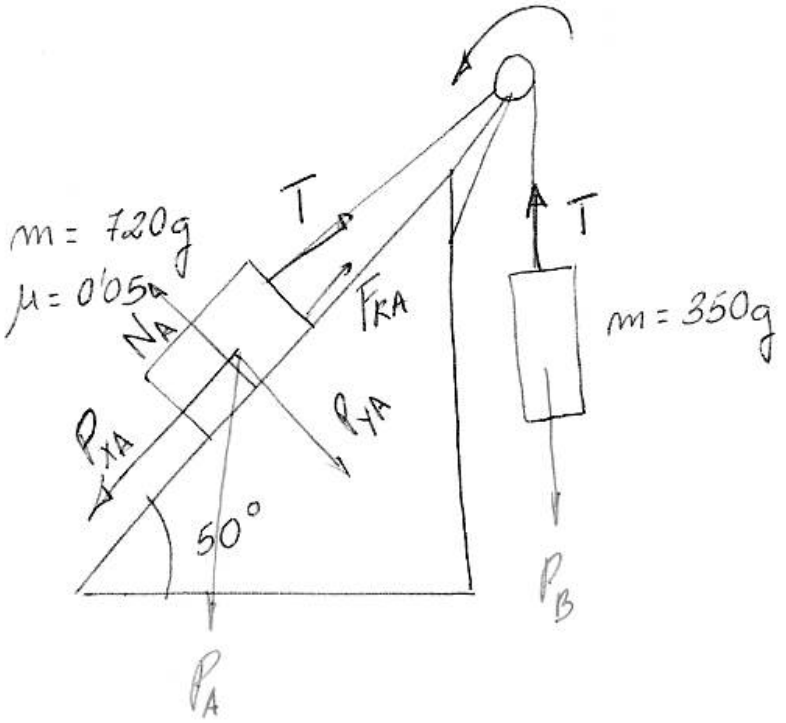


$P_A = m_A \cdot g = 0'72 \cdot 9'81 = 7'06\,N$

$P_{XA} = P_A \cdot \operatorname{sen}\alpha = 7'06 \cdot \operatorname{sen} 50°$

$P_{XA} = 5'41\,N$

$P_{YA} = P_A \cdot \cos\alpha = 7'06 \cdot \cos 60°$

$P_{YA} = 3'53\,N \equiv N_A$

$F_{RA} = N_A \cdot \mu = 3'53 \cdot 0'05$

$F_{RA} = 0'18\,N$

$P_B = m_B \cdot g = 0'35 \cdot 9'81 = 3'43\,N$

$P_{XA} - \cancel{T} - F_{RA} = m_A \cdot a$

$\cancel{T} - P_B = m_B \cdot a$

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

$5'41 - 3'43 - 0'18 = (0'72 + 0'35) \cdot a$

$a = \dfrac{1'89}{1'07} = 1'77\ m/s^2$

$a = 1'77\ m/s^2$

(2) $M_{MER} = 3'3 \cdot 10^{23}\ Kg$

$\phi_{MER} = 4879'4\ Km \rightarrow R_{MER} = 2'4 \cdot 10^{6}\ m$

a) $F = G \cdot \frac{M_{MER} \cdot m_{PER}}{(R_{MER})^2} = 6'67 \cdot 10^{-11} \cdot \frac{3'3 \cdot 10^{23} \cdot 40}{(2'4 \cdot 10^{6})^2} =$

$F = \underline{269'5\ N}$

b) $h = 400\ Km = 4 \cdot 10^{5}\ m$

$F = G \frac{M_{MER} \cdot m_{SAT}}{(R_{SAT} + h)^2} = 6'67 \cdot 10^{-11} \cdot \frac{3'3 \cdot 10^{23} \cdot 300}{(2'4\,10^{6} + 4 \cdot 10^{5})^2} =$

$F = \underline{842'26\ N}$

c) $F_C = F_G \Rightarrow \frac{m_{SAT} \cdot v_{SAT}^2}{(R_M + h)} = G \frac{M_{MER} \cdot m_{SAT}}{(R_M + h)^2}$

$v_{SAT} = \sqrt{G \cdot \frac{M_{MER}}{(R_M + h)}} = \sqrt{6'67 \cdot 10^{-11} \frac{3'3 \cdot 10^{23}}{(2'4 \cdot 10^{6} + 4 \cdot 10^{5})}} =$

$v_{SAT} = 2803'7\ m/s$

d) $\frac{T_T^2}{R_T^3} = \frac{T_M^2}{R_M^3} \rightarrow \frac{365^2}{(5'8 \cdot 10^{10})^3} = \frac{T_M^2}{(1'5 \cdot 10^{11})^3}$

$T_M = \sqrt{\frac{365^2 \cdot (1'5 \cdot 10^{11})^3}{(5'8 \cdot 10^{10})^3}} = \underline{677\ dias}$

(3) $E_{m_A} = E_{m_B} = E_{m_C}$

$E_{m_B} = m g h_B + \frac{1}{2} m v_B^2 = 3700 \cdot 9'81 \cdot 16'5 + \frac{1}{2} 3700 \cdot 12'5^2 =$

