

1° $[P] = L^2 M T^{-3}$ $\eta = P^{a_1} \omega^{a_2} \mu^{a_3} R^{a_4} = (L^2 M T^{-3})^{a_1} (T^{-1})^{a_2} (L^{-3} M)^{a_3} L^{a_4} = L^{2a_1 - 3a_3 + a_4} M^{a_1 + a_3} T^{-3a_1 - a_2}$

$[W] = T^{-1}$ $2a_1 - 3a_3 + a_4 = 0$ $\begin{pmatrix} 2 & 0 & -3 & 1 \\ 1 & 0 & 1 & 0 \\ -3 & -1 & 0 & 0 \end{pmatrix}$ $h=3$ $i=4-3=1$ MONOMIO PI

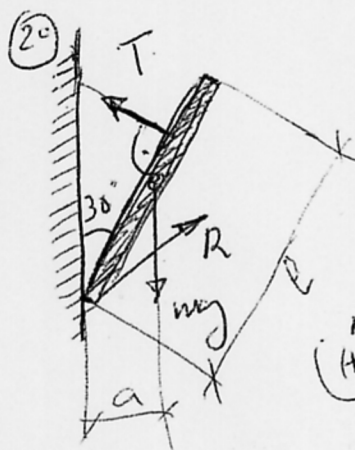
$[P] = L^{-3} M$ $a_1 + a_3 = 0$

$[R] = L$ $-3a_1 + a_2 = 0$

$a_1 = 1 \Rightarrow a_2 = -3, a_3 = -1, a_4 = -1$

$\eta = P \omega^3 \mu R^5 \Rightarrow P = \eta \omega^3 \mu R^5$

$\eta_M = \eta_P \Rightarrow \frac{20}{\left(\frac{\omega_P}{2}\right)^3 \mu_M (R_P/10)^5} = \frac{P_P}{\omega_P \mu_P R_P} \Rightarrow P_M = 16 \cdot 10^6 W$



$\sum F_x = 0$ $T \sin 60 = R_x$ $T = 200 N$

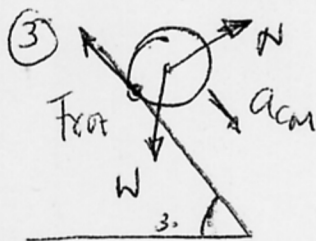
$\sum F_y = 0$ $T \cos 60 + R_y = mg$ $R_x = 100\sqrt{3} N$

$\sum M = 0$ $T \cdot \frac{3l}{4} - mg a = 0$ $R_y = 500 N$

$a = \frac{l}{2} \omega^2$

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1) $s = v_0 t + \frac{1}{2} a t^2 \Rightarrow a = \frac{2s}{t^2} = \frac{2 \cdot 3}{2^2} = 1.5 m/s^2$



2) $F_{roz,e} = W_x - m a = mg \sin 30 - m a = 6(10 - \frac{1}{2} \cdot 1.5) = 21$

$I = \frac{R F_{roz,e}}{\alpha} = \frac{R^2 F_{roz,e}}{a} = \frac{0.3^2 \cdot 21}{1.5} = 1.26 kg \cdot m^2$

$W_x - F_{roz,e} = m a$

$W_y - N = 0$

$R F_{roz,e} = I \alpha$

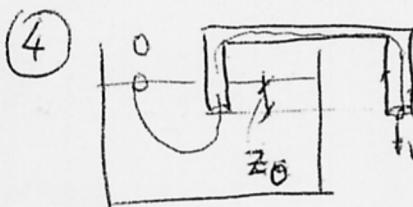
$a = \alpha R$

3) $F_{roz,e} \leq \mu N \Rightarrow \mu \geq \frac{F_{roz,e}}{N} = \frac{F_{roz,e}}{mg \cos 30} = \frac{21}{51.96} = 0.4$

4) $E_{TRANSLACION} = \frac{1}{2} m v_{CM}^2 = \frac{1}{2} m (v_0 + a t)^2 = \frac{1}{2} 6(1.5 \cdot 1)^2 = 6.75 J$

$E_{ROTACION} = \frac{1}{2} I \omega^2 = \frac{1}{2} I \frac{v_{CM}^2}{R^2} = \frac{1}{2} 1.26 \left(\frac{1.5 \cdot 1}{0.3}\right)^2 = 15.75 J$

5) Si, pues el rozamiento estático, no produce disipación



Bernoulli: "0 ÷ 1" $P_1 = P_0$ $v_1 \gg v_0 \Rightarrow v_1^2 \gg v_0^2 \Rightarrow v_0^2 \approx 0$

$P_0 + \frac{1}{2} \rho v_0^2 + \rho g z_0 = P_1 + \frac{1}{2} \rho v_1^2 + \rho g z_1$

$\rho g z_0 + \frac{1}{2} \rho v_1^2 = \rho g z_1 \Rightarrow v_1 = \sqrt{2g(z_0 - z_1)} = \sqrt{2 \cdot 9.8 \cdot 0.09} = 1.33 m/s$

$Q = v_1 S = 1.33 \cdot 10^{-4} = 6.65 \cdot 10^{-4} m^3/s = 39.9 l/h$