b) $a = \frac{\Delta \vec{v}}{\Delta t} = \frac{50\ m/s}{5\ s} = 10\ m/s^2$ oeste.

c) MRU

d) $\vec{d} = \text{área } \Delta = \frac{10 \cdot 70}{2} = 350\ m$ oeste.

e) este

f) $\vec{v} = 0$

Capítulo VI

Actividad 6.1 (Página 170)

1. $F = m \cdot a \Rightarrow a = \frac{F}{m} = \frac{132\ N}{60\ kg} = 2{,}2\ m/s^2$ derecha.

2. $F = m \cdot a = (75\ kg)(1{,}2\ m/s^2) = 90\ N$ derecha.

3. Calcule la aceleración del sistema si se desprecia la fricción:

$$\Sigma F_x = m \cdot a_x$$

$$F_1 \cos\theta + F_2 - F_3 = m \cdot a_x$$

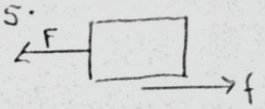
$$a_x = \frac{F_1 \cos\theta + F_2 - F_3}{m} = \frac{35\ N \cos 55 + 40\ N - 60\ N}{12\ kg}$$

$$a_x = 6 \times 10^{-3}\ m/s^2 \text{ derecha.}$$

4. $\Sigma F_x = m \cdot a_x \qquad a_x = \frac{\Sigma F_x}{m} = \frac{F_1 \cos\theta + F_2}{m}$

$$a_x = \frac{75\ N \cos 40 + 80\ N}{60\ kg} = 2{,}29\ m/s^2 \text{ derecha.}$$

5.



$\Sigma F_x = 0$ ($\vec{v}$ constante)

$-F + f = 0$

$F = f$

$F =$

10) a) $\Sigma F_x = m \cdot a_x$

$F_1 + F_2 \cos 20° + F_4 \cos 30° = m \cdot a_x$

$a = \dfrac{F_1 + F_2 \cos 20° + F_4 \cos 30°}{m}$

$a = \dfrac{30N + 25 \cos 20° + 50 \cos 30°}{10kg} = 9,68 m/s^2$ R/

b)

① $\Sigma F_y = 0$

$N - F_3 - F_2 \operatorname{sen} 20 + F_4 \operatorname{sen} 30 - P = 0$

$N = F_3 + F_2 \operatorname{sen} 20 - F_4 \operatorname{sen} 30 + P = 0$

$N = 20N + 25 \operatorname{sen} 20 - 50 \operatorname{sen} 30 + (10kg)(9,8 m/s^2)$

$N = 101,55 N$

② $f = (0,25)(101,55 N) = 25,4N$

③ $\Sigma F_x = m \cdot a$

$F_1 + F_2 \cos 20° + \cos 30° - f = m \cdot a_x$

$a_x = \dfrac{F_1 + F_2 \cos 20 + F_4 \cos 30 - f}{m}$

$a_x = \dfrac{30N + 25 \cos 20° + 50 \cos 30° - 25,4 N}{10kg}$

$a_x = 7,14 m/s^2$ R/

---

11)

$\Sigma F_y = m \cdot a$

$T - P = m \cdot a$

$T = ma + P$

$T = (4600kg)(2 m/s^2) + (45080N)$

$T = 54280N$ R/

$P = mg$

$P = (4600kg)(9,8 m/s^2)$

$P = 45080N$

(56)

) a) $F = m \cdot a$ $F = (5kg)(3m/s^2)$ $F = 15N$ R/

b) $20km/h^2 = 0,0015 m/s^2$

$F = m \cdot a$ $F = (5kg)(0,0015 m/s^2) = 0,0075N$ R/

c) $a = \frac{V_f - V_i}{t}$

$a = \frac{15m/s - 5m/s}{4s} = 2,5 m/s^2$

$F = ma$
$F = (5kg)(2,5 m/s^2)$
$F = 12,5N$ R/

(63)

d) $a = \frac{V_f^2 - V_i^2}{2d}$ $a = \frac{(15m/s)^2 - (20m/s)^2}{2(30m)} = -2,92 m/s^2$

