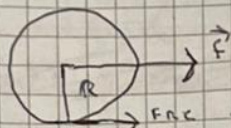


7)



$$\sum M_{cm} = I_{cm} \ddot{\theta}$$

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

$$(M \ddot{\theta} R - F_{rc}) \cdot R = \frac{3}{2} M R^2 \ddot{\theta}$$

$$M \ddot{\theta} R - F_{rc} R = \frac{3}{2} M R \ddot{\theta}$$

$$M \ddot{\theta} R - 750 \text{ N} = 37,5 \text{ kg} \ddot{\theta}$$

$$25 \text{ kg} \ddot{\theta} - 37,5 \text{ kg} = 750 \text{ N}$$

$$-12,5 \ddot{\theta} = 750 \text{ N}$$

$$\ddot{\theta} = 12 \text{ s}^{-2}$$

$$\sum F_{ext} = F_{rc} + \vec{F} = M \cdot A_{cm}$$

$$M \cdot \ddot{\theta} \cdot R$$

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

$$F_{rc} = 150 \text{ N}$$

$$F_{rc} = -150 \text{ N}$$

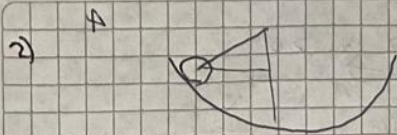
CONTRARIO A LO
SUPUESTO

$$\sum F_{ext} = -150 \text{ N} + F = 50 \text{ kg} \cdot 6 \text{ m/s}^2$$

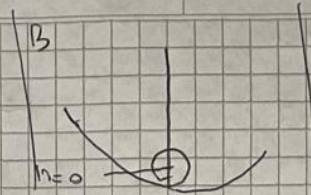
$$-150 \text{ N} + F = 300 \text{ kg} \cdot \text{m/s}^2$$

$$\vec{F}_{max} = 450 \text{ N}$$





n
R



$$E_{MA} = M \cdot g \cdot h_{cm}$$

$$E_{MB} = \frac{1}{2} I_{cm} \omega^2$$

$$h = \cos \theta \cdot R - n = h$$

$$E_{MA} = M \cdot g \cdot (\cos \theta \cdot R - n) h_{cm}$$

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

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

$$M \cdot g \cdot h_{cm} = \frac{7}{10} M R^2 \omega^2$$

$$g \cdot \frac{10}{7} \cdot h_{cm} = R^2 \omega^2$$

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

$$\frac{6 \cdot 10 \cdot R(1 - \cos \theta)}{7 R^2} = \omega^2$$

$$\sqrt{\frac{6 \cdot 10 R(1 - \cos \theta)}{7 R^2}} = \omega \rightarrow \text{EN EL PUNTO MAS BAJO}$$

Es una
G de
GRAVEDAD



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

$$\cos \theta \cdot R = A$$

don

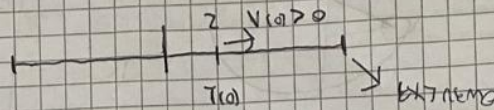
$$h = R - A$$

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

3) M.O.A

$$A = 8 \text{ cm}$$

$$x(0) = 2 \text{ cm}$$



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

$$x(t) = 8 \cdot \cos(\pi \cdot t + \delta)$$

$$T = 2 \text{ s}$$

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

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

$$v(0) > 0 \rightarrow \text{SE ALEJA DEL ORIGEN}$$

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

$$v(t) = -8 \cdot \pi \cdot \sin(\pi t + \delta)$$

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

$$v(0) = \underbrace{-8 \cdot \pi}_{-} \cdot \underbrace{\sin(\pi \cdot 0 + \delta)}_{-} > 0$$

$$\text{Arc Sen } \frac{1}{4} = \delta \quad \begin{matrix} 75^\circ 37' \\ 285^\circ 37' \end{matrix}$$

APROXIMAMENTE

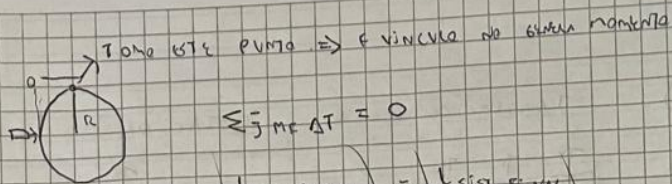
$$\underbrace{-8 \pi}_{-} \cdot \underbrace{\sin(\delta)}_{-} \Rightarrow \delta \approx \frac{7\pi}{12}$$

$$\frac{285^\circ}{180} = \frac{7\pi}{12}$$

$$x(t) = 8 \cdot \pi \cdot \cos\left(\pi \cdot t + \frac{7\pi}{12}\right)$$



4)



$$\sum \vec{r} \times \vec{F} = 0$$

$$L_{\text{sist. inicial}} = L_{\text{sist. final}}$$

$$L_{\text{sist. inicial}} = L_{\text{masa}} + L_{\text{ang}}$$

$$L_{\text{sist. inicial}} = \vec{R} \times \vec{P}_{\text{masa}} + 0$$

$$L_{\text{inicial}} = 0,20\text{m} \cdot 1\text{Kg} \cdot 50\frac{\text{m}}{\text{s}}$$

