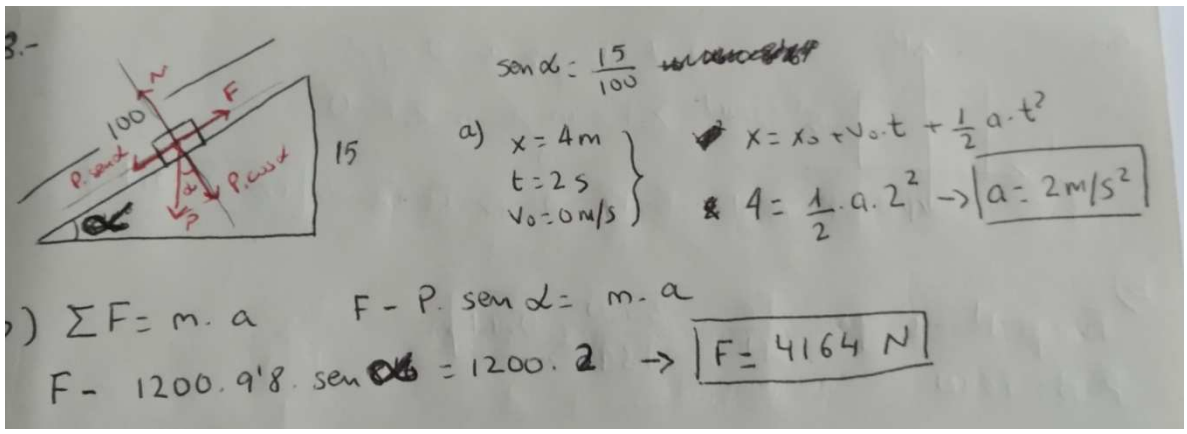
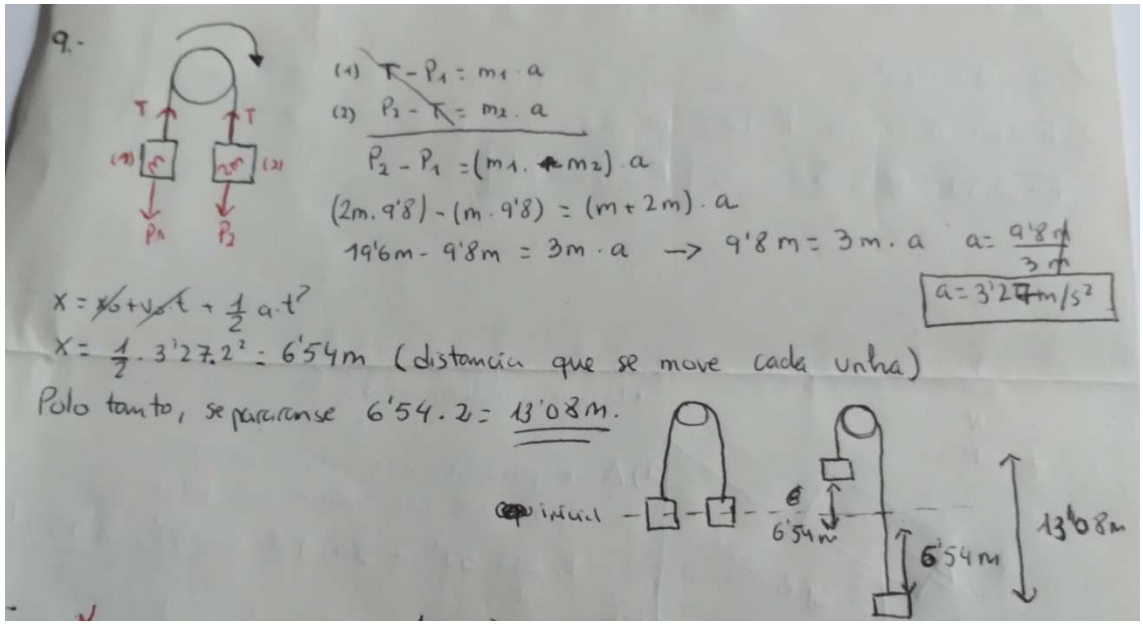
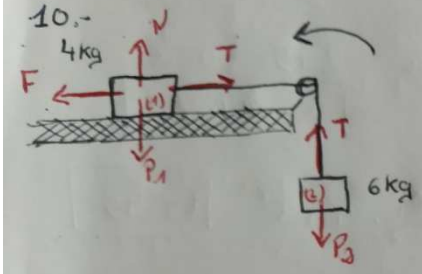
EXERCICIOS DINÁMICA

(DO 8 AO 15)





10.-



$x = 1m$, $t = 5s$, $v_0 = 0 m/s$ $\Big\}$ $x = \frac{1}{2} a \cdot t^2$

$1 = \frac{1}{2} \cdot a \cdot 5^2 \rightarrow a = 0'08 m/s^2$

(1) $F - T = m_1 \cdot a$

(2) $T - P_2 = m_2 \cdot a$

$F - P_2 = (m_1 + m_2) \cdot a$

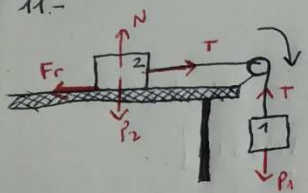
$F - 6 \cdot 9'8 = (6+4) \cdot 0'08 \rightarrow \boxed{F = 59'6 N}$

Para calcular a tensión pódese empregar calquera das dúas fórmulas.

