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Curso: 2º C

PREGUNTA 1:

$$\Delta E = W_{roce}$$

$$E_f - E_i = W_{roce}$$

$$(K_f + U_{gf}) - (K_i + U_{gi}) = W_{roce}$$

$$m \cdot g \cdot h - \left(\frac{1}{2} \cdot m \cdot (v_i)^2 \right) = \vec{f}_r \cdot d \cdot \cos 180^\circ$$

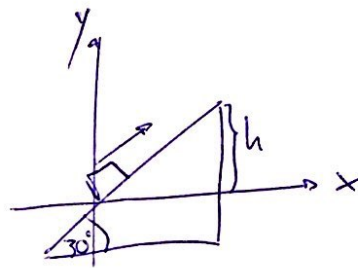
$$5 \text{ [kg]} \cdot 10 \text{ [m/s}^2] \cdot 1,5 \text{ [m]} - \frac{1}{2} \cdot 5 \text{ [kg]} \cdot (8 \text{ [m/s]})^2 = \vec{f}_r \cdot 3 \text{ [m]} \cdot -1$$

$$75 \text{ [J]} - 160 \text{ [J]} = \vec{f}_r \cdot -3 \text{ [m]}$$

$$\vec{f}_r = \frac{-85 \text{ [J]}}{-3 \text{ [m]}}$$

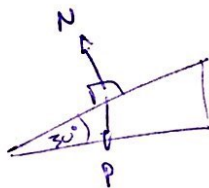
$$\vec{f}_r = 28,33 \text{ [N]}$$

~~$$\mu \cdot m \cdot g = 28,33 \text{ [N]}$$
$$\mu = \frac{28,33 \text{ [N]}}{5 \text{ [kg]} \cdot 10 \text{ [m/s}^2]}$$
$$\mu = 0,57$$~~



$$h = 3 \text{ [m]} \cdot \sin 30^\circ$$

$$h = 1,5 \text{ [m]}$$



$$\vec{f}_r = 28,33 \text{ [N]}$$

$$\mu \cdot N = 28,33 \text{ [N]}$$

$$\mu \cdot 43,3 \text{ [N]} = 28,33 \text{ [N]}$$

$$\mu = 0,65$$



$$P_y = P \cdot \cos 30^\circ$$

$$P_y = m \cdot g \cdot \cos 30^\circ$$

$$P_y = 5 \cdot 10 \cdot \cos 30^\circ$$

$$N = P_y = 43,30 \text{ [N]}$$

PREGUNTA 2:

x) $p_i = p_f$

$$m_i \cdot \vec{v}_i = m_{f1} \cdot \vec{v}_{f1} + m_{f2} \cdot \vec{v}_{f2}$$

$$2m \cdot 8[m/s] = m \cdot 20[m/s] \cdot \cos 37^\circ + m \cdot \vec{v}_{f2}$$

$$16[m/s] = 20[m/s] \cdot \cos 37^\circ + \vec{v}_{f2}$$

$$\vec{v}_{f2} = 16[m/s] - 20[m/s] \cdot \cos 37^\circ$$

$$\vec{v}_{f2} = 16[m/s] - 15,97[m/s]$$

$$\vec{v}_{f2} = 0,03[m/s]$$

y) $p_i = p_f$

$$m_i \cdot \vec{v}_i = m_{f1} \cdot \vec{v}_{f1} + m_{f2} \cdot \vec{v}_{f2}$$

$$2m \cdot 0 = m \cdot 20 \cdot \sin 37^\circ + m \cdot \vec{v}_{f2}$$

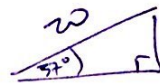
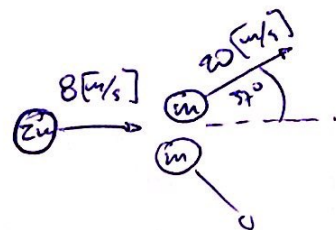
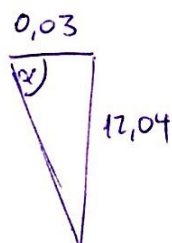
$$0 = 20 \cdot \sin 37^\circ + \vec{v}_{f2}$$

$$\vec{v}_{f2} = -20[m/s] \cdot \sin 37^\circ$$

$$\vec{v}_{f2} = -12,04[m/s]$$

$$\vec{v}_{f2} = (0,03 \uparrow - 12,04 \downarrow)[m/s]$$

$$|\vec{v}_{f2}| = 12,04[m/s]$$



$$y = 20 \cdot \sin 37^\circ$$

$$x = 20 \cdot \cos 37^\circ$$

$$\sqrt{0,03^2 + 12,04^2}$$

$$= 12,04$$

$$\tan \alpha = \frac{12,04}{0,03}$$

$$\alpha = 89,86^\circ$$

PREGUNTA 3:

$$\begin{array}{lcl} 2,51 \text{ [m]} & \longrightarrow & 1 \text{ [rev]} \\ 3,14 \text{ [m]} & \longrightarrow & x \end{array}$$

a) $2 \cdot \pi \cdot R_3$

$$= 2 \cdot \pi \cdot 0,4 \text{ [m]}$$

$$= 2,51 \text{ [m]}$$

$$\frac{3,14 \text{ [m]} \cdot 1 \text{ [rev]}}{2,51 \text{ [m]}} = 125 \text{ [rev]}$$

$R =$ La rueda da 125 vueltas.

b) $\bar{\omega} = \frac{125 \text{ [rev]} - 0}{30 \text{ [s]} - 0}$

$$\bar{\omega} = \frac{\Delta \theta}{\Delta t}$$

$$\bar{\omega} = 4,17 \left[\frac{\text{rev}}{\text{s}} \right] \cdot \frac{2\pi \text{ [rad]}}{1 \text{ [rev]}}$$

$$\bar{\omega} = 26,18 \left[\frac{\text{rad}}{\text{s}} \right]$$

$\frac{1}{3}$

c) $\omega_3 = \omega_2$

$$\omega_2 = 26,18 \left[\frac{\text{rad}}{\text{s}} \right]$$

$$v_{T1} = v_{T2}$$

$$\omega_1 \cdot R_1 = \omega_2 \cdot R_2$$

$$\omega_1 \cdot 10 \text{ [cm]} = 26,18 \left[\frac{\text{rad}}{\text{s}} \right] \cdot 4 \text{ [cm]}$$

$$\omega_1 = \frac{26,18 \left[\frac{\text{rad}}{\text{s}} \right] \cdot 4 \text{ [cm]}}{10 \text{ [cm]}}$$

$$\omega_1 = 10,47 \left[\frac{\text{rad}}{\text{s}} \right]$$