$$L_{\text{final}} = I_{\text{por sistema}} \cdot \vec{\omega}$$

$$(\underbrace{m_1 r^2}_{\text{momento de la masa}} + \underbrace{m_2 r^2}_{\text{momento de la masa}} + \underbrace{m_3 r^2}_{\text{momento de la masa}}) \cdot \vec{\omega}$$

$$0,20\text{m} \cdot 50\frac{\text{m}}{\text{s}} = (2 \cdot 1\text{Kg} \cdot 0,20\text{m}^2 + 1\text{Kg} \cdot 0,20\text{m}^2) \cdot \vec{\omega}$$

$$50\frac{\text{m}}{\text{s}} = (4\text{Kg} \cdot 0,20\text{m} + 0,20\text{Kg} \cdot \text{m}) \cdot \vec{\omega}$$

$$50\frac{\text{m}}{\text{s}} = 1,1\text{Kg} \cdot \vec{\omega}$$

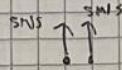
$$50\frac{\text{m}}{\text{s}} = \vec{\omega}$$



5) ~~COLISION = CHOQUE ELASTICO~~ \Rightarrow ~~SE CONSERVA ENERGIA~~

$$M_H = 80 \text{ Kg}$$

$$M_N = 40 \text{ Kg}$$



~~Diagrama de la colisión: Se muestra un eje horizontal con dos masas. La masa de 40 Kg se mueve a la izquierda a 5 m/s, y la masa de 80 Kg se mueve a la derecha a 5 m/s. Después de la colisión, se indican velocidades finales.~~

$$\sum \vec{F}_{ext} = 0 \quad \vec{P}_{ch} = \vec{P}_{sist} = 0$$

$$\vec{P}_{sist} = 0$$

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

$$600 \text{ Kg m/s} = 40 \text{ Kg} \cdot 5 \text{ m/s} + 80 \text{ Kg} \cdot v_f =$$

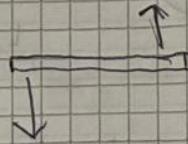
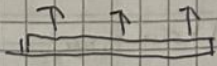
$$\frac{600 \text{ Kg m/s} - 280 \text{ Kg m/s}}{80 \text{ Kg}} = v_f \text{ hombre} = 4 \text{ m/s}$$

$$E_{c \text{ sist}} = \sum \frac{1}{2} m_i v_i^2 = \frac{1}{2} 40 \text{ Kg} (5 \text{ m/s})^2 + \frac{1}{2} 80 \text{ Kg} (4 \text{ m/s})^2$$

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

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 REGISTRO NACIONAL DE LAS PERSONAS
 MINISTERIO DEL INTERIOR, OBRAS PUBLICAS Y VIVIENDA
 Apellido / Surname
 ENRIQUE ZABALA
 Nombre / Name
 LAUREANO GASPAR
 Sexo / Sex M Nacionalidad / Nationality ARGENTINA Ejemplar A
 Fecha de nacimiento / Date of birth 29 ABR / APR 2002
 Fecha de emisión / Date of issue 27 ABR / APR 2017
 Fecha de vencimiento / Date of expiry 27 ABR / APR 2032
 Documento / Document 43.980.678
 Trámite N° / CI ident. 00492176843
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6) TRANSLACION + ROTACION



TRANSLACION

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

$$16N = M \cdot A_{cm}$$

$$\frac{16N}{8Kg} = \frac{2M}{s^2} \Rightarrow A_{cm}$$

$$R \cdot \vec{\gamma} = 2ms$$

↓
10.1
5

$$GIR = 0,2m$$

ROTACION

$$\sum_{M(F_{EXT})}^{CM} = I_{CM} \cdot \vec{\gamma}$$

$$16N \cdot \frac{L}{2} = \frac{1}{12} M L^2 \cdot \vec{\gamma}$$

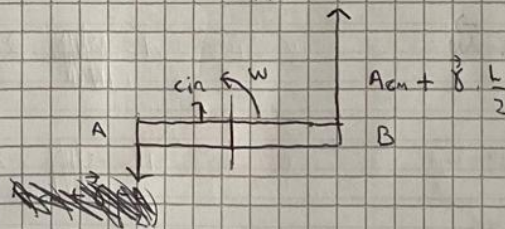
$$8N \cdot L = \frac{1}{12} M L^2 \cdot \vec{\gamma}$$

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

$$96 = 1,2M \cdot 8Kg \cdot \vec{\gamma} \rightarrow A_{C. ANGULAR}$$

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

$$\vec{\gamma} = 10 \frac{ms^2}{s^2}$$



$$0,9m = cin$$

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

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

$$\vec{\gamma} \cdot R_{cin}^A = -4m/s$$

$$\vec{\gamma} \cdot R_{cin}^B = 8m/s^3$$

$$10 \cdot 5^{-1} \cdot (-0,4) = -4m/s$$