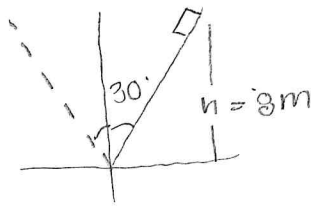
Keila Belen Campos Leiva

00103225

Nº: 9

1) a
2) b
3) b
4) C
5) d
6) a

7)




$\Sigma F_V = 0$

$N\sin\theta - mg - f_s\cos\theta = 0$

$\Sigma F_r = 0$

$N\cos\theta + f_s\sin\theta = m\frac{v^2}{r}$

$f_s = \mu_s N$

$r = h\tan\theta = 0.800\tan 30 = 0.4618\ m.$

rapidez maxima

$N(\sin\theta - \mu_s\cos\theta) = mg$

$N = \frac{mg}{\sin\theta - \mu_s\cos\theta}$

$N = 14$

$N = 15$

$V_{max} = \sqrt{\frac{rN\cos(30) + (0.2)\sin 30}{0.5}}$ $V_{max} = 3.49 m/s$

$V_{max} \sqrt{\frac{0.4618(15)\cos 30 + 0.2\sin 30}{0.5}}$

8)

a) $W_g = 800(9.8)(14) = 109760\ J$

b) $K = 1/2\ (800)(18)^2 = 129{,}600\ J$

c) $E_{total} = 109{,}760 + 129{,}600 = 239{,}360\ J$

$P = \frac{E_{total}}{t} = \frac{239{,}360}{60\,s} = 3989.33\ KW$

trabajo necesario para acelerar el agua = 129,600 J

ligeramente mayor que el trabajo requerido para elevarla contra la gravedad (109,760 J)

9)

a) Rapidez en el punto inferior de la pista

$mgh = 1/2\ mv_0^2 \Rightarrow v_0 = \sqrt{2gh}$

$v_0 = \sqrt{2(9.8)(30)} = 7.668\ m/s$

b) Trabajo de la friccion y energia mecanica

$f_k = \mu_k N = \mu_k mg = (0.250)(2.00)(9.80) = 4.9N$

$W = -f_k L = -4.9(1.5) = -7.35\ J$

energia mecanica

$E_{final} = 58.8 - 7.35 J = 51.45$

c)

$E = 1/2\ k x^2_{max}$

$51.45 = \frac{1}{2}(400) x^2_{max}$

$2(51.45) = 400\ x^2 max$

$\frac{2(51.45)}{400} = x^2 max$

$0.25725 = x^2 max$

$x = 0.507m$

10)

a) $781.25 = A(1.25)^2$

$\frac{781.25}{(1.25)^2} = A$

$A = 500\ N/s^2$

b) $t_1 = 2s$

$t_2 = 3.50s$

$J_x = \int_2^{3.50} f(x) = \int_2^{3.50} (500t^2)\,dt$

$J_x = 5812.5\ N \cdot s$

c) $J_x = \Delta P = m\Delta v_x$

$\Delta v_x = \frac{J_x}{m} \quad \Delta x = \frac{5812.5}{2150} = 2.7035\ m/s$

00024026 christhian Eduardo Sánchez Lopez

1. C
2. b
3. b
4. a
5. d
6. b

7. $m = 0.500\,kg$, $\beta = 30.0°$, $\mu_s = 0.200$, $h = 0.800\,m$

$\tan\beta = \frac{R}{h} \rightarrow R = h\tan\beta = (0.800\,m)\tan(30.0°) = 0.462\,m$

b) $\text{Radial}(r) = \sum F_r = ma_c \rightarrow N\cos\beta + F_{s,max}\sin\beta = m\frac{v^2_{max}}{R}$

$\text{Vertical}(y) = \sum F_y = 0 \rightarrow N\sin\beta - F_{s,max}\cos\beta - mg = 0$