$F = m \cdot a \Rightarrow$ $F = (5kg)(-2,92 m/s^2) = -14,6N$

$F = 14,6N$ izq. R/

e) $a = \frac{V_f - V_i}{t}$ $a = \frac{9m/s - 0}{6s} = 1,5 m/s^2$

$F = m \cdot a$ $F = (5kg)(1,5 m/s^2) = 7,5N$ R/

f) $a = \frac{V_f - V_i}{t} = \frac{6,94m/s - 3,33m/s}{20s} = 0,18 m/s^2$

$F = m \cdot a$ $F = (5kg)(0,18 m/s^2) = 0,9N$ R/

Repaso de conceptos (Página, 172)

I Parte

1) No necesariamente. Pueden haber fuerzas aplicadas, pero tener una fuerza neta equilibrada.
2) Sí, según la I Ley de Newton.
3) No, según la I Ley de Newton
4) No experimenta fricción. Esta fuerza aparece, cuando las superficies rozan entre sí.
5) Sí. Actúan el peso y la normal.
6) El peso va disminuyendo, pero la masa se mantiene.
7) Equivale a cero.
8) La fuerza normal actúa solo cuando está en el suelo.
9) c)

II Parte.

1) a) $\Sigma F_x = m \cdot a_x$ $\quad a_x = \frac{\Sigma F_x}{m} = \frac{10N - 10N}{3kg} =$

$a_x = 0$ R/

b) $\Sigma F_x = m \cdot a_x$ $\quad a_x = \frac{\Sigma F_x}{m} = \frac{10N + 10N}{3kg} = 6,67 m/s^2$ R/

c) $a_x = \frac{\Sigma F_x}{m} = \frac{-10N - 10N + 10\cos 40°}{3kg} = -4,11 m/s^2$ R/

d) $a_x = \frac{\Sigma F_x}{m} = \frac{-10N - 10N + 10N + 10\cos 45°}{3kg} = -0,98 m/s^2$ R/

e) $a_x = \frac{\Sigma F_x}{m} = \frac{10N + 10N - 10\cos 75° - 10\cos 55°}{3kg} = 3,89 m/s^2$ R/

f) $a_x = \frac{\Sigma F_x}{m} = \frac{10\cos 60° + 10N - 10\cos 50° N}{3kg} = 2,86 m/s^2$ R/

2) a) $\Sigma F_y = 0 \quad N = P = mg \quad N = (3kg)(9{,}8 m/s^2) = 29{,}4N$ R/

b) $\Sigma F_y = 0$

$N - P + 10 = 0$

$N = P - 10N$

$N = 29{,}4N - 10N = 19{,}4N$ R/

c) $\Sigma F_y = 0$

$N - P + 10\,sen40 = 0$

$N = P - 10\,sen40°$

$N = 29{,}4N - 10\,sen40°\ N$

$N = 22{,}97N$ R/

d) $\Sigma F_y = 0$

$N - P + 10\,sen45° = 0$

$N = P - 10\,sen45°$

$N = 29{,}4N - 10\,sen45\ N$

$N = 22{,}33N$ R/

e) $\Sigma F_y = 0$

$N - P + 10\,sen55 - 10\,sen75 = 0$

$N = P - 10\,sen55° + 10\,sen75° = 30{,}87N$ R/

f) $\Sigma F_y = 0$

$N - P - 10\,sen60 - 10\,sen50 = 0$

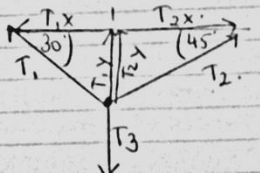
$N = P + 10\,sen60 + 10\,sen50$

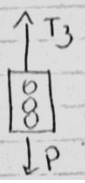
$N = 29{,}4N + 10\,sen60\ N + 10\,sen50°\ N = 45{,}72N$ R/

3) a) $\Sigma F_x = m \cdot a_x \qquad a_x = \frac{\Sigma F_x}{m} = \frac{12N}{3kg} = 4 m/s^2$ R/

b) $\Sigma F_x = m \cdot a_x = (3kg)(8 m/s^2) = 24N$ R/

4)





