Física 1 Prova 2

15/12/17 Gabarito

1) $W_T = \Delta K = K_2 - K_1$ 1

$K_2 = 0$ $K_1 = \frac{1}{2} m v_0^2$ $v_0 = ?$

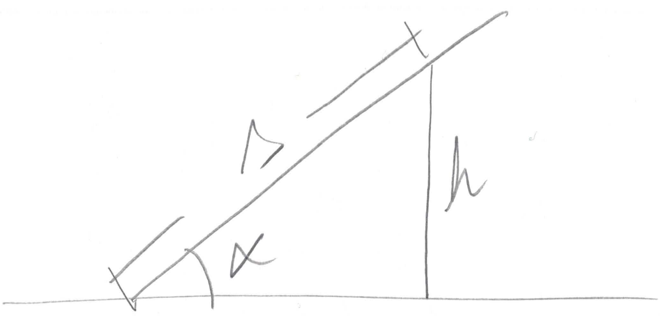
$W_T = W_g + W_a$ → atrito

↳ gravidade

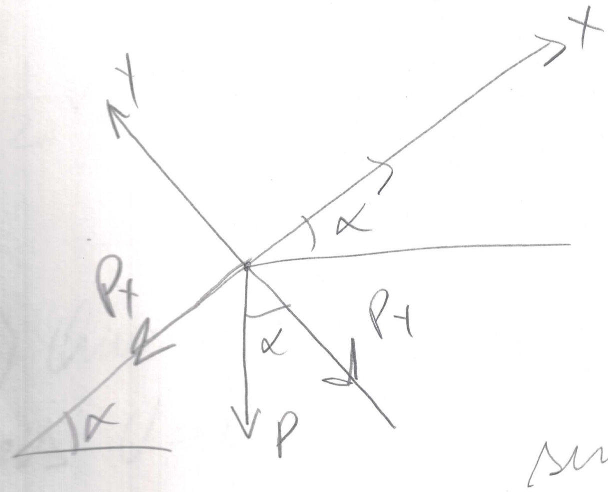
2,5

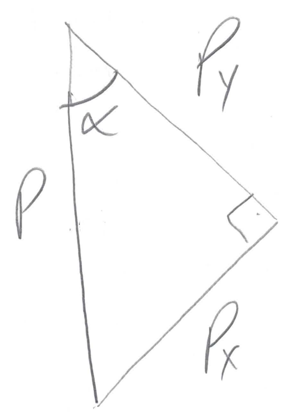
$W_T = -mgh$ $W_a = -f s$

$\sin\alpha = \frac{h}{s}$



$\Rightarrow s = \frac{h}{\sin\alpha}$





$\sin\alpha = \frac{P_x}{P}$ $\cos\alpha = \frac{P_y}{P}$

$f = \mu N = \mu P_y = \mu m g \cos\alpha$

$$\Rightarrow W_a = -\mu m g \cos\alpha \frac{h}{\sin\alpha} = -\frac{\mu m g h}{\tan\alpha}$$

De ① temos

$$-mgh - \frac{\mu m g h}{\tan\alpha} = -\frac{1}{2} m v_0^2$$

$$\Rightarrow v_0 = \sqrt{2gh\left(1 + \frac{\mu}{\tan\alpha}\right)}$$

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2) a) Apenas a gravidade tem $W \neq 0$.

2,5

$K_1 + U_1 = K_2 + U_2$

$K_1 = 0 \qquad U_1 = MgH$

$K_2 = \frac{1}{2}(m+M)v_2^2 \qquad U_2 = mgH$

Logo

$$MgH = \frac{1}{2}(m+M)v_2^2 + mgH$$

quero $v_2 = ?$

$$\frac{1}{2}(m+M)V_2^2 = MgH - mgH$$

$$V_2 = \sqrt{\frac{2(M-m)gH}{m+M}}$$

$$V_2 = \sqrt{\frac{235{,}2 - 78{,}4}{8}} = \boxed{4{,}4\,m/s}$$

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b) $L = H = \boxed{2m}$

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3) a) $U_1 = K_2 + U_2$ 2,5

$U_1 = MgH$ $K_2 = \frac{1}{2}Mv_2^2$ $U_2 = MgD$

$$\Rightarrow MgH = \frac{1}{2}Mv_2^2 + MgD$$

$$\frac{1}{2}V_2 = gH - gD \Rightarrow V_2 = \boxed{\sqrt{2g(H-D)}}$$

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b) Quando ele atinge o chão abaixo da ponte B, pois $U = 0$.

c) $U_1 = K_3 \Rightarrow Mg H = \frac{1}{2} M v_3^2$

$$\Rightarrow v_3 = \boxed{\sqrt{2gH}}$$

5) a) $x > 0$.

2,0

b) $x < 0$.

c) $x \simeq 0{,}7\,m$.

d) $x = 2{,}2\,m$.

e) $x \simeq 0{,}7\,m$.

f) ponto C.