Prueba n°4 Física II 28-08-20

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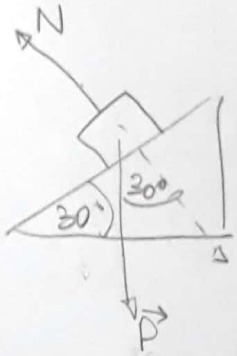
Pregunta (1):

$m = 5\ Kg$ $\quad d = 3\ m$

$V_0 = 8\ \frac{m}{s}$ $\quad \mu = ?$

$V_f = 0\ \frac{m}{s}$ $\quad g = 10\ \frac{m}{s^2}$



$h = 3 \cdot \text{sen}\,30$

$h = 1,5\ [m]$

$N = P \cdot \cos 30$

$N = 50,87\ [N]$

$W_{FNC} = \Delta E$

$F_R = E_f - E_0$

$F_R = (mgh) - \left(\frac{1}{2} m V^2\right)$

$F_R = (5 \cdot 10 \cdot 1,5) - \left(\frac{1}{2} \cdot 5 \cdot 8^2\right)$

$F_R = 75 - 160$

$F_R = -\mu \cdot N \cdot d$

$F_R = -\mu \cdot 50,87 \cdot 3$

$F_R = -\mu \cdot 129,9\ [N]$

$-\mu \cdot 129,9 = -85$

$\mu = \frac{+85}{+129,9}$

$\boxed{\mu = 0,65}$

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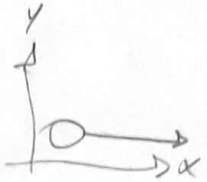
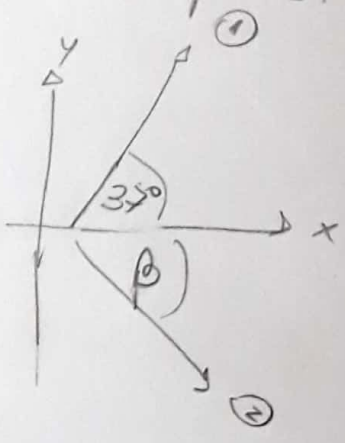
Pregunta ②:

antes



después:



$V_0 = 8\hat{i}\ \frac{m}{s}$

$m_1 = m_2 = \frac{1}{m}$

$V_1 = 20\ \frac{m}{s}$

$\alpha = 37°$

$\beta = ?$

$V_2 = ?$

$$P_0 = P_f$$

$\hat{i}$:

$$m \cdot V_0 = \frac{m}{2} \cdot V_1 + \frac{m}{2} \cdot V_2$$

$$m \cdot V_0 = \frac{m}{2} \cdot V_1 \cdot \cos 37 + \frac{m}{2} \cdot V_2 \cdot \cos \beta$$

$$m \cdot 8 = \frac{m}{2}(20 \cdot \cos 37 + V_2 \cdot \cos \beta)$$

$$16 = 15{,}97 + V_2 \cos \beta \quad (1)$$

$\hat{j}$:

$$0 = 20 \operatorname{sen} 37 - V_2 \operatorname{sen} \beta$$

$$0 = 12{,}04 - V_2 \operatorname{sen} \beta \quad (2)$$

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① $0,03 = V_2 \cos\beta$

② $12,04 = V_2 \cdot \operatorname{sen}\beta$

$$0,03 \cdot \operatorname{sen}\beta = 12,04 \cdot \cos\beta$$

$$\operatorname{sen}\beta = 401,3 \cdot \cos\beta \quad / \cdot \frac{1}{\cos\beta}$$

$$\operatorname{tan}\beta = 401,3$$

$$\beta = \operatorname{arctg}(401,3)$$

$$\boxed{\beta = 89,86°}$$

$$V_2 = \frac{0,03}{\cos\beta}$$

$$\boxed{V_2 = 12,28 \ \frac{m}{s^2}}$$

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Pregunta (3):

$d = 314\ m$

$t = 30\ s.$

$R_1 = 0,1\ m.$

$R_2 = 0,04\ m.$

$R_3 = 0,4\ m.$

a) $V = \frac{d}{t} \rightarrow V_t = \frac{314}{30} \rightarrow V_t = 10,47\ \frac{m}{s}.$

$\omega = \frac{V_t}{R} \rightarrow \omega = \frac{10,47}{0,4} \rightarrow \omega = 26,18\ \frac{rad}{s}.$

$\theta = \cancel{\theta_0}^{\,0} + \omega_0 \cdot t$

$\theta = 26,18 \cdot 30$

$\theta = \frac{785,4}{2\pi}$

$\theta = 125$ vueltas

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b) $\omega_3 = \frac{\Delta\theta}{\Delta t} = \frac{\theta_f - \theta_0^{\,0}}{t_f - t_0^{\,0}} = \frac{785,4}{30} \Rightarrow$

$$\boxed{\omega_3 = 26,2 \left[\frac{rad}{s}\right]}$$

c) $V_3 = V_1$

$$R_3 \cdot \omega_3 = R_1 \cdot \omega_1$$

$$\omega_1 = \frac{R_3 \cdot \omega_3}{R_1}$$

$$\boxed{\omega_1 = 104,80 \left[\frac{rad}{s}\right]}$$

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