UERJ

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vestibular estadual 2 0 0 0

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EsFAO-CBMERJ
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Física
Padrão de Respostas

01.

A) Região III

B) $\dfrac{4Q^2}{(3+x)^2} = \dfrac{Q^2}{x^2} \Rightarrow 4x^2 = (3+x)^2 \Rightarrow 2x = 3 + x \ (x>0)$

$x = 3 \rightarrow$ ponto 11

02.

A) energia = tensão x corrente x tempo
= 120 x (10 + 20 + 30 + 10) x 100
= 7 x 120 kW.min = 14 kWh
custo = 0,2 x 14 = R\$ 2,80

B) $\dfrac{1}{3}$ energia = calor = mc ΔT

$\dfrac{1}{3}$ x 120 x 10 x 42 x 60 = 10 x 4,2 x 10^3 x ΔT

ΔT = 24 °C

03.

A) E = P + T cos 30°

$E = 0,1 + 0,2 \cdot \dfrac{\sqrt{3}}{2} \cong 0,27$ N

B) F = T sen 30°
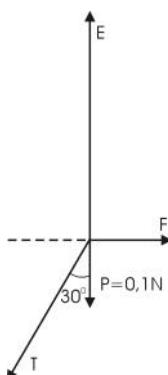
$F = 0,2 \cdot \dfrac{1}{2} = 0,1$ N

Diagrama de forças

04.
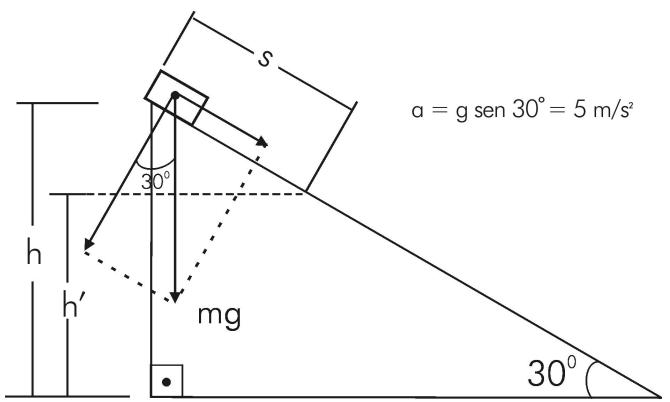
A) $v = at \implies v_2 = 5 \times 2 = 10$ m/s

$E_c = \dfrac{1}{2}\, mv^2 \implies E_c\,(2) = 100$ J

B) $\begin{cases} s = \dfrac{1}{2}at^2 \\[2mm] h' = h - s\cos 60^\circ \end{cases}$
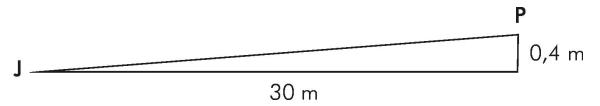
$h'_2 = h - s_2\cos 60^\circ = 25$ m

$E_p = mgh' \implies E_p\,(2) = 500$ J

$a = g \operatorname{sen} 30^\circ = 5$ m/s²

05.

A) $\Delta t_1 = \dfrac{\overline{JG}}{v_s} = \dfrac{60}{340} = \dfrac{3}{17}s \cong 0,18$ s

B) $(\overline{JP})^2 = 30^2 + 0,4^2 = 30^2\left(1 + \dfrac{0,16}{900}\right)$

$\overline{JP} = 30\left(1 + \dfrac{16}{9} \times 10^{-4}\right)^{\frac{1}{2}} \cong 30\left(1 + \dfrac{8}{9} \times 10^{-4}\right)$

$\Delta t_2 = \dfrac{(2\cdot\overline{JP})}{v_s} - \Delta t_1 = \dfrac{60}{340}\left(1 + \dfrac{8}{9} \times 10^{-4}\right) - \dfrac{60}{340}$

$= \dfrac{3}{17} \times \dfrac{8}{9} \times 10^{-4}\,s \cong 0,16 \times 10^{-4}$ s