$F_{s,max} = \mu_s N$

$N(\cos\beta + \mu_s\sin\beta) = m\frac{v^2_{max}}{R}$ (1)

$N(\sin\beta - \mu_s\cos\beta)mg$ (2)

c) $(v_{max})$

$\frac{v^2_{max}}{gR} = \frac{\cos\beta + \mu_s\sin\beta}{\sin\beta - \mu_s\cos\beta} \rightarrow V_{max} = \sqrt{gR\left(\frac{\cos\beta + \mu_s\sin\beta}{\sin\beta - \mu_s\cos\beta}\right)}$

$V_{max} = \sqrt{(9.8\,m/s^2)(0.462\,m)\left(\frac{\cos(30.0°) + 0.200\sin(30.0°)}{\sin(30.0°) - 0.200\cos(30.0°)}\right)}$

$= 3.66\,m/s$

8) $m = 800\,kg$, $h = 14.0\,m$, $V = 18.0\,m/s$, $\Delta t = 1\,min = 60.0\,s$, $g = 9.80\,m/s^2$

a) $W_g = \Delta V_g = mgh = (800\,kg)(9.80\,m/s^2)(14.0\,m) = 109760\,J$

b) $W_k = \Delta K = \frac{1}{2}mv^2 = \frac{1}{2}(800\,kg)(18.0\,m/s)^2 = 129600\,J$

c) $W_{tot} = W_g + W_K = 109760\,J + 129600\,J = 239360\,J$

$P = \frac{W_{tot}}{\Delta t} = \frac{23936\,J}{60.0\,s} = 3989.3\,w \approx 3.99\,kw$

d) $\frac{W_K}{W_g} = \frac{129600\,J}{109760\,J} = 1.8$ ($W_K = 54.1\%$ de $W_{tot}$, $W_g = 45.9\%$ de $W_{tot}$)

9) $m = 2.00\,kg$, $h = 3.00\,m$, $L = 1.50\,m$, $\mu_k = 0.250$, $k = 400\,N/m$, $g = 9.8\,m/s^2$

a) $E_A = E_{base} \rightarrow mgh = \frac{1}{2}mv^2$

$v = \sqrt{2gh} = \sqrt{2(9.80\,m/s^2)(3.00\,m)} = 7.67\,m/s$

b) $W_{Fk} = -F_k L = -\mu_k mgL = -(0.250)(2.00\,kg)(9.80\,m/s^2)(1.50\,m) = -7.35\,J$

$E_{res} = E_A + W_{Fk} = (2.00\,kg)(9.80\,m/s^2)(3.00\,m) - 7.35\,J = 58.80\,J - 7.35\,J = 51.45\,J$

c) $x_{max} = \sqrt{\frac{2E_{res}}{k}} = \sqrt{\frac{2(51.45\,J)}{400\,N/m}} = 0.507\,m\ (50.7\,cm)$

10) $m = 2150\,kg$, $F_x(t) = At^2$, $F_x = 781.25\,N$ en $t = 1.25\,s$

a) $A = \frac{F_x}{t^2} = \frac{781.25\,N}{(1.25\,s)^2} = 500\,N/s^2$

b) $t_1 = 2.00\,s$ hasta $t = 2.00\,s + 1.50\,s = 3.50\,s$

$J_x = \int_{t_1}^{t_2} F_x(t)\,dt = \int_{2.00}^{3.50} 500t^2\,dt = \left[\frac{500}{3}t^3\right]_{2.00}^{3.50}$

$J_x = \frac{500}{3}((3.50\,s)^3 - (2.00\,s)^3) = \frac{500}{3}(42.875 - 8.00) = 5812.5\,Ns$

c) $(\Delta V_x)$

$J_x = \Delta p_x = M\Delta V_x \rightarrow \Delta V_x = \frac{J_x}{m} = \frac{5812.5\,Ns}{2150\,kg} = 2.70\,m/s$

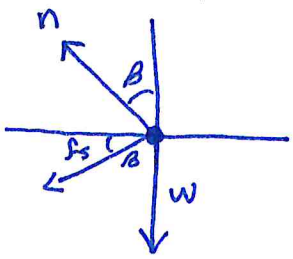
00048624 Nathaly Beatriz Mauricio Guadrón

| Pregunta | Literal |
|---|---|
| 1 | c |
| 2 | b |
| 3 | b |
| 4 | c |
| 5 | d |
| 6 | b |

Justificación Pregunta 2.

