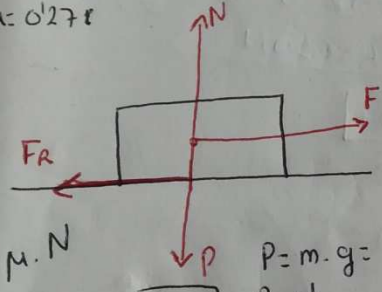


EXERCÍCIOS DINÂMICA

(DO 1 AO 7)

1-
 $m = 10 \text{ kg}$
 $\mu = 0.27$



$\Sigma F = m \cdot a$
 $F - F_r = m \cdot a$
 $30 - 26.5 = 10 \cdot a$
 $a = 0.35 \text{ m/s}^2$

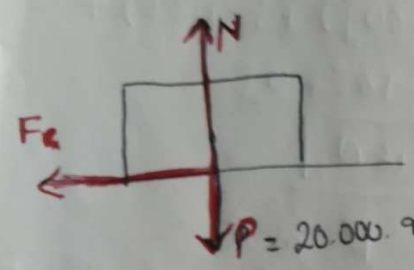
$F_r = \mu \cdot N$
 $F_r = 0.27 \cdot 98 = 26.5 \text{ N}$

$P = m \cdot g = 10 \cdot 9.8 = 98 \text{ N}$
 $P = N$

$V = V_0 + a \cdot t$
 $V = 0 + 0.35 \cdot 4 = 1.4 \text{ m/s}$

$V^2 = V_0^2 + 2ax$
 $1.4^2 = 0^2 + 2 \cdot 0.35 \cdot x$
 $x = 2.8 \text{ m}$

2. $m = 20 \text{ T} = 20.000 \text{ kg}$
 $v_0 = 24 \text{ m/s} \xrightarrow{15s} v = 0 \text{ m/s}$

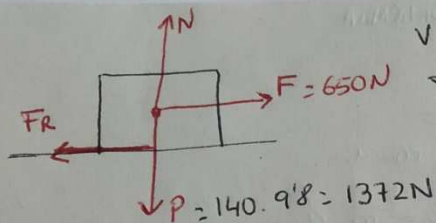


$P = 20.000 \cdot 9.8 = 196.000 \text{ N} = N$

$\Sigma F = m \cdot a \rightarrow F = m \cdot a$
 $F = 20.000 \cdot (-1.6) = -32.000 \text{ N}$

$V = V_0 + a \cdot t$
 $0 = 24 + a \cdot 15$
 $a = -1.6 \text{ m/s}^2$

3.-



$v \text{ cte} \rightarrow a = 0$

$\Sigma F = m \cdot a \rightarrow \Sigma F = 0$

$F - F_R = 0 \rightarrow F = F_R$

$F_R = 650 \text{ N}$

$$\left. \begin{array}{l} F_R = \mu \cdot N \\ N = P \end{array} \right\} 650 = \mu \cdot 1372 \rightarrow \boxed{\mu = 0.47}$$

4. $m = 2 \text{ kg}$ $t = 10 \text{ s}$ $v_0 = 0 \text{ m/s}$

$\vec{r}_0 = 2\vec{i} + 3\vec{j}$

$\vec{F} = 2\vec{i} - 5\vec{j}$

$\vec{F} = m \cdot \vec{a} \rightarrow \vec{a} = \frac{\vec{F}}{m} = \frac{2\vec{i} - 5\vec{j}}{2} = \frac{(2\vec{i} - 5\vec{j})}{2} \text{ m/s}^2$

$\vec{r} = \vec{r}_0 + \vec{v}_0 t + \frac{1}{2} \vec{a} t^2 \rightarrow \vec{r} = (2\vec{i} + 3\vec{j}) + \frac{1}{2} (2\vec{i} - 5\vec{j}) \cdot 10^2$
 $\vec{r} = (2\vec{i} + 3\vec{j}) + (50\vec{i} - 125\vec{j}) = \frac{(52\vec{i} - 122\vec{j})}{m}$

$\vec{v} = \vec{v}_0 + \vec{a} \cdot t$

$\vec{v} = 0 + (2\vec{i} - 2.5\vec{j}) \cdot 10 = \boxed{10\vec{i} - 25\vec{j} \text{ (m/s)}}$