(1) $F - T = m_1 \cdot a$

$59'6 - T = 4 \cdot 0'08 \rightarrow \boxed{T = 59'3 N}$

11.-



$P_1 - T = m_1 \cdot a$

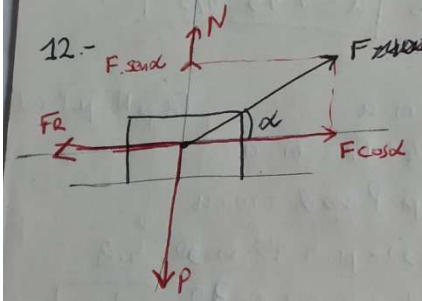
$T - F_r = m_2 \cdot a$

$P_1 - F_r = (m_1 + m_2) \cdot a$

$(3'8 + 0'2) \cdot 9'8 - 6 \cdot 9'8 \cdot 0'1 = (3'8 + 0'2 + 6) \cdot a$

$39'2 - 5'88 = 10a \rightarrow \boxed{a = 3'33 m/s^2}$

12.-



F = 100 N

a) Reposo $a = 0$ $\quad \Sigma F = 0$

$\Sigma F = 0 \rightarrow F \cdot \cos\alpha - F_R = 0$

$F_R = F \cdot \cos\alpha \rightarrow \boxed{F_R = 100 \cdot \cos 30 = 86'6 N}$

$P = F \cdot sen\alpha + N \rightarrow N = P - F sen\alpha$

$\boxed{N = 40 \cdot 9'8 - 100 \cdot sen\ 30 = 342 N}$

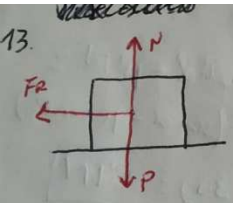
b) $F = 148 N$

$F_R = 148 \cdot \cos 30 = 128'2 N$

$N = 40 \cdot 9'8 - 148 \cdot sen\ 30 = 318 N$

$\Big\}$ $F_R = \mu \cdot N \rightarrow \mu = \frac{F_R}{N} = \frac{128'2}{318} = 0'4$

13. $V_0 = 2\ m/s$ $\quad V_f = 0\ m/s$



$F_R = \mu \cdot N$; $N = P$

$F_R = 0'2 \cdot 9'8 \cdot 10 = 19'6\ N$

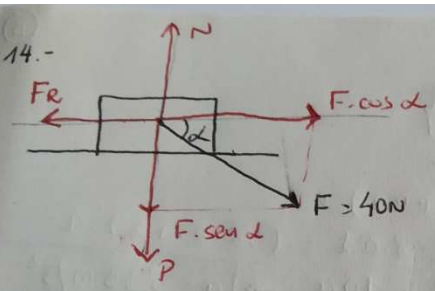
$\Sigma F = m \cdot a$

$0 - F_R = m \cdot a \rightarrow -19'6 = 10 \cdot a \rightarrow a = -1'96\ m/s^2$

$V = V_0 + a \cdot t$

$0 = 2 + (-1'96) \cdot t \rightarrow t = \frac{-2}{-1'96} = \boxed{1'02\ s}$

14.-



$F_R = \mu \cdot N$

$N = P + F \cdot \text{sen}\ \alpha$

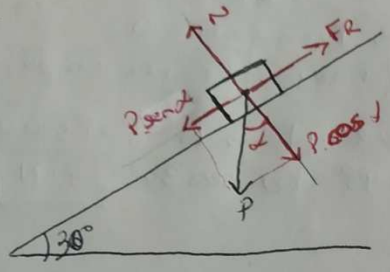
$N = 3 \cdot 9'8 + 40 \cdot \text{sen}\ 30^\circ = 49'4\ N$

$F_R = 0'25 \cdot 49'4 = \boxed{12'35\ N}$

$\Sigma F = m \cdot a \rightarrow F \cdot \cos\alpha - F_R = m \cdot a$

$40 \cdot \cos 30 - 12'35 = 3 \cdot a \rightarrow \boxed{a = 7'43\ m/s^2}$

15.-



a) $\Sigma F = m \cdot a$ $\qquad F_R = \mu N = \mu \cdot P \cdot \text{sen}\ \alpha$

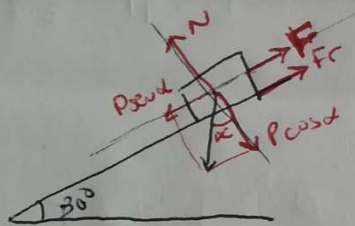
$P \cdot \text{sen}\ \alpha - F_R = m \cdot a$

$P \cdot \text{sen}\ \alpha - \mu \cdot P \cdot \cos\alpha = m \cdot a$

$4 \cdot 9'8\ \text{sen}\ 30 - \mu \cdot 4 \cdot 9'8 \cdot \cos 30 = 4 \cdot 3$

$\mu = \frac{4 \cdot 3 - 4 \cdot 9'8 \cdot \text{sen}\ 30}{-4 \cdot 9'8 \cdot \cos 30} = \boxed{0'34}$

b)



b) $\Sigma F = m \cdot a$

V cte $\rightarrow a = 0$

$\Sigma F = 0$

$P \cdot \text{sen}\ \alpha - F_r - F = 0$

$F = P\ \text{sen}\ \alpha - F_r = P \cdot \text{sen}\ \alpha - \mu N =$

$= P \cdot \text{sen}\ \alpha - \mu \cdot P \cdot \cos\alpha = P(\text{sen}\ \alpha - \mu \cos\alpha)$

$F = 4 \cdot 9'8(\text{sen}\ 30 - 0'34 \cdot \cos 30) = \boxed{8'1\ N}$