- Sistema A: incluye la gravedad de la tierra, la deformación del resorte y el movimiento.
- Sistema B: no hay gravedad, la deformación del resorte y el movimiento sí.

7. a)




b) $\sum f_y = n\,\text{sen}\beta - \mu_s n \cos\beta - mg = 0$

$\sum f_x = n\cos\beta + \mu_s n\,\text{sen}\beta = \frac{mv^2}{r}$

c) $n = \frac{mg}{\text{sen}30 - \mu_s \cos 30}$

$n[\cos 30 + \mu_s \text{sen}30] = \frac{mv^2}{r}$

sustituyendo n y despejando $v^2$

$v^2 = gr\left[\frac{\cos 30 + \mu_s \text{sen}30}{\text{sen}30 - \mu_s \cos 30}\right]$

$= (0.4619m)(9.8\frac{m}{s^2})\left[\frac{0.8660 + (0.200)(0.500)}{0.500 - (0.200)(0.8660)}\right]$

$= \sqrt{13.3809\frac{m^2}{s^2}}$

R/ $v = 3.6579\frac{m}{s}$

Nathaly Beatriz Mauricio Guadrón 00048624

8. $m = 800\,kg$

$\Delta t = 1\,min = 60\,s$

$h = 14.0\,m$

$r = 18.0\,\frac{m}{s}$

$g = 9.8\,\frac{m}{s^2}$

$W = mgh$

$= 800\,kg\left(9.8\,\frac{m}{s^2}\right)(14.0\,m)$

a) $= 109,760\,J$

b) $K = \frac{1}{2}mv^2 = W_K$

$= \frac{1}{2}(800\,kg)\left(18.0\,\frac{m}{s}\right)^2$

$= 129,600\,J$

c) $W_{total} = \Delta W$

$= (109,760 + 129,600)J$

$= 239,360J$

$P = \frac{W_{Total}}{\Delta t} = \frac{239,360J}{60s} = 3,989.33W$

$1W = 1000KW$

$\frac{3,989.33}{1000} = 3.9893KW$

d) $239,360 \longrightarrow 100\%$

$109,760 \longrightarrow x$

$x = 45.85\% \rightarrow W$

$100 - x = 54.14\% \rightarrow W_K$

darle vel. al agua necesita más de la mitad del trabajo total de la bomba, por lo que la energía cinética no es despreciable.

Carnet: 00208225 Nombre: Carlos Enmanuel, Marcos Palma

Nº lista: 34

1. Respuesta = c
2. Respuesta = a
3. Respuesta = b
4. Respuesta = c
5. Respuesta = d
6. Respuesta = b

7. a) DCL = Fuerzas concurrentes peso ($\vec{w}$ hacia abajo), Normal ($\vec{n}$ perpendicular a la pared del cono), Friccion estatica ($\vec{f_s}$ hacia habajo a lo largo para la rapidez maxima).

b) Ecuaciones de movimiento = $\sum F_r = n \operatorname{sen}\beta + f_s \cos\beta = m\frac{v^2}{r}$ ← Ecuacion 1.