✓ Del D.C.L del semáforo

$$\Sigma F_y = 0 \Rightarrow T_3 - P = 0 \Rightarrow T_3 = P$$

$$T_3 = mg = (25kg)(9,8 m/s^2) = 245N$$

✓ Del D.C.L del nudo:

$$\Sigma F_x = 0$$

$$-T_1 \cos 30 + T_2 \cos 45 = 0$$

$$-T_1 \cos 30 + T_2 \cos 45 = 0 \quad (1)$$

$$\Sigma F_y = 0$$

$$T_1 \operatorname{sen} 30 + T_2 \operatorname{sen} 45 - T_3 = 0$$

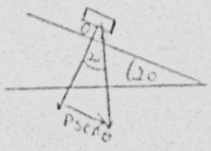
$$T_1 \operatorname{sen} 30 + T_2 \operatorname{sen} 45 = 245 \quad (2)$$

Resolviendo el sistema:

$$\begin{cases} T_1 = 179,35N \\ T_2 = 219,66N \end{cases}$$

---

5)



- La única fuerza que actúa es la componente del peso

$$F_x = m \cdot a_x$$

$$P \operatorname{sen}\theta = m \cdot a_x$$

$$mg \operatorname{sen}\theta = m a_x$$

$$a = 9,8 m/s^2 \cdot \operatorname{sen} 20 = 3,35 m/s^2$$

---

6) $P = 50N \quad t = 10s \quad d = 300m \quad m$

✓ $m = \frac{P}{g} = \frac{50N}{9,8 m/s^2} = 5,10 kg$

✓ $d = y_i^{\nearrow 0} t + \frac{1}{2} a t^2 \qquad a = \frac{2d}{t^2} = \frac{2(300m)}{(10s)^2} = 6 m/s^2$

✓ $F = m \cdot a = (5,10kg)(6 m/s^2) = 30,6N$ R/

7) a) $F = m \cdot a \Rightarrow m = \frac{F}{a} = \frac{50N}{1,5 m/s^2} \qquad m = 33,33 kg$ R/

b) $v_i = 0 \quad t = 10s \qquad a = \frac{v_f - v_i}{t} \rightarrow v_f = at + v_i^{\nearrow 0}$

8) $m_T = 15kg + 12kg + 5kg = 32kg$

$F = m \cdot a = (32kg)(3,8 m/s^2) = \boxed{121,6N}$ R/

9) a $\Sigma F_y = m \cdot a$

$T - P = m \cdot a$

$T = P + ma$

$T = mg + ma$

$T = (100kg)(9,8 m/s^2) + (100kg)(5 m/s^2)$

$T = 480N$

b) $\Sigma F_y = 0$

$T - P = 0$

$T = P = mg$

$T = (100kg)(9,8 m/s^2)$ $T = 980N$ R/

10) $a = \frac{v_f - v_i}{t} = \frac{0 - 10 m/s}{5s} = -2 m/s^2$

$F = m \cdot a$ $F = (500kg)(-2 m/s^2) = -1000N$ R/

11) $d = \frac{v_f^2 - v_i^2}{2a}$ $a = \frac{v_f^2 - v_i^2}{2d} = \frac{0 - (18 m/s)^2}{2(90m)} = -1,8 m/s^2$

$-f = m \cdot a$

$-\mu_k mg = ma$

$\mu_k = \frac{-a}{-g} = \frac{1,8 m/s^2}{9,8 m/s^2} = 0,18$ R/

12) $\Sigma F_y = 0$

$N - P = 0$

$N = P = mg$

$N = 245N$

② $\Sigma F_x = m \cdot a$

$-F + f = m \cdot -a$

$f = F - ma$

$f = 300N - (25kg)(10 m/s^2)$

$f = 50N$ R/

③ $f = \mu_k \cdot N$

$\mu_k = \frac{f}{N} = \frac{50N}{245N} = 0,2$ R/

13)

$\Sigma F_y = m_1 a$ $\quad$ $\Sigma F_y = m_2 a$

$T - P_1 = m_1 a$ $\quad$ $T - P_2 = m_2 \cdot -a$

$T - 98 = 10a$ $\quad$ $T - 117,6 = -12a$

(1) $T - 10a = 98$ $\quad$ (2) $T + 12a = 117,6$

Resolviendo el sistema

$T = 106,91 N \quad a = 0,89 m/s^2$ R/

14)

① $\Sigma F_y = 0$

$N - 196 - 50 \operatorname{sen} 50° = 0$

$N = 234,3 N$

② $a = \frac{V_f - V_i}{t} = \frac{9 m/s - 0}{3s}$

$a = 3 m/s^2$

③ $\Sigma F_x = m \cdot a_x$

$F_1 \cos 50 + F_2 - f = m \cdot a_x$

$f = F_1 \cos 50 + F_2 - m a_x$

$f = 50 \cos 50 + 80N - (20kg)(3 m/s^2)$

$f = 52,14 N$

④ $f = \mu_k \cdot N$

$\mu_k = \frac{f}{N} = \frac{52,14 N}{234,3 N}$

$\mu_k = 0,22$ R/

15)

