

Prueba Física II N°4.

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$$\begin{aligned} v &= \omega \cdot R \\ a &= \alpha \cdot R \\ s &= \theta \cdot R \end{aligned}$$

$$\begin{aligned} \omega &= \frac{d\theta}{dt} & \alpha &= \frac{d\omega}{dt} \\ \bar{\omega} &= \frac{\Delta\theta}{\Delta t} & \bar{\alpha} &= \frac{\Delta\omega}{\Delta t} \end{aligned}$$

$$1 \text{ rev} = 2\pi [\text{rad}]$$

$$g = 10 [\text{m/s}^2]$$

$$\omega_f = \omega_i + \alpha t \quad / \quad \omega_f^2 = \omega_i^2 + 2\alpha \Delta\theta \quad / \quad \theta_f = \theta_i + \omega_i t + \frac{1}{2} \alpha t^2$$

$$W = F \cdot d \cdot \cos\theta \quad / \quad K = \frac{1}{2} m v^2 \quad / \quad U_g = m \cdot g \cdot h \quad U_e = \frac{1}{2} k x^2$$

$$E = K + U_g + U_e \quad / \quad \Delta E = W_{FNC} \quad / \quad \vec{p} = m \vec{v} \quad / \quad \vec{P}_{antes} = \vec{P}_{después}$$

Pregunta 1): Coef. fricción?



$$\text{masa} = 5 [\text{kg}]$$

$$v_i = 8.00 [\text{m/s}]$$

$$d = 3 [\text{m}]$$

$$\theta = 30.0^\circ$$

$$U_g = m \cdot g \cdot h$$

$$U_g = 5 [\text{kg}] \cdot 10 [\text{m/s}^2] \cdot 3 \sin(30^\circ)$$

$$U_g = 50 \cdot 3 \cdot \frac{1}{2}$$

$$U_g = 75$$

$$\Delta E = W_{FNC} \rightarrow E_f - E_i = W_{FNC} \rightarrow U_g - \frac{1}{2} m v^2 = F \cdot d \cdot \cos(\theta)$$

$$75 - 160 = \boxed{U_k \cdot \overset{\text{normal}}{m g \cos(30^\circ)} \cdot d \cdot \cos(180^\circ)} \rightarrow 43,3 \times 3 \times -1 = \boxed{-129,9}$$

$$75 - 160 = -129,9 \quad U_k$$

$$\frac{-85}{-129,9} = U_k$$

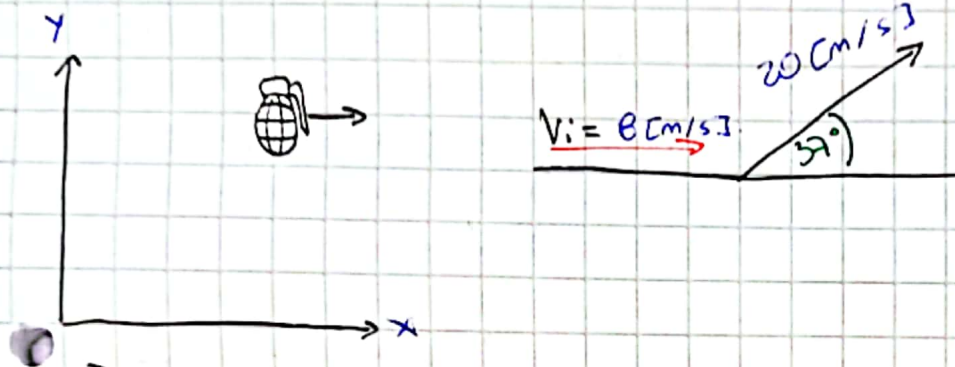
$$U_k = 0,65$$

Leif

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Pregunta 2: magnitud y dirección.

Ay B = 2 fragmentos



$$\theta = \arctan \frac{12,04}{7,97} = 56,4$$

$$\cos \theta = \cos 56,4$$

$$\vec{P}_{ix} = \vec{P}_{fx}$$

$$m \cdot 8 = m \cdot 20 \cos 37^\circ + m V_0 \cos \theta$$
$$8 - 20 \cos 37^\circ = V_0 \cos \theta$$

B = 2 fragmentos.

$$-7,97 \text{ m/s} = V_0 \cos \theta \rightarrow 56,4$$

$$\frac{-7,97}{56,4} = V_x \rightarrow \boxed{V_x = -14,4 \text{ [m/s]}}$$

$$\vec{P}_{iy} = \vec{P}_{fy}$$

$$0 = m \cdot 20 \sin 37^\circ + m V_0 \sin \theta$$

$$-20 \sin 37^\circ = V_0 \sin \theta$$

$$-12,04 = V_0 \sin \theta \rightarrow \sin 56,4$$

$$\frac{-12,04}{0,83} = \boxed{V_y = -14,50 \text{ [m/s]}}$$

$$V_f = \sqrt{(-14,4)^2 + (-14,50)^2}$$

$$V_f = \sqrt{207,36 + 210,25}$$

$$V_f = \sqrt{417,61}$$

$$\boxed{V_f = 20,44 \text{ [m/s]}}$$

Alf

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Pregunta 3:

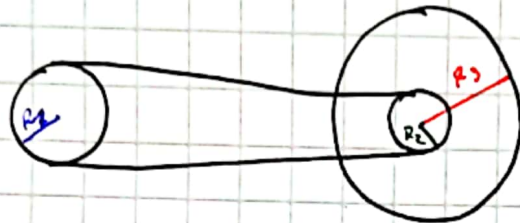
$$R_1 = 10 \text{ [cm]}$$

$$R_2 = 4 \text{ [cm]}$$

$$R_3 = 40 \text{ [cm]}$$

$$d = 314 \text{ [cm]}$$

$$t = 30 \text{ [s]}$$



$$40 \text{ cm} \rightarrow 0,4 \text{ m.}$$

a) n° vueltas:

$$V_{tg} = \frac{d}{t} \quad \left. \vphantom{\frac{d}{t}} \right\} V_{tg} = \frac{314 \text{ [cm]}}{30 \text{ [s]}} = 10,47 \text{ [m/s]}$$

$$V = \omega \cdot r \rightarrow \omega = \frac{V}{r} \rightarrow \omega = \frac{10,47 \text{ [m/s]}}{0,4 \text{ [m]}} = 26,175 \text{ [s]}$$

n° vueltas = distancia / perimetro.

$$\hookrightarrow \text{n° vueltas} = \frac{314 \text{ [cm]}}{2\pi \cdot r} \rightarrow \frac{314 \text{ [cm]}}{2\pi \cdot 0,4 \text{ [m]}}$$

$$\hookrightarrow \text{n° vueltas} = \frac{314 \text{ [cm]}}{2,512 \text{ [cm]}} \rightarrow \text{n° vueltas} = 125 \text{ vueltas}$$

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b)

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b) Velocidad angular media: rueda

$$\omega = \frac{2\pi}{T} = 2\pi \left(\frac{125}{30} \right) \rightarrow \boxed{\omega = 26,2 \text{ [rad/s]}}$$

c) Velocidad angular media: pedal.

$$\omega_2 = \omega_1 \quad R_1 \omega_1 = R_2 \omega_2$$

$$\omega = \frac{0,04 \cdot 26,2}{0,1} \rightarrow \boxed{\omega = 10,48 \text{ [rad/s]}}$$

[Signature]