Prueba Física II N°4.

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$V = \omega \cdot R$	$\omega = \frac{d\theta}{dt}$	$\alpha = \frac{d\omega}{dt}$
$a = \alpha \cdot R$		
$S = \theta \cdot R$	$\bar{\omega} = \frac{\Delta\theta}{\Delta t}$	$\bar{\alpha} = \frac{\Delta\omega}{\Delta t}$

$1\,rev = 2\pi\,[rad]$

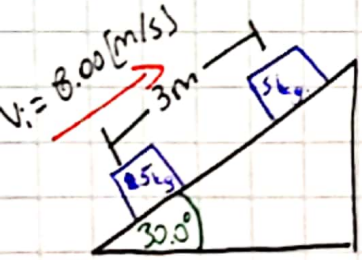
$g = 10\,[m/s^2]$

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

$W = F \cdot d \cdot \cos\theta$ / $K = \frac{1}{2}mv^2$ / $U_g = m \cdot g \cdot h$. $U_e = \frac{1}{2}kx^2$

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

Pregunta 1): Coef. fricción?



masa = 5[kg]
Vi = 8.00 [m/s]
d = 3 [m]
θ = 30.0°

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

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

$U_g = 50 \cdot 3 \cdot 1/2$

$U_g = 75$.

$\Delta E = W_{FNC.} \rightarrow E_f - E_i = W_{FNC.} \rightarrow U_g - \frac{1}{2}mv^2 = F_r \cdot d \cdot \cos(180°)$

$75 - 160 = U_k \cdot mg\cos(30) \cdot d \cdot \cos 180$ → $43,3 \times 3 \times -1 = -129,9$

(normal: $5 \cdot 10 \cdot 0,866 = 43,3$)

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

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

$U_k = 0,65$

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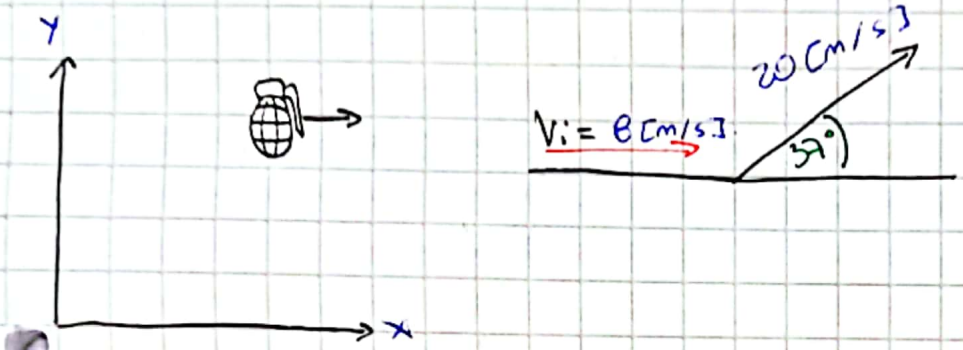
Pregunta 2: magnitud y dirección.

A y B = 2 fragmentos



θ: arctg $\frac{12,04}{7,97}$ = 56,4

60 Cos θ = Cos 56,4

$\vec{P}_{i\,x} = \vec{P}_{f(x)}$. $m \cdot 0 = m \cdot 20 \cos 37° + m V_B \cos\theta$

$0 - 20 \cos 37° = V_B \cos\theta$

B = 2do fragmento.

$-7,97$ m/s $= V_B \cos\theta \rightarrow 56,4$.

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

$\vec{P}_{iy} = \vec{P}_{fy}$ $0 = m \cdot 20 \operatorname{sen} 37 + m V_B \operatorname{sen}\theta$

$-20 \operatorname{sen} 37° = V_B \operatorname{sen}\theta$

$-12,04 = V_B \operatorname{sen}\theta \rightarrow \operatorname{sen} 56,4$.

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

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

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

$Vf = \sqrt{417,61}$

$Vf = 20,44$ [m/s]

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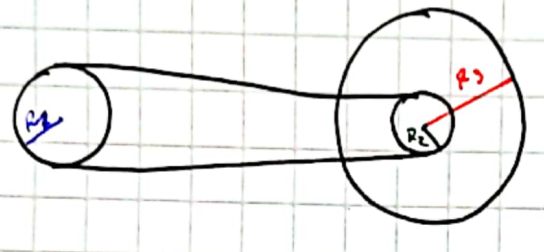
Pregunta 3:

$R_1 = 10\ [cm]$
$R_2 = 4\ [cm]$
$R_3 = 40\ [cm]$
$d = 314\ [m]$
$t = 30\ [s]$



40 cm → 0,4 m.

a) n° vueltas:

$$Vtg = \frac{d}{t} \Rightarrow Vtg = \frac{314\ [m]}{30\ [s]} = \boxed{10,47\ [m/s]}$$

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

n°vueltas = distancia / perímetro.

↳ n°vueltas: $\frac{314\ [m]}{2\pi \cdot R} \rightarrow \frac{314\ [m]}{2\pi \cdot 0,4\ [m]}$

↳ n° vueltas = $\frac{314\ [m]}{2,512\ [m]} \rightarrow \boxed{\text{n° vueltas} = 125\ \text{Vueltas}}$

b)

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b) Velocidad angular media: rueda

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

c) Velocidad angular media: pedal.

$$\omega_2 = \omega_1 \qquad R_1\omega_1 = R_2\omega_2.$$

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