$\Sigma F_y = 0$

$N - P \cos\theta = 0$

$N = P \cos\theta = mg \cos\theta$

$\Sigma F_x = 0$

$P \operatorname{sen}\theta - f = 0$

$f = mg \operatorname{sen}\theta$

$f = \mu_k N$

$mg \operatorname{sen}\theta = \mu_k \cdot mg \cos\theta$

$\mu_k = \frac{\operatorname{sen}\theta}{\cos\theta} = \tan\theta = \tan 20° = 0,36$ R/

16)

① $\Sigma F_y = 0$

$N = mg \cos\theta$

② $f = \mu_e \cdot N$

$f = \mu_e \, mg \cos\theta$

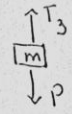
⑤ $P \operatorname{sen}\theta = f$

$mg \operatorname{sen}\theta = \mu_e \, mg \cos\theta$

$\mu_e = \frac{\operatorname{sen}\theta}{\cos\theta} = \tan\theta$

$\theta = \tan^{-1} \mu_e = 15,1°$ R/

17) ✓ DCL cuerpo

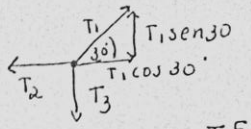


$\Sigma F_y = 0$

$T_3 = P = mg$

$T_3 = 58,8\ N$

✓ DCL nudo



$\Sigma F_x = 0$

$T_1 \cos 30° - T_2 = 0$

$T_2 = T_1 \cos 30°$

$T_2 = (117,6N)\cos 30°$

$T_2 = 101,84N$

$\Sigma F_y = 0$

$T_1 \operatorname{sen} 30 - T_3 = 0$

$T_1 = \frac{T_3}{\operatorname{sen} 30°}$

$T_1 = \frac{58,8N}{\operatorname{sen} 30°}$

$T_1 = 117,6N$

18) $F = m \cdot a$

$a = \frac{F}{m} = \frac{20N}{20kg} = 1m/s^2$

$d = \frac{V_f^2 - V_i^2}{2a}$

$V_f = \sqrt{2ad}$

$V_f = \sqrt{2(1m/s^2)(2m)}$

$V_f = 2m/s$ R/

19)

a) $\Sigma F_y = m \cdot a$

$T - P = m \cdot a$

$T = P + ma$

$T = (65kg)(9,8m/s^2) + (65kg)(1m/s^2)$

$T = 702N$ R/

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

$T - P = m \cdot -a$

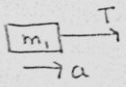
$T = P - ma$

$T = (65kg)(9,8m/s^2) - (65kg)(1m/s^2)$

$T = 572N$ R/

20)

DCL m_1



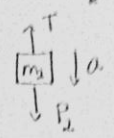
$\Sigma F_x = m \cdot a$

$T = m \cdot a$

$T - ma = 0$

$T - 47a = 0$ (2)

DCL m_2



$\Sigma F_y = m \cdot -a$

$T - P_2 = -m \cdot a$

$T = P_2 - m \cdot a$

$T + ma = P_2$

(2) $T + 60a = 588$

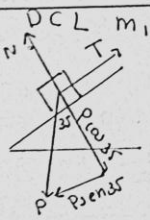
Resolviendo el sistema

$T = 258,3\ N$

$a = 5,5\ m/s^2$

21)

DCL m_1



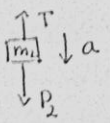
$\Sigma F_x = m \cdot a_x$

$T - P\,sen35 = m \cdot a$

$T - 495\cos 35 = 5 \cdot a$

(1) $T - 5a = 28,1$

DCL m_2



$\Sigma F_y = m \cdot a$

$T - P_2 = m \cdot -a$

$T - 49 = -5a$

(2) $T + 5a = 49$

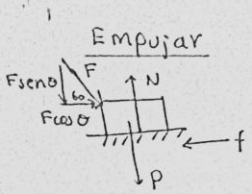
Resolviendo el sistema

$T = 38,55\ N$

$a = 2,09\ m/s^2$

22)

