B$
 $V_B = 0, \quad z_A = z_B$
 $\Rightarrow P_B - P_A = \frac{1}{2} \rho V_A^2$
 $\overline{V_A} = \left[\frac{2(P_B - P_A)}{\rho_{\text{aire}}} \right]^{1/2} = 13,9 \text{ m/s}$