

data 08.04.21
 fecha

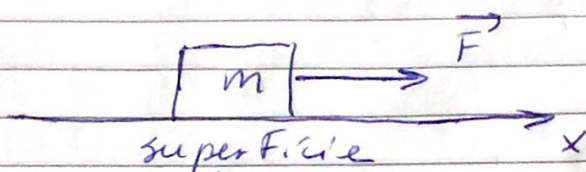
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Aluno: JORGE NANI HARBS

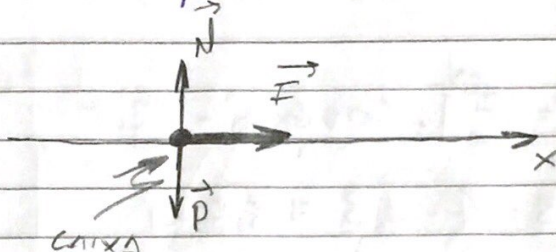
FÍSICA - 2021.1 - SIST. DE INFORMAÇÃO

LISTA EXERCÍCIOS - CAP. 5 - FORÇA E MOV. I

1- $m = 0,2 \text{ kg}$ $|\vec{F}| = 4 \text{ N}$



a)

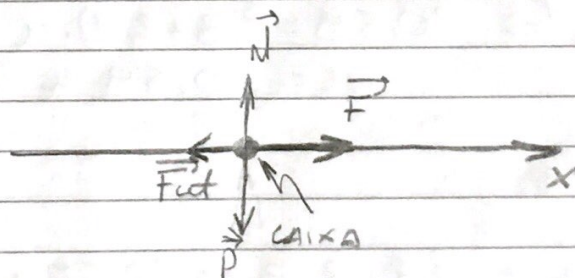


b) $|\vec{F}| = m \cdot |\vec{a}| \Rightarrow |\vec{a}| = \frac{4}{0,2} = 20 \text{ m/s}^2$

Direção horizontal, sentido positivo eixo x

2-

a)



b)

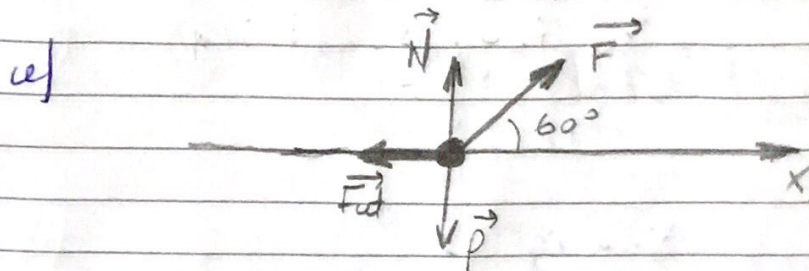
$$\vec{F}_R = \vec{F} + \vec{F}_{ct}$$

$$F_R = F - F_{ct} = 4 - 2 = 2 \text{ N}$$

$$|\vec{F}_R| = m \cdot |\vec{a}| \Rightarrow |\vec{a}| = \frac{2}{0,2} = 10 \text{ m/s}^2$$

Direção horizontal, sentido positivo eixo x

3- $|\vec{F}| = 8 \text{ N}$ $|\vec{F}_{ut}| = 1,3 \text{ N}$
 $\text{Sen } 60^\circ = 0,87$ $\text{Cos } 60^\circ = 0,5$



b) $\vec{F}_2 = \vec{F} + \vec{F}_{ut}$

$\vec{F}_{ex} = \vec{F}_x + \vec{F}_{ut}$

$F_{ex} = F_x - F_{ut} = |\vec{F}| \cdot \text{Cos } 60^\circ - F_{ut}$

$F_{ex} = 8 \cdot 0,5 - 1,3 = 4 - 1,3 = 2,7 \text{ N}$

$a = \frac{|\vec{F}_{ex}|}{m} = \frac{2,7}{0,2} = 13,5 \text{ m/s}^2$

4- $M = 3,3 \text{ Kg}$ $m = 2,1 \text{ Kg}$

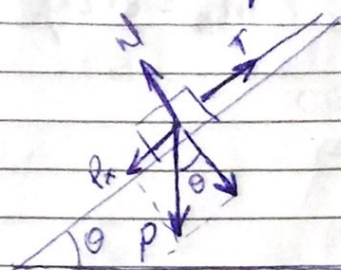
a) $\text{Peso } P = m \cdot g = 2,1 \cdot 9,8 = 20,58 \text{ N}$

