

F1 - Ficha SA

Energia

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Parte I

Problemas

Problema 12

(i) v_a

$$\begin{aligned} &= \sqrt{2 \Delta E_k / m} - v_0; \quad v_0 = 0; \\ \Delta E_k &= \Delta E_g = m g \Delta h \implies \\ \implies v_a &= \sqrt{2 m g \Delta h / m} = \\ &= \sqrt{2 * g * (3.5 - 2) R} = \sqrt{3 g R} \end{aligned}$$

(ii) \vec{F}_N

$$\begin{aligned} &= \vec{a} m - \vec{F}_g; \quad a = v^2 / R \implies \\ \implies \vec{F}_N &= (m (\sqrt{3 g R})^2 / R - m g) - \hat{j} = \\ &= -2 m g \hat{j} = -2 * 5.00 * 9.81 \cong -98.07 \text{ mN } \hat{j} \end{aligned}$$

Problema 13 ΔS_2

$$\begin{aligned} &= \Delta U_2 / F_{2 \text{ atrito}}; \quad F_{2 \text{ atrito}} = \mu m g; \quad \Delta U_2 = \Delta E_{\text{Gravidade}} - W_{1 \text{ Atrito}} = m g \Delta h - \frac{F_{1 \text{ atrito}} \Delta h}{\sin(30^\circ)} \implies \\ \implies \Delta S_2 &= \frac{m g \Delta h - \mu m g \cos(30^\circ) \Delta h / \sin(30^\circ)}{\mu m g} = \left(\frac{1}{\mu} - \frac{1}{\tan(\theta)} \right) \Delta h = \\ &= \left(\frac{1}{0.20} - \frac{1}{\tan(30^\circ)} \right) 60 \text{ cm} \cong 196 \text{ cm} \end{aligned}$$