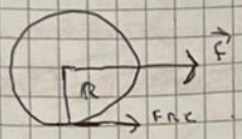
1)



$\sum M^{CIR}_{F} = I^{CIR}_{CM} \cdot \vec{\gamma}$

$\vec{F} \cdot R = \left(\frac{1}{2} M \cdot R^2 + M R^2\right) \cdot \vec{\gamma}$

$(M \cdot \vec{\gamma} \cdot R - F_{RC}) \cdot R = \frac{3}{2} M \cdot R^2 \cdot \vec{\gamma}$

$M \cdot \vec{\gamma} \cdot R \cdot R - F_{RC} \cdot R = \frac{3}{2} M \cdot R^2 \cdot \vec{\gamma}$

$M \cdot \vec{\gamma} \cdot R - 150N = 37,5 Kgm \vec{\gamma}$

$25 Kg.m \cdot \vec{\gamma} - 37,5 Kgm = 150N$

$-12,5 \cdot \vec{\gamma} = 150N$

$\vec{\gamma} = 12 s^{-2}$

$\sum F_{ext} = F_{RC} + \vec{F} = M \cdot A_{CM}$

$M \cdot \vec{\gamma} \cdot R$

$F_{RC} = 0,30 \cdot 500N$

$F_{RC} = 150N$

$F_{RC} = -150N$

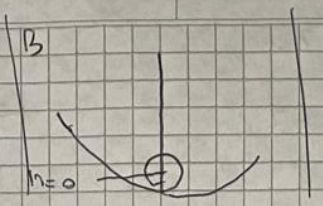
COMO DANIO A LO SUPUESTO

$\sum F_{ext} = -150N + F = 50Kg \cdot 6 m/s$

$-150N + F = 300Kg\,m/s$

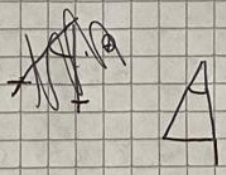
$\vec{F}_{MAX} = 450N$

2)



$E_{MA} = M.G.h_{cm}$

$E_{MB} = \frac{1}{2} I^{eje\ R}_{cm} . \omega^2$



$h = \cos\theta . R - R = h$

$E_{MA} = M.G. (\cos\theta (R) - R) h_{cm}$

$E_{MB} = \frac{1}{2} \left(\frac{2}{5} M.R^2 + M\left(\frac{R}{R}\right)^2 \right) . \omega^2$

$M.G.h_{cm} = \frac{1}{2} \left(\frac{2}{5} M R^2 + M R^2 \right) . \omega^2$

$M.G.h_{cm} = \frac{7}{10} M.R^2 . \omega^2$

$G . \frac{10}{7} . h_{cm} = R^2 . \omega^2$

$G . \frac{10}{7} . \underbrace{R(1-\cos\theta)}_{\text{DESPLAZAMIENTO}} = \underbrace{R^2}_{\text{ESFERA}} . \omega^2$

$\frac{G.10.R(1-\cos\theta)}{7 R^2} = \omega^2$

ES UNA G DE GRAVEDAD

$\sqrt{\frac{G.10R(1-\cos\theta}{7 R^2}} = \omega$ → EN EL PUNTO MAS BAJO

$\cos\theta = \frac{A}{R}$

$\cos\theta . R = A$

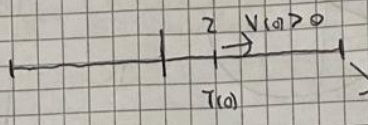
$h = R - A$

$h = R - \cos\theta . R$

3) MOA

$A = 8\,cm$

$X(0) = 2\,cm$



$0{,}5\,s \Rightarrow \frac{1}{4}$ RECORRIDO TOTAL

$T = 2\,s$

$\omega = \frac{2\pi}{T}$

$\omega = \frac{2\pi}{2s}$ $\quad \omega = \pi\,s^{-1}$

$X(T) = 8 \cdot \cos(\pi \cdot T + \delta)$

$X(0) = 8 \cdot \cos(\delta) = 2$

$\cos(\delta) = \frac{1}{4}$

$V(0) > 0$ → SE ALEJA DEL ORIGEN

$V(T) = -8 \cdot \pi \cdot \text{SEN}(\pi T + \delta)$

$\text{Arc SEN}\ \frac{1}{4} = \delta$ < $75°\,37'$ / $285°\,37'$

$V(0) = \underbrace{-8\pi}_{-} \cdot \underbrace{\text{SEN}(\pi \cdot 0 + \delta)}_{-} > 0$

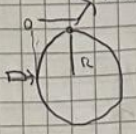
APROXIMADAMENTE

$\underbrace{-8\pi}_{-} \cdot \underbrace{\text{SEN}(\delta)}_{-} \Rightarrow \delta \cong \frac{17\pi}{12}$

