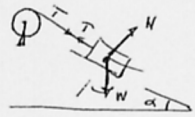
SOLUCIONES FISICA I JUNIO 2008

1º

a)



$\Sigma \vec{F} = m \cdot \vec{a} \Rightarrow Wt - T = m\,a$

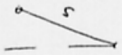
$\Sigma M_{cil} = I \cdot \alpha \Rightarrow T \cdot R = I \cdot \alpha$

$a = \alpha \cdot R$ — $a = \alpha \cdot R$

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

$\Rightarrow T = \frac{1}{2} M_p a$

$Wt = \left(m + \frac{1}{2} M_p\right) \cdot a$



M.R.U.A $\quad s = v_0 t + \frac{1}{2} a t^2 \quad a = \frac{2s}{t^2}$

$a = 2 \times 25 / 5^2 = 2\ m/s^2$

$m + \frac{1}{2} M_p = \frac{m \cdot g \cdot \sin(30)}{a} = \frac{80 \cdot 10 \cdot 1/2}{2} = 200$

$\Rightarrow M_p = (200 - 80)\,2 = 240\ Kg$

b) $E_c = \frac{1}{2} m v^2 = \frac{1}{2} 80 \cdot 10^2 = 4000\ J$

c) $E_{mi} = E_{mf} + |W_{roz}| \Rightarrow \frac{1}{2} m v^2 = \mu_c m g s$

$\mu_c = \frac{v^2}{2gs} = \frac{100}{2 \cdot 10 \cdot 8} = 0'625$

2º

a) $e = 0'5 = \frac{v_2' - v_1'}{v_1 - v_2} = \frac{v_2' - v_1}{10 - 0}$

$v_2' - v_1' = 5$ (1)

$m_1 \vec{v}_1 + m_2 \vec{v}_2 = m_1 \vec{v}_1' + m_2 \vec{v}_2'$

$20 + 0 = 2 v_1' + 1 v_2'$ (2)

Resolviendo (1) y (2)

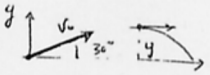
$v_1' = 5\ m/s \qquad v_2' = 10\ m/s$

b) $\frac{1}{2} m_2 v_2'^2 = m_2 g H \Rightarrow H = \frac{v_2'^2}{2g} = \frac{100}{20} = 5m$

c) $T = m_2 g + m_2 \frac{v_2'^2}{R} = 2 \cdot 10 + 2 \frac{10^2}{2'5} = 100\ (N)$

3º

a) $E_{m,A} = E_{m,C} \Rightarrow v_c = \sqrt{2 g h_1} = 6{,}92\ m/s$



$v_{0y} = v_0 \cdot \sin(30°) = 3{,}46\ m/s$

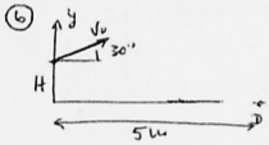
$v_{0x} = v_0 \cos(30°) = 6\ m/s$

$v_y = v_{0y} - g \cdot t = 0$

$t = v_{0y}/g = 0{,}346\ s$

$y = v_{0y} \cdot t - \frac{1}{2} g t^2 = 0{,}6\ m$

b)



$x = v_{0x} \cdot t \;;\; 5 = 6 \cdot t$

$t = 0{,}83\ s$

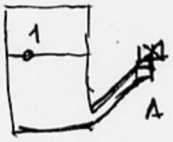
$y = H + v_{0y} t - \frac{1}{2} g t^2 = 0 \;;\; H = \frac{1}{2} \cdot 10 \cdot 0{,}83^2 - 3{,}46 \times 0{,}83 = 0{,}57\ m$

4º

a) $P_A = P_1 + \rho g (h_2 - h_1) =$

$= 4'7 \cdot 10^5 + 10^3 \cdot 10\ (12 - 2) = 5'5 \cdot 10^5\ Pa$

b) BERNOULLI "1 – A"



$P_1 + \frac{1}{2} \rho v_1^2 + \rho g h_1 = P_A + \frac{1}{2} \rho v_A^2 + \rho g h_A$

$4'5 \cdot 10^5 + 10^3 \cdot 10 \cdot (12 - 2) = 10^5 + \frac{1}{2} 10^3 v_A^2$

$\Rightarrow v_A = \sqrt{\frac{9 \cdot 10^5}{10^3}} = 30\ m/s$