Empujar



✓ $\sum F_y = 0$

$N - F_1 \operatorname{sen}60 - P = 0$

$N = F_1 \operatorname{sen}60 + P$

$N = F_1 \operatorname{sen}60 + 490$

✓ $f = \mu_k N$

$f = 0{,}17(F_1 \operatorname{sen}60 + 490)$

$f = 0{,}147F_1 + 83{,}3$

✓ $\sum F_x = m \cdot a$

$F_1 \cos 60 - f = m \cdot a$

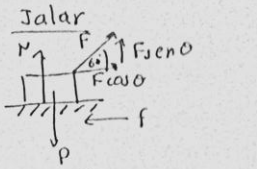
$F_1 \cos 60 - (0{,}147F_1 + 83{,}3) =$

$F_1 \cos 60 - 0{,}147F_1 \quad 83{,}3 = (50kg)(1{,}5m/s^2)$

$0{,}353F_1 = 75 + 83{,}3$

$F_1 = 448{,}4N$

Jalar



✓ $\sum F_y = 0$

$N + F_1 \operatorname{sen}60 - P = 0$

$N = P - F_1 \operatorname{sen}60$

$N = 490 - F_1 \operatorname{sen}60$

✓ $f = \mu_k \cdot N$

$f = 0{,}17(490 - F_1 \operatorname{sen}60)$

$f = 83{,}3 - 0{,}147F_1$

✓ $\sum F_x = m \cdot ax$

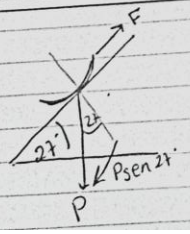
$F_1 \cos 60 - (83{,}3 - 0{,}147F_1) = ma$

$0{,}647F_1 = 75 + 83{,}3$

$F_1 = 244{,}7N$

R/ Es más fácil halar porque se debe aplicar menos fuerza.

23)



$\sum F_x = m \cdot a$

$-P \operatorname{sen}27 + F = m \cdot a^0$

$F = P \operatorname{sen}27$

$F = mg \operatorname{sen}27$

$F = 77N \operatorname{sen}27$

$F = 35N$

24) a) $F = P\sin 35$

$P = \frac{F}{\sin 35^\circ} = \frac{300N}{\sin 35}$ $\quad P = 523N$ R/

b) $\Sigma F_y = 0$

$N - P\cos\theta = 0 \rightarrow N = P\cos\theta = 523\cos 35^\circ = 428{,}4N$ R/

25) a) $P\sin\theta = 325\sin 20$

$P\sin\theta = 111N$ R/

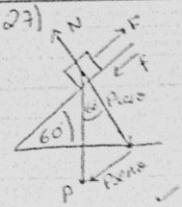
b) $\Sigma F_y = 0$

$N - P\cos\theta = 0 \rightarrow N = P\cos\theta = 325\cos 20^\circ$

$N = 305{,}4N$ R/

26) 1° masa: $F = m \cdot a \Rightarrow m = \frac{F}{a} = \frac{120N}{3m/s^2} = 40kg$

2° aceleración $F = m \cdot a \Rightarrow a = \frac{F}{m} = \frac{360N}{40kg} = 9m/s^2$ R/

27) 

$\Sigma F_y = 0$

$N - P\cos\theta = 0$

$N = P\cos\theta$

$N = (80kg)(9{,}8m/s^2)\cos 60^\circ = 392N$

$f = \mu_k \cdot N = (0{,}4)(392N) = 156{,}8N$

$\Sigma F_x = m \cdot a$ ($a \rightarrow 0$)

$F - f - P\sin\theta = 0$

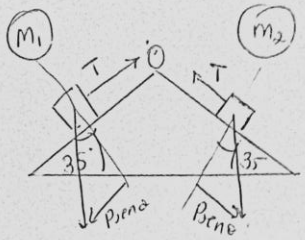
$F = f + P\sin\theta$

$F = 156{,}8N + (80kg)(9{,}8m/s^2)\sin 60^\circ$

$F = 835{,}8N$

(6)

28)



$P_1 = 34,2\ N$

$P_2 = 78,4\ N$

Para m_1: $T - P_1 \operatorname{sen}\theta = m_1 a$ (1)

Para m_2: $-T + P_2 \operatorname{sen}\theta = m_2 a$ (2)