$\frac{285°}{180} = \frac{17}{12}\pi$

$X(T) = 8 \cdot \pi \cdot \cos\left(\pi \cdot T + \frac{17\pi}{12}\right)$

4) TOMO ESTE PUNTO ⇒ F VINCULO NO GENERA MOMENTO



$\sum_j \vec{M}_{F\Delta T} = 0$

$|L_{SIST\ INICIAL}| = |L_{SIST\ FINAL}|$

$L_{SIST\ INICIAL} = L_{MASA} + \underbrace{L_{ARO}}_{0}$

$L_{SIST\ INICIAL} = \vec{R} \times \vec{P}_{M_T} + 0$

$L_{INICIAL} = 0{,}20m \cdot 1KG \cdot 50\frac{m}{s}$

$L_{FINAL} = I^{fin}_{TOTAL\ SISTEMA} \cdot \vec{\omega}$

$(M_A \cdot R^2 + M_A R^2 + M_T \cdot R^2) \cdot \vec{\omega}$

$M_A \cdot R^2$: MOMENTO ARO; $M_A R^2$: MOMENTO; $M_T \cdot R^2$: MOMENTO DE LA MASA

$R \cdot M_T \cdot 50\frac{m}{s} = (2 M_A R^2 + M_T \cdot R^2) \cdot \vec{\omega}$

$50 KGm/s = (4KG \cdot 0{,}20m + 0{,}20 KGm) \cdot \vec{\omega}$

$50 KGm/s = 1 KGm \cdot \vec{\omega}$

$50\ s^{-1} = \vec{\omega}$

5) EXPLOSION = CHOQUE ELASTICO ⇒ SE CONSERVA ENERGIA CINETICA

$M_H = 80\,Kg$

$M_N = 40\,Kg$

5m/s ↑ ↑ 5m/s

~~$E_{c\,sist\,i} = \frac{1}{2} 40\,Kg\,(5\,m/s)^2 + \frac{1}{2} 80\,Kg\,(5\,m/s)^2$~~

~~$\frac{1}{2} 40\,Kg\,V_N^2 + \frac{1}{2} 80\,Kg\,V_H^2$~~

$\sum \vec{F}_{ext\,AT} = 0 \quad \Delta \vec{P}_{cm} = \Delta \vec{P}_{sist} = 0$

$\Delta \vec{P}_{sist\,i} = 0$

$\vec{P}_{sist\,i} = \sum m_i v_i = 40\,Kg.\,5\,m/s + 80\,Kg.\,5\,m/s$

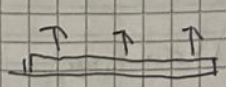
$600\,Kg\,m/s = 40\,Kg.\,7\,m/s + 80\,Kg.\,V_f =$

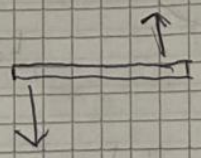
$\frac{600\,Kg\,m/s - 280\,Kg\,m/s}{80\,Kg} = V_{f\,HOMBRE} = 4\,m/s$

$E_{c\,sist} = \sum \frac{1}{2} m_i v_i^2 = \frac{1}{2} 40\,Kg\,(7\,m/s)^2 + \frac{1}{2} 80\,Kg.\,(4\,m/s)^2$

$980\,Kg\frac{m^2}{s^2} + 640\,Kg\frac{m^2}{s^2} = 7620\,J$

b) TRASLACIÓN + ROTACIÓN





TRASLACIÓN

$\sum F_{(EXT)} = M \cdot A_{CM}$

$76N = M \cdot A_{CM}$

$\frac{76N}{8KG} = \boxed{2\frac{M}{S^2} \Rightarrow A_{CM}}$

ROTACIÓN

$\sum M^{CM}_{F(EXT)} = I^{BAR}_{CM} \cdot \vec{\gamma}$

$76N \cdot \frac{L}{2} = \frac{1}{12} M L^2 \cdot \vec{\gamma}$

$8N \cdot \Delta = \frac{1}{12} M L^2 \cdot \vec{\gamma}$

$8N \cdot 12 = M \cdot L \cdot \vec{\gamma}$

$96 = 1{,}2KG \cdot 8KG \; \vec{\gamma} \rightarrow$ Ac. ANGULAR

$9.6\ KGM \cdot \vec{\gamma}$

$\frac{96}{9{,}6} = \vec{\gamma}$

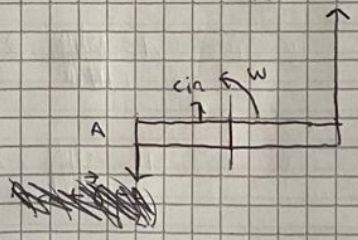
$\boxed{\vec{\gamma} = 10\frac{1}{S^2}}$

$|R| \cdot \vec{\gamma} = 2\ M/S$

$\downarrow$

$10\frac{1}{S^2}$

$CIR = 0{,}2\ M$



$0{,}9\ M = CIR$

$A_{PUNTO\ A} = 2\frac{m}{s^2} + \vec{\gamma}\left(-\frac{L}{2}\right) = 2\frac{M}{S^2} - 6\frac{M}{S^2} = \boxed{-4\frac{M}{S^2}}$

$A_{PUNTO\ B} = 2\frac{M}{S^2} + \vec{\gamma}\left(\frac{L}{2}\right) = 2\frac{M}{S^2} + 6\frac{M}{S^2} = \boxed{8\frac{M}{S^2}}$

$\vec{\gamma} \cdot \vec{R}^{A}_{CIR} = -4\ M/S$

$10\frac{1}{S^2} \cdot (-0{,}4) = -4\ M/S$

$\vec{\gamma}\ \vec{R}^{B}_{CIR} = 8\ M/S^2$