$\sum F_y = n\cos\beta - f_s \operatorname{sen}\beta - mg = 0$ ← Ecuacion 2.

c) Rapidez Maxima ($V_{max}$) = 1.99 m/s aprox ← Respuesta

- Radio = $h\tan(30°) = (0.800)(0.5774) = 0.46192$
- $N = \frac{mg}{\cos 30° - \mu_s \operatorname{sen} 30°} = \frac{(0.500)(9.8)}{(0.866) - (0.200)(0.5)} = 6,396866841$
- Sustituyendo ($V_{max}$) con $f_s = \mu_s n$ : $V_{max} = \sqrt{\frac{rn(\operatorname{sen}30° + \mu\cos 30°)}{m}} = \sqrt{\frac{(0,46192)(6,396866841)(\operatorname{sen}30° + 0.200\cos 30°)}{0,500}} = 1,99$

8. Trabajo gravitacional por minuto (800Kg) =

a) $W_{grav} = mgh = (800)(9.80)(14.0) = \boxed{109,800\,J}$ ← Respuesta

b) Trabajo cinetico al salir =

$W_{cin} = \frac{1}{2}mv^2 = \frac{1}{2}(800)(18.0)^2 = \boxed{129,600\,J}$ ← Respuesta

c) Potencia en KW =

$$P = \frac{109,800 + 129,600}{60} = 3,990\,W = \boxed{3.99\,KW}$$ ← Respuesta

d) El trabajo para acelerar el agua es superior al trabajo para elevarla (129,600J > 109,800J), sin embargo ambos son esenciales para analisar el calculo de la Energia Total de la bomba.

9. a) Rapidez en la base de la rampa ($V_1$):

$mgh = \frac{1}{2}mv_1^2 \therefore V_1 = \sqrt{2gh} = \sqrt{2(9.80)(3.00)}$

$= \boxed{7.67\,m/s}$ ← Respuesta

b) Trabajo de friccion y Energia Residual:

$W_F = -NmgL = -(0,250)(2,00)(9.80)(1.50)$

$= -7.35\,J$ ■ Respuesta → $\boxed{51.45\,J}$

$EMI = E_1 = mgh = 58.8\,J$

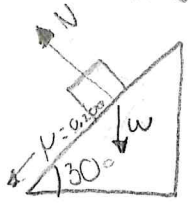
Energia Residual: $E_F = 58.8 - 7.35 =$

000600025 Ramírez Quintanilla, Lourdes Emperatriz

1. C
2. B
3. B
4. B
5. A
6. B

7.

a) DCL en 2D (7.) del bloque




datos

$m = 0.500\ kg$

$\beta = 30.0°$ $\quad f_s = \mu_s n$

$\mu_s = 0.200$ → coeficiente de fricción estática

$h = 0.800\ m$

radio del círculo:

$R = h \tan\beta = 0.800 \tan 30° = 0.462\ m$

b)

$\Sigma F_y = n\sin\beta - f_s\cos\beta - mg = 0$

ecu 1 $\boxed{n\sin\beta - f_s\cos\beta = mg}$

$\Sigma F_x = n\cos\beta + f_s\sin\beta = \frac{mv^2}{R}$

$n(\cos\beta + \mu_s\sin\beta = \frac{mv^2}{R}$

$\boxed{n\cos\beta + f_s\sin\beta = \frac{mv^2}{R}}$ ecu 2

c.

$$v_{max} = \sqrt{gR\left(\frac{1+\mu_s\tan\beta}{\tan\beta - \mu_s}\right)}$$

$$v_{max} = \sqrt{(9.8)(0.462)\left(\frac{1+(0.200)(0.577)}{0.577-0.200}\right)} = 3.66\ \frac{m}{s}$$

La rapidez máxima es de $3.66\ \frac{m}{s}$

8. datos

masa = 800 kg

h = 14 m

v = 18 m/s → rapidez

t = 1 min → 60 s

a)

$W = mgh$

el trabajo en J se efectuara en

$W = (800\,kg)(9.80\,m/s^2)(14\,m) = \boxed{109760\,J}$

b) $W_k = \frac{1}{2}mv^2$

$W_k = \frac{1}{2}(800\,kg)(18\,m/s)^2 = \boxed{129600\,J}$

c) $W_T = W + W_k$

$W_T$ = Trabajo Total

$W_T = 109760J + 129600J = 239360\,J$

$P = \frac{W_T}{t} = \frac{239360J}{60s} = 3989.3\,W \simeq \boxed{3.99\,kW}$

$\frac{3989.3}{1000}$

d) ambos procesos contribuyen de manera similar al requerimiento energetico total, al darle velocidad a la salida del agua requiere mas energia que elevarla a los 14 m, dar mayor energia cinetica representa la mayor parte de la potencia requerida por la bomba.

