

Prueba de física N° 4.

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Problema N° 1.

Datos

$$m = 5 \text{ Kg}$$

$$D = 3 \text{ m}$$

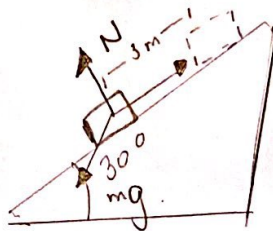
$$V_i = 0,00 \text{ m/s}$$

$$\alpha = 30^\circ$$

$$\Delta E = - W_{\text{Roca}}$$

$$E_f - E_i = - f_r \cdot \Delta x$$

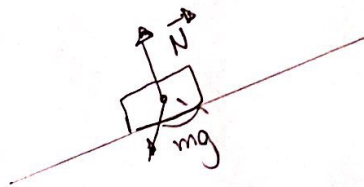
Energía potencial igual a 0 donde parte el bloque.



$$E_f = \cancel{K_f} + U_f$$
$$= U_f = mgy = mg \cdot 3 \text{ sen } 30^\circ$$

$$E_i = \cancel{K_i} + U_i = \frac{1}{2} m v^2 = 32 m \rightarrow \text{masa}$$
$$= 0$$

$$mg \cdot 3 \text{ sen } 30^\circ - 32 m = - f_r \cdot 3$$



$$N - mg \cos 30^\circ = 0$$

$$N = mg \cos 30$$

$$f_r = N \cdot \mu_k = mg \cos 30 \mu_k$$

$$mg \cdot 3 \cdot \text{sen } 30 - 32 m = - 3mg \cos 30 \mu_k$$

$$\mu_k = \frac{3g \text{ sen } 30 - 32}{3g \cos 30} = 0,6542$$

$$\mu_k = 0,65$$

Salazar

Problema 2

$$\sum \vec{p}_f = \sum \vec{p}_i$$

eje x:

$$2 \text{ m} \cdot 8 \text{ m/s} = m \cdot 20 \text{ m/s} \cdot \cos 37^\circ + m v \cos \theta$$

eje y

$$0 = m \cdot 20 \text{ m/s} \cdot \sin 37^\circ + m v \sin \theta$$

$$\Rightarrow v = - \frac{20 \sin 37^\circ}{\sin \theta}$$

Reemplazo eje x:

$$16 = 20 \cos 37^\circ - \frac{20 \sin 37^\circ}{\sin \theta} \cdot \cos \theta$$

$$16 = 20 \cos 37^\circ - \frac{20 \sin 37^\circ}{\tan \theta}$$

$$\frac{20 \sin 37^\circ}{\tan \theta} = 20 \cos 37^\circ - 16$$

$$\tan \theta = \frac{20 \sin 37^\circ}{-16 - 20 \cos 37^\circ} = -441054$$

$$\tan^{-1}(-441054) = 89,87^\circ$$

$$\theta = 89,87^\circ$$

$$v = 12,037 \text{ m/s}$$

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Problema 3

a. 1 vuelta se recorre en perimetro de R_3

el perimetro es $2\pi \cdot 0.4m = 2513[m]$
 $\hookrightarrow P = 2\pi \cdot R$

Por lo que el n° de vueltas
es

$$N^{\circ} \text{ vueltas} = \frac{314 \text{ m}}{2513 \text{ m}} = 124,938$$

$$\Gamma \text{ Aprox } \therefore = 125 \text{ vueltas}$$

b.

$$\omega = \frac{2\pi}{T} = 2\pi f = 2\pi \left(\frac{N^{\circ} \text{ vueltas}}{\text{Tiempo}} \right)$$

$$= 2\pi \left(\frac{124,938}{30 \text{ seg}} \right) = 26,166$$

$$\omega = 26,2 \text{ Rad/seg}$$

c.

$$\omega_2 = \omega_3$$

$$\Gamma V_{R_3} = V_{R_2}$$

$$\omega = \frac{0,04 \cdot 26,166}{0,1} = 10,466$$

$$\omega_1 = 10,47 \text{ Rad/seg}$$

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