$F = m \cdot a \Rightarrow 20,58 = (3,3 + 2,1) \cdot a$

$a = \frac{20,58}{5,4} \approx 3,8 \text{ m/s}^2$

b) $F = m \cdot a = 3,3 \cdot 3,8 \approx 12,57 \text{ N}$

5- $m = 5 \text{ kg}$ $\theta = 30^\circ$ $T = 25 \text{ N}$



$$P_x = P \cdot \sin 30^\circ$$

$$P_x = 5 \cdot 9,8 \cdot \frac{1}{2} = 24,5$$

$$P_x = 24,5 \text{ N}$$

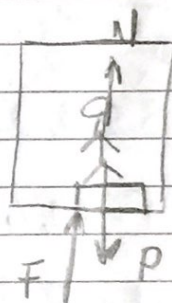
$$T - P_x = m \cdot a$$

$$0,5 = 5 \cdot a \Rightarrow a = 0,1 \text{ m/s}^2$$

6- $m = 72,2 \text{ kg}$

a) $P = m \cdot g$

$$N = m \cdot a + m \cdot g = m(a + g)$$



b) Nesse caso $P = N$

$$N = m \cdot g = 72,2 \cdot 9,8 = 707,56 \text{ N}$$

c) $N = m(a + g)$

aceleração p/ cima $\Rightarrow \uparrow F - P = m \cdot a$

$$F = m \cdot a + m \cdot g$$

$$F = 72,2(3,2 + 9,8)$$

$$F = 938,6 \text{ N}$$

$$F + P = m \cdot a$$

$$F = m \cdot a - m \cdot g$$

$$F = m(a - g) = -426,52 \text{ N (sentido p/ baixo)}$$

7- $|\vec{F}| = 20 \text{ N}$ $m_A = 4 \text{ kg}$ $m_B = 6 \text{ kg}$

a) $F_R = m \cdot a = (4 + 6) \cdot a = 20$
 $a = 2 \text{ m/s}^2$

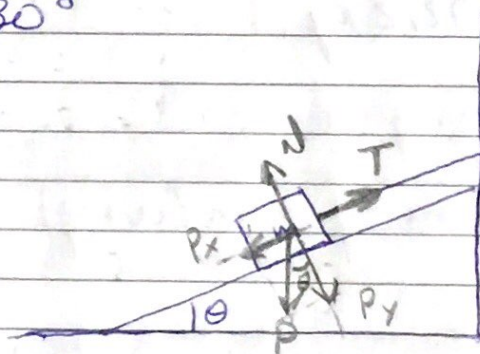
b) $F_{AB} = m_B \cdot a = 6 \cdot 2 = 12 \text{ N}$

19- $m = 8,5 \text{ kg}$ $\theta = 30^\circ$

a)

$T = P_x$
 $P_x = P \cdot \sin \theta = T$
 $T = 8,5 \cdot 9,8 \cdot 1/2$

$T = 41,65 \text{ N}$



b) $N = P \cdot \cos \theta = P_y$

$N = 8,5 \cdot 9,8 \cdot \frac{\sqrt{3}}{2} = 41,65 \cdot \sqrt{3} \approx 72,14 \text{ N}$

c) $P_x = P \cdot \sin \theta = m \cdot a$

$\frac{m \cdot g \cdot \sin \theta}{m} = a$

$a = g \cdot \sin \theta = 4,9 \text{ m/s}^2$

$$31- \quad m = 3 \text{ kg} \quad \vec{v} = 8,00t \hat{i} + 3,00t^2 \hat{j} \quad \text{m/s}$$

$$|\vec{F}_R| = 35 \text{ N}$$

$$\vec{a} = (8,0 \hat{i} + 6,0t \hat{j}) \cdot m = \vec{F}_R$$

$$F_{Rx} = 3 \cdot 8 = 24 \text{ N}$$

$$F_{Ry} = 6,0t \cdot 3 = 18t \approx 25,4 \text{ N}$$

$$(8 \cdot 3)^2 + (6 \cdot 3 \cdot t)^2 = 35^2$$

$$576 + 324t^2 = 1225$$

$$324t^2 = 649$$

$$t^2 = 2 \Rightarrow t \approx 1,415$$

$$\tan \theta = \frac{25,4}{24} \approx 1,0624$$

$$\arctan 1,0624 \approx \boxed{46,7^\circ}$$

$$b) \quad \vec{v} = 8,00t \hat{i} + 3,00t^2 \hat{j} \quad \text{m/s}$$

$$v_x = 8,00t = 8,00(1,415) = 11,32 \text{ m/s}$$

$$v_y = 3,00t^2 = 3,00(1,415)^2 \approx 6 \text{ m/s}$$

$$\tan \theta = \frac{v_y}{v_x} \approx \frac{6}{11,32} \approx 0,5306$$

$$\arctan 0,5306 \approx \boxed{27,95^\circ}$$

31 - $T_3 = 65 \text{ N}$ $m_1 = 12 \text{ kg}$ $m_2 = 24 \text{ kg}$ $m_3 = 31 \text{ kg}$

a) $F_R = T_3 = m \cdot a$
 $65 = (12 + 24 + 31) \cdot a$
 $65 = 67 \cdot a$
 $a \approx 0,97 \text{ m/s}^2$

b) $T_1 = m_1 \cdot a = 12 \cdot 0,97 \approx 11,64 \text{ N}$

c) $T_2 = (m_2 + m_1) \cdot a = (36) \cdot 0,97 = 34,92 \text{ N}$