$v = 45 \text{ Km/h} = 12'5 \text{ m/s}$

$E_{m_B} = 887963 \text{ J}$

$E_{m_A} = m g h_A + \frac{1}{2} m v_A^2 = 3700 \cdot 9'81 \cdot 5 + \frac{1}{2} 3700 \cdot v_A^2$

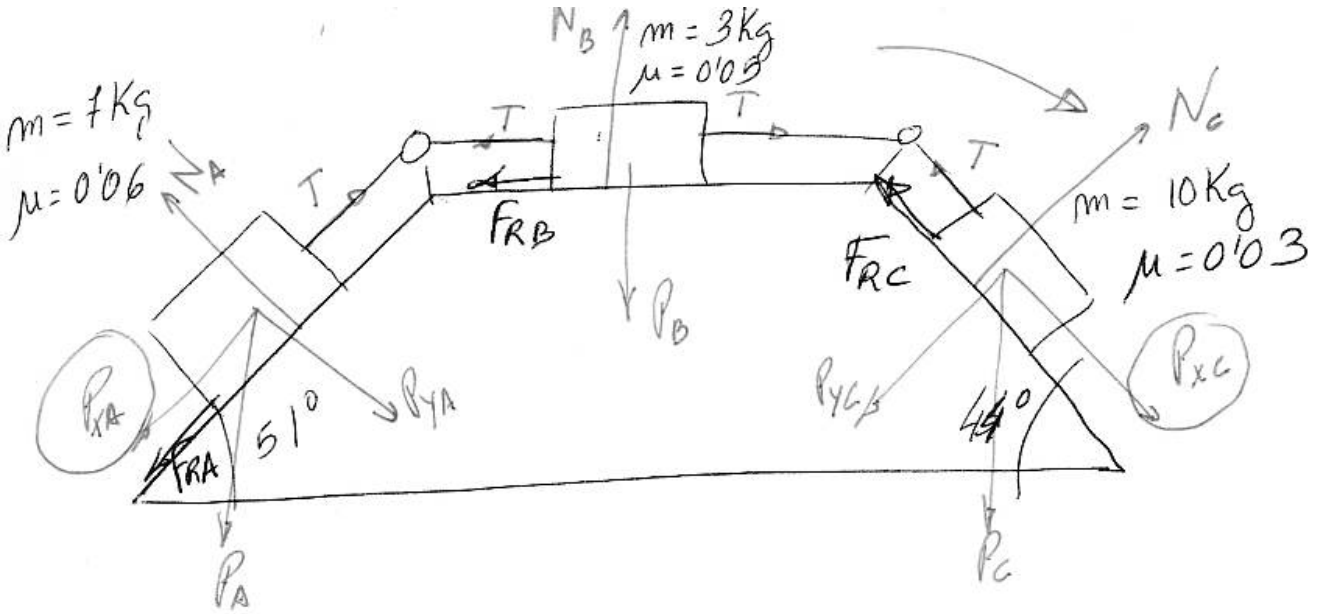
$887963 = 181485 + 1850 \, v_A^2$

$v_A = \sqrt{\frac{887963 - 181485}{1850}} = 19'5 \text{ m/s}$

$E_{m_C} = m g h_C + \frac{1}{2} m v_C^2 = 3700 \cdot 9'81 \cdot 3'7 + \frac{1}{2} 3700 \, v_C^2$

$887963 = 134298'9 + 1850 \, v_C^2$

$v = \sqrt{\frac{887963 - 134298'9}{1850}} = 20'18 \text{ m/s}$



$P_A = m_A \cdot g = 7 \cdot 9'81 = 68'87\,N$

$P_{XA} = P_A \cdot \operatorname{sen}\alpha = 68'87 \cdot \operatorname{sen} 51° = \underline{53'52\,N}$

$P_{YA} = P_A \cdot \cos\alpha = 68'87 \cdot \cos 51° = 43'34\,N \equiv N_A$

$F_{RA} = N_A \cdot \mu_A = 43'34 \cdot 0'06 = \underline{2'6\,N}$

$P_B = m_B \cdot g = 3 \cdot 9'81 = 29'43\,N \equiv N_B$

$F_{RB} = N_B \cdot \mu_B = 29'43 \cdot 0'05 = 1'47\,N$

$P_C = m_C \cdot g = 10 \cdot 9'81 = \underline{98'10\,N}$

$P_{XC} = P_C \cdot \operatorname{sen}\beta = 98'1 \cdot \operatorname{sen} 44° = \underline{68'14\,N}$

$P_{YC} = P_C \cdot \cos\beta = 98'1 \cdot \cos 44° = 70'57\,N \equiv N_C$

$F_{RC} = N_C \cdot \mu_C = 70'57 \cdot 0'03 = \underline{2'12\,N}$

$\cancel{T} - P_{XA} - F_{RA} = m_A \cdot a$

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

$P_{XC} - \cancel{T} - F_{RC} = m_C \cdot a$

$P_{XC} - P_{XA} - F_{RA} - F_{RB} - F_{RC} = (m_A + m_B + m_C)\, a$

$$68'14 - 53'52 - 2'6 - 1'47 - 2'12 = (7+3+10)\cdot a$$

$$8'43 = 20\,a$$

$$a = \frac{8'43}{20} = 0'42\ m/s^2$$