SHOT ON REDMI 7
AI DUAL CAMERA

a) $\left. \begin{array}{l} \vec{F}_1 = 174\vec{i} + 100\vec{j} \text{ (N)} \\ \vec{F}_2 = -80\vec{j} \text{ (N)} \\ \vec{F}_3 = -118\vec{i} \text{ (N)} \\ \vec{F}_4 = -40\vec{i} - 20\vec{j} \text{ (N)} \end{array} \right\} \begin{array}{l} \Sigma \vec{F} = (174\vec{i} + 100\vec{j}) + (-80\vec{j}) + (-118\vec{i}) + (-40\vec{i} - 20\vec{j}) = 16\vec{i} + 0\vec{j} \\ \vec{F}_R = 16\vec{i} \text{ (N)} \quad |\vec{F}| = 16 \text{ N} \end{array}$

b) $\vec{v}_0 = 0 \text{ m/s}$

$\vec{r}_0 = 0 \text{ m}$

$t = 5 \text{ s}$

$\vec{r} = \vec{r}_0 + \vec{v}_0 t + \frac{1}{2} \vec{a} t^2$

$\vec{r} = \frac{1}{2} \cdot 2\vec{i} \cdot 5^2 = 25\vec{i} \text{ (m)}$

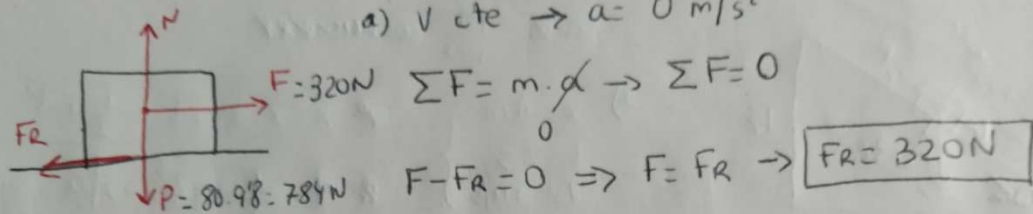
Posic. $(25, 0) \text{ (m)}$

$\vec{F} = m \cdot \vec{a}$

$\vec{a} = \frac{\vec{F}}{m} = \frac{16\vec{i}}{8} = 2\vec{i} \text{ (m/s}^2\text{)}$

$\vec{v} = \vec{v}_0 + \vec{a} \cdot t \rightarrow \vec{v} = 0 + 2\vec{i} \cdot 5 = \boxed{10\vec{i} \text{ (m/s)}}$

6.-

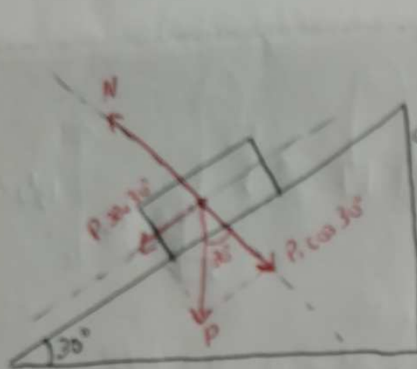


b) $F_R = \mu \cdot N \rightarrow \mu = \frac{F_R}{N} = \frac{320}{784} = \boxed{0.41}$
 $P = N = 784 \text{ N}$

c) $a = 0.2 \text{ m/s}^2$

$\Sigma F = m \cdot a \rightarrow F - F_R = m \cdot a$
 $F - 320 = 80 \cdot 0.2 \rightarrow \boxed{F = 336 \text{ N}}$

7.



a) A responsável do deslizamento é a componente do seno do peso.
 $P \cdot \sin 30^\circ = 50 \cdot 9.8 \cdot \sin 30^\circ = \boxed{245 \text{ N}}$

b) $\Sigma F = m \cdot a$
 $P \cdot \sin \alpha = m \cdot a$
 $245 = 50 \cdot a$
 $\boxed{a = 4.9 \text{ m/s}^2}$

c) $\left. \begin{array}{l} v_0 = 0 \text{ m/s} \\ x = 39.2 \text{ m} \\ a = 4.9 \text{ m/s}^2 \end{array} \right\} \begin{array}{l} \cancel{x = v_0 t + \frac{1}{2} a t^2} \\ x = \frac{1}{2} a t^2 \rightarrow 39.2 = \frac{1}{2} \cdot 4.9 t^2 \end{array} \quad \boxed{t = 4 \text{ s}}$

d) $v = v_0 + a \cdot t \rightarrow v = 4.9 \cdot 4 = \boxed{19.6 \text{ m/s}}$