(1) $T - 34,2 \operatorname{sen}35 = 3,5a$

$T - 3,5a = 19,61$

(2) $-T + 78,4 \operatorname{sen}35 = 8a$

$-T - 8a = -45$

$T + 8a = 45$

Resolviendo el sistema

$T = 27,33\ N$

$a = 2,21\ m/s^2$

Trabajo extraclase (Página 175)

I parte:

1) b

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2) c $\quad \Sigma F_y = m \cdot a \Rightarrow F - P = m \cdot a$

$a = \frac{F-P}{m} = \frac{7000\ N - 5880}{600\ kg}$

$a = 1,87\ m/s^2$

---

4) c $\quad \Sigma F = m \cdot a = 440\ kg \cdot 5\ m/s^2 = 2,2 \times 10^3\ N$

---

3) b

---

5) a

I Verdadera

II Verdadera

III Falsa

6) a

7) a $\Sigma F = \cancel{m}\vec{a}^{\,0}$ ($\vec{v}$ constante)

8) a La magnitud de la aceleración sería la misma fuerza implica que si se quintuplica la masa, la aceleración se reduce 5 veces.

9) a $\Sigma F_x = m \cdot a$

$m = \frac{\Sigma F_x}{a} = \frac{7500N - 300N}{5m/s^2} = 1440kg.$

10) b $\Sigma F_y = m \cdot a$

$F - P = m \cdot a$

$a = \frac{F-P}{m}$

$a = \frac{198N - 98N}{10kg}$

$a = 10m/s^2.$

11) a Rapidez constante.

12) a $\Sigma F_x = m \cdot a$

$m = \frac{\Sigma F_x}{a}$

$m = \frac{80N - 20N}{5m/s^2}$

$m = 12kg.$

13) a Fuerza y aceleración son directamente proporcionales.

14) c $\Sigma F_y = 0$

$N - P = 0 \Rightarrow N = P = (100kg)(9,8m/s^2)$

$N = 980N$

15) b $\Sigma F = m \cdot a$ $a = \frac{F_1 - F_2}{m} = \frac{7N - 3N}{5kg}$

$a = 0,8m/s^2$

16) c $m = \frac{F}{a} = \frac{40N}{4m/s^2} = 10kg$ $a = \frac{F}{m} = \frac{10N}{10kg} = 1m/s^2$

$F = (10kg)(3m/s^2) = 30N$

17) c $\quad N = P = 333{,}2\,N \quad f = (0{,}1)(333{,}2N)$

$f = 33{,}32\,N$

18) d

$\Sigma F_x = m \cdot a_x$

$a_x = \frac{\Sigma F_x}{m} = \frac{12\cos 60° - 3{,}0\,N}{5{,}0\,kg}$

$a_x = 0{,}60\,m/s^2$

19) a

20) d $\quad \Sigma F_x = m \cdot a_x \Rightarrow \quad a_x = \frac{\Sigma F_x}{m}$

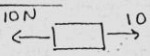
$a_x = \frac{50\,N\cos 37 + 30N - 20N}{10\,kg}$

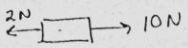
$a_x = 4{,}99\,m/s^2$

21) a $\quad a_x = \frac{\Sigma F_x}{m} = \frac{8\,N - 10\,N + 2\,N}{2kg} = 0$

La fricción va hacia el este.

III Parte.

1) $\Sigma F = 0$ 

$\Sigma F \neq 0$ 

2) I , Ley de inercia

3) 5. a) Masa b) Peso c) directa d) inercia
e) fuerza de acción a distancia.
f) fuerza de contacto.

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4) a) III, Ley de acción y reacción

b) Porque ambas fuerzas de acción y reacción son aplicadas a cuerpos distintos.

5) Semejanza: Ambas son fuerzas de contacto

Diferencia: La fuerza normal es perpendicular a la superficie, y la de fricción es paralela a la superficie.

6) a) I b) III c) I d) II e) III

7) Fuerza: Se define como la causa que modifica el estado de reposo o de movimiento de un cuerpo.

- Fuerza neta: Suma vectorial de todas las fuerzas.
- Puede ser:

Fuerza neta equilibrada $\Rightarrow \Sigma F = 0$

Fuerza neta no equilibrada $\Rightarrow \Sigma F \neq 0$

IV Parte.

