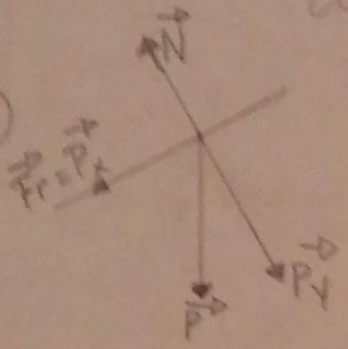
Universidad de Margarita Rodrigo Oliveira
Alma Mater del Caribe 29655609

Evaluación 202 Física I

1)



$\Sigma F_y = 0 \quad \vec{N} = \vec{P_y} \quad P_y = mg\cos 45^\circ$

$F_r = \mu \cdot \vec{N} = \mu \cdot mg\cos 45^\circ$

Trabajo en Fuerza de roce

$W_r = E_{mB} - E_{mA} \rightarrow W_r = mg \cdot h_B - \frac{1}{2} m(V_A)^2$

$E_{mB} = E_{CB} + E_{pB}$	$E_{mA} = E_{CA} + E_{pA}$
$E_{mB} = 0 + E_{pB}$	$E_{mA} = E_{CA} + 0$
$E_{mB} = E_{pB} = m \cdot g \cdot h_B$	$E_{mA} = E_{CA} = \frac{1}{2} \cdot m(V_A)^2$

$W_r = F_r \cdot x \cdot \cos 180^\circ \rightarrow W_r = -\mu \cdot mg\cos 45^\circ \cdot x$

$W_r = -0{,}2 \cdot m \cdot 9{,}8\ m/s^2 \cdot \cos 45^\circ = -1{,}39m \cdot x$ Joules

$\operatorname{Sen} 45^\circ = \frac{h_B}{x} \rightarrow h_B = x \operatorname{Sen} 45^\circ$

$W_r = mg \cdot h_B - \frac{1}{2} m(V_A)^2 = -1{,}39x$

$2g \cdot x \operatorname{Sen} 45^\circ - (V_A)^2 = -2{,}78x \rightarrow x(2g \cdot \operatorname{Sen} 45^\circ + 2{,}78) = (V_A)^2$

$$x = \frac{(56\ m/s)^2}{2 \cdot 9{,}8\ m/s^2 \cdot \operatorname{Sen} 45^\circ + 2{,}78} = 188{,}47\ m$$

2) Datos

$m = 6500\,kg$

$x = 500\,m$

$V_0 = 14\,m/s$

$V_f = 22\,m/s$

$E_c = ?$

$F = ?$

a) Calculo del Trabajo

$E_{c0} = \frac{1}{2} m V_0^2 \quad E_{cf} = \frac{1}{2} m V_f^2$

$E_c = E_{cf} - E_{c0} \rightarrow E_c = \frac{1}{2} m V_f^2 - \frac{1}{2} m V_0^2$

$E_c = \frac{1}{2} m (V_f^2 - V_0^2)$

$E_c = \frac{1}{2} 6500\,kg \left[(22\,m/s)^2 - (14\,m/s)^2 \right] =$

$E_c = 936000\ Joules$

b) Calculo de la Fuerza

$E_c = W \rightarrow W = F \cdot X \rightarrow F = \frac{W}{X}$

$F = \frac{936000\ Joules}{500\,m} = 1872\,N$

4) a) $E_{mA} = E_{mB} \rightarrow E_{cA} + E_{pA} = E_{cB} + E_{pB}$

$V_A = 0$, $E_{cA} = 0$, $h_B = 0 \rightarrow E_{pA} = E_{cB} \rightarrow$

$mgh_A = \frac{1}{2} m (V_B)^2 \rightarrow (V_B)^2 = 2gh_A \rightarrow$

$(V_B)^2 = 2 \cdot 9{,}8\ m/s^2 \cdot 5m \rightarrow 98\ m^2/s^2 \rightarrow V_B = 9{,}89\ m/s$

b) $E_{mB} = E_{mC} \rightarrow E_{cB} + E_{pB} = E_{cC} + E_{pC}$

$h_B = 0$, $E_{pB} = 0 \rightarrow E_{cB} = E_{cC} + E_{pC} \rightarrow$

$\frac{1}{2} m (V_B)^2 = \frac{1}{2} m (V_C)^2 + mgh_C \rightarrow \frac{1}{2} (V_B)^2 = \frac{1}{2} (V_C)^2 + gh_C \rightarrow$

$\frac{1}{2} (V_B)^2 - gh_C = \frac{1}{2} (V_C)^2 \rightarrow 2\left[\frac{1}{2} (V_B)^2 - gh_C\right] = (V_C)^2$

$(V_C)^2 = (V_B)^2 - 2gh_C \rightarrow V_C = \sqrt{100\ m^2/s^2 - 2 \cdot 9{,}8\ m/s^2 \cdot 3\ m}$

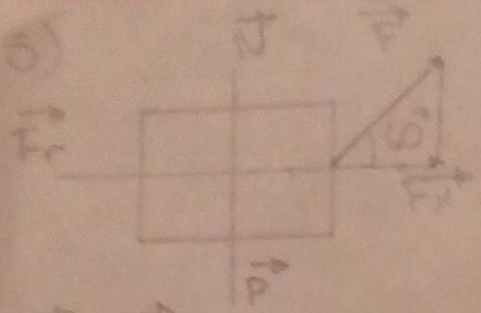
$V_C = 6{,}4\ m/s$

$h_B = 0$ $E_{pB} = 0$

c) $E_{mB} = E_{cB} + E_{pB} \rightarrow E_{mB} = E_{cB} = \frac{1}{2} \cdot 6\ kg \cdot (9{,}89\ m/s)^2$

$E_{mB} = 293{,}44$ Joules

6)



$\vec{N} = \vec{P}$

$\vec{P} = mg$

$m = 65\,Kg$

$t = 60\,s$

$x = ?$

$F_h = F_x - F_r \Rightarrow F_h = F \cdot \cos 60° - \mu \cdot mg$

$F_h = 400N \cdot \cos 60° - 0,2 \cdot 65Kg \cdot 9,8 m/s^2$

$F_h = 72,6\,N$

$x = \frac{a \cdot t^2}{2} \rightarrow x = \frac{0,05 m/s^2 \cdot (60s)^2}{2}$

$x = 60\,m$

$W = F_h \cdot x \cdot \cos 0°$

$W = 72,6\,N \cdot 60m \cdot \cos 0°$

$W = 4356\ Joules$

6) Datos

$m = 6\,Kg$

$V_0 = 5\,m/s$

$V_f = 4\,m/s$

$k = 500\,N/m$

$x = ?$

$E_{c0} = E_{cf} + E_{pe} \rightarrow E_{pe} = E_{c0} - E_{cf}$

$E_{pe} = \frac{1}{2} m(V_0)^2 - \frac{1}{2} m(V_f)^2$

$E_{pe} = \frac{1}{2} m[(V0^2 - Vf^2)]$

$E_{pe} = \frac{1}{2} 6Kg[(5m/s)^2 - (4m/s)^2]$

$E_{pe} = 27\ Joules$

$E_{pe} = \frac{1}{2} K x^2 \rightarrow x = \sqrt{\frac{2 E_{pe}}{K}}$

$x = \sqrt{\frac{2 \cdot 27\ Joules}{500\,N/m}} = 0,33\,m$