00060025 Ramírez Quintanilla, Lourdes Emperatriz

9. Datos

$m = 2\ kg$

$h = 3\ m$

$L = 1.50\ m$

$\mu_k = 0.250$

$k = 400\ N/m$

$g = 9.80\ m/s^2$

a) $mgh = \frac{1}{2}mv^2$ $\quad v_1 = \sqrt{2gh}$

$v_1 = \sqrt{2(9.80)(3)}$

$\boxed{v_1 = 7.67\ m/s}$

b)

$f_k = \mu_k mg$

$f_k = (0.250)(2)(9.80) = 4.9\ N$

$W_{fk} = -f_k L = -(4.90)(1.50) = -7.35\ J$

$E_0 = mgh = (2)(9.80)(3) = 58.8\ J$

justo antes del resorte $E_2 = E_0 + W_{fk} = 58.8\ J - 7.35\ J = \boxed{51.45\ J}$

c)

$E_2 = \frac{1}{2}kx^2$

$51.45 = \frac{1}{2}(400)x^2$

$51.45 = 200x^2$

$\frac{51.45}{200} = x^2$

$\sqrt{\frac{51.45}{200}} = x$

$\boxed{0.50\ m = x_{máx}}$

10. datos

$m = 2150\,kg$

$F_x = At^2$

$t = 1.25\,s$, $F_x = 781.25\,N$

a) $F_x = At^2$

$781.25\,N = A(1.25\,s)^2$

$781.25\,N = A(1.5625)$

$\frac{781.25\,N}{1.5625} = A \rightarrow \boxed{A = 500\ \frac{N}{s^2}}$

b) $J = \int_{t_1}^{t_2} F_x\,dt$

$J = \int_{2}^{3.50} 500t^2$

$\left[\frac{500t^3}{3}\right]_2^{3.50}$

evaluando en 3.50

$\frac{500(3.50)^3}{3} = 7145.83$

evaluando en 2

$\frac{500(2)^3}{3} = 1333.33$

restamos lo que evaluamos

$= 7145.83 - 1333.33$

$\boxed{= 5812.5\ N \cdot s}$

C) $\Delta v = \frac{J}{m}$

$\Delta v = \frac{5812.5\,N \cdot s}{2150\,kg} = \boxed{2.70\ m/s}$

00091624 Sebastián Pablo García González

1. C
2. B
3. B
4. C
5. D
6. B

7. a) 


$m = 0.500\ kg$
$\beta = 30.0°$
$\mu_s = 0.200$
$h = 0.800$

b) $R = h\tan\beta = 0.800\tan(30°) = 0.4619$

$\Sigma_{ye\ vertical} = N\sin\beta - f_s\cos\beta - mg = 0$

$\Sigma_{ye\ radial} = N\cos\beta + f_s\sin\beta = \frac{mv^2}{R}$

$f_s = \mu_s N$

c) $a_c = \frac{v^2}{r}$

$\sum F_r = \frac{mv^2}{r}$

$N\cos\beta + \mu_s N\sin\beta = \frac{mv^2}{r}$

$N(\cos\beta + \mu_s\sin\beta) = \frac{mv^2}{r}$

$v^2 = \frac{rN}{m}(\cos\beta + \mu_s\sin\beta)$

$v = \sqrt{\frac{rN}{m}(\cos\beta + \mu_s