1)

$\Sigma F_y = m_1 a$ | $\Sigma F_y = -m_2 a$

$T - P_1 = m_1 a$ | $T - P_2 = -m_2 a$

$T - m_1 a = P_1$ | $T + m_2 a = P_2$

$T - 49 = 5a$ | $T + 8a = 78,4$

R/ Resolviendo el sistema $T = 60,3\,N$; $a = 2,26\,m/s^2$

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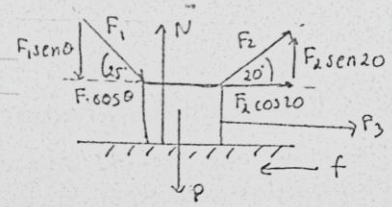
2)



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✓ $\Sigma F_y = 0$

$N - P - F_1 \operatorname{sen} 25 + F_2 \operatorname{sen} 20 = 0$

$N = P + F_1 \operatorname{sen} 25 - F_2 \operatorname{sen} 20° = 490N + 12,08N - 13N$

$N = 489,68N$

✓ $f = \mu_k \cdot N = (0,17)(489,68N) = 83,24N$

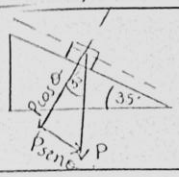
✓ $\Sigma F_x = m \cdot a_x$

$F_1 \cos 25 + F_2 \cos 20 - f + F_3 = m \cdot a$

$a = \dfrac{F_1 \cos 25 + F_2 \cos 20° - f + F_3}{m}$

$a = \dfrac{27,19N + 35,71N - 83,24N + 45N}{50kg} = 0,49 m/s^2$ R/

3)



$\Sigma F_x = m \cdot a$

$P \operatorname{sen} \theta = m \cdot a$

$a = \dfrac{P \operatorname{sen} \theta}{m} = \dfrac{735 \operatorname{sen} 35}{75kg} = 5,62 m/s^2$ R/

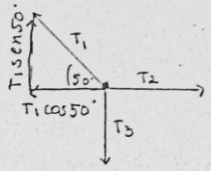
4)

$\Sigma F_y = 0$

$T_3 - P = 0$

$T_3 = P$

$\boxed{T_3 = 78,4N}$



✓ $\Sigma F_x = 0$

$-T_1 \cos 50° + T_2 = 0$

$T_2 = T_1 \cos 50°$

$T_2 = (102,34N) \cos 50°$

$\boxed{T_2 = 65,8N}$

✓ $\Sigma F_y = 0$

$T_1 \operatorname{sen} 50° - T_3 = 0$

$T_1 = \dfrac{T_3}{\operatorname{sen} 50°} = \dfrac{78,4N}{\operatorname{sen} 50°}$

$\boxed{T_1 = 102,34N}$

5)

$\Sigma F_y = 0$

$N - P - F_1 \operatorname{sen} 40 = 0$

$N = P + F_1 \operatorname{sen} 40$

$N = 588\,N + 145 \operatorname{sen} 40$

$N = 616{,}92\,N$

$f = \mu_k \cdot N = (0{,}14)(616{,}92\,N)$

$f = 86{,}37\,N$

✓ $\Sigma F_x = m \cdot a$

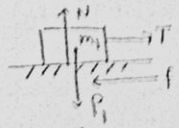
$\mu_k F_1 \cos 40 - F_2 + F_3 = m \cdot a$

$F_3 = ma - F_1 \cos 40 + F_2 + f$

$F_3 = (60kg)(0{,}13 m/s^2) - 34{,}47\,N + 46\,N + 86{,}37\,N$

$F_3 = 99{,}7\,N$ R/

6)



✓ $\Sigma F_y = 0$

$N = P = 60{,}76\,N$

✓ $f = \mu_k \cdot N = (0{,}2)(60{,}76\,N)$

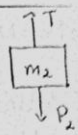
$f = 12{,}15\,N$

✓ $\Sigma F_x = m \cdot a$

$T - f = m \cdot a$

$T = ma + f$

$T = 6{,}2a + 60{,}8$ (1)



✓ $\Sigma F_y = ma$

$T - P_2 = -m_2 a$

$T + m_2 a = P_2$

$T + 8{,}5a = 83{,}3$ (2)

Resolviendo el sistema:

$T = 70{,}3\,N$

$a = 1{,}53 m/s^2$

Capítulo VII → Teoría.