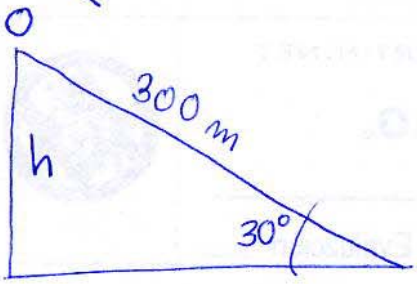
Segunda Evaluación

2



$\text{sen } 30° = \frac{h}{300} \rightarrow h = 300 \cdot \text{sen } 30°$

$h = 150 \text{ m}$

$m = 300g = 0'3 \text{ Kg}$

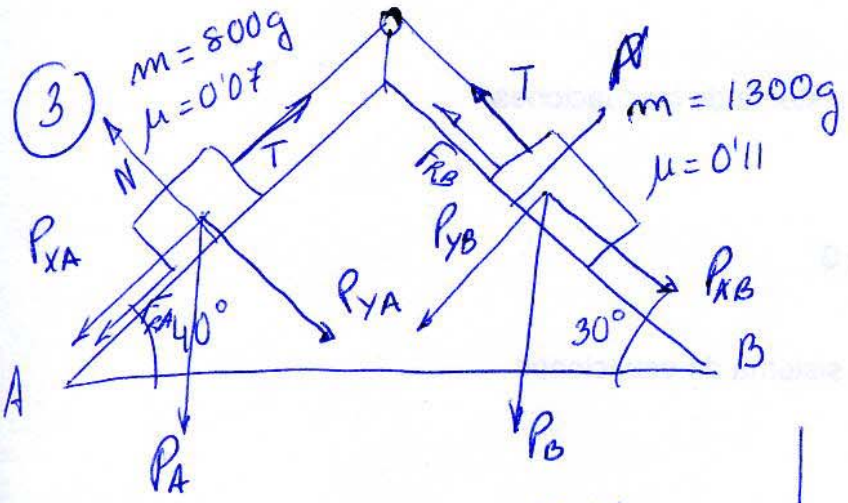
$E_{pi} = E_{cf}$

$mgh_i = \frac{1}{2} m v_f^2$

$0'3 \cdot 9'81 \cdot 150 = \frac{1}{2} 0'3 \cdot v_f^2 \Rightarrow v_f = \sqrt{\frac{2 \cdot 0'3 \cdot 9'81 \cdot 150}{0'3}}$

$v_f = 54'24 \text{ m/s}$

3



A $m_A = 800g = 0'8 \text{ Kg}$

$P_A = 0'8 \cdot 9'81 = 7'8 \text{ N}$

$P_{XA} = P_A \cdot \text{sen } \alpha = 7'8 \cdot \text{sen } 40°$

$P_{XA} = 5'01 \text{ N}$

$P_{YA} = P_A \cdot \cos \alpha = 7'8 \cdot \cos 40°$

$P_{YA} = 5'97 \text{ N} \equiv N_A$

$F_{RA} = N_A \cdot \mu = 5'98 \cdot 0'07 = 0'41 \text{ N}$

B $m_B = 1300g = 1'3 \text{ Kg}$

$P_B = m_B \cdot g = 1'3 \cdot 9'81 = 12'7 \text{ N}$

$P_{XB} = P_B \cdot \text{sen } \beta = 12'7 \cdot \text{sen } 30° = 6'35 \text{ N}$

$P_{YB} = P_B \cdot \cos \beta = 12'7 \cdot \cos 30° = 11 \text{ N} \equiv N_B$

$F_{RB} = N_B \cdot \mu = 11 \cdot 0'11 = 1'21 \text{ N}$

$P_{XB} > P_{XA}$

$P_B - F_{RB} - T = m_B \cdot a$

$T - P_A - F_{RA} = m_A \cdot a$

$P_B - P_A - F_{RB} - F_{RA} = (m_A + m_B) \cdot a$

cont...

$6'37 - 5'01 - 0'41 - 1'21 = (0'8 + 1'3) \cdot a$

$-0'26 = 2'1a$ $\quad \underline{a}$ negativa

EP sistema no se mueve

(4) $g = G \cdot \frac{M_P}{R_P^2}$ $\quad M_P = ?$ $\quad g = 11\ m/s^2$

$G = 6'67 \cdot 10^{-11}$

$R_P = 24746\ Km = 2'47 \cdot 10^7\ m$

$$M_P = \frac{g \cdot R_P^2}{G} = \frac{11 \cdot (2'47 \cdot 10^7)^2}{6'67 \cdot 10^{-11}} = 1 \cdot 10^{26}\ kg$$

b) $P = m \cdot g = 75 \cdot 11 = \underline{825\ N}$

c) $F_C = F_G$ $\quad \frac{m_{SAT} \cdot v_{SAT}^2}{R} = G \frac{M_P \cdot m_{SAT}}{R^2}$

$\underline{R = R_P + h} = 2'47 10^7 + 1'2 \cdot 10^6 = 2'59 \cdot 10^7\ m$

$$v_{SAT} = \sqrt{G \frac{M_P}{R}} = \sqrt{6'67 \cdot 10^{-11} \cdot \frac{1 \cdot 10^{26}}{2'56 \cdot 10^7}} = 16110\ m/s$$

$\frac{T_T^2}{R_T^3} = \frac{T_N^2}{R_N^3}$ $\quad \frac{365^2}{(1'49 \cdot 10^{11})^3} = \frac{T_N^2}{(4'5 \cdot 10^{12})^3}$

$$T = \sqrt{\frac{365^2 \cdot (4'5 \cdot 10^{12})^3}{(1'49 \cdot 10^{11})^3}} = \underline{60580\ d}$$

⑤ $P = 65\,N \rightarrow m = 66\,kg$

① $E_{m_1} = E_{p_1} + E_{c_1} = m g h_1 = 66 \cdot 15 \cdot 9'81 = 9712\,J$

$E_{c_1} = 0$

② $E_{m_2} = E_{m_1} = 9712\,J = E_{p_2} + E_{c_2} = \frac{1}{2} m v_2^2$

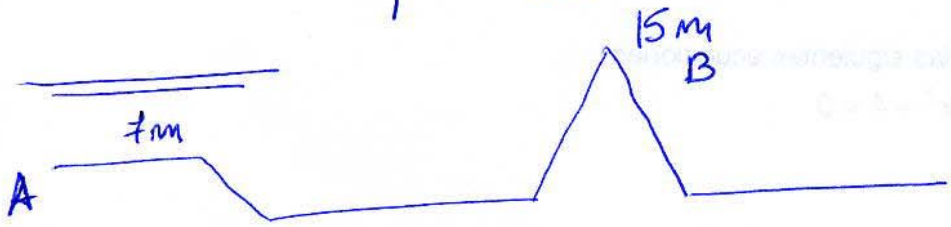
$E_{p_2} = 0$

$9712\,J = \frac{1}{2} 66 \cdot v_2^2 \rightarrow v_2 = \sqrt{\frac{2 \cdot 9712}{66}} = 17'15\ m/s$

③ $E_{m_3} = E_{m_1} = 9712\,J = E_{p_3} + E_{c_3} = m g h_3 + \frac{1}{2} m v_3^2$

$66 \cdot 9'81 \cdot 7 + \frac{1}{2} 66 \cdot v_3^2 = 9712 \qquad 4532 + 33 v_3^2 = 9712$

$v_3 = \sqrt{\frac{9712 - 4532}{33}} = 12'5\ m/s$



$E_{m_A} = E_{m_B}$

$E_{m_B} = 9712\,J$

$E_{m_A} = E_{p_A} + E_{c_A} \longrightarrow E_{c_A} \Rightarrow v_A = v_3$

$v_3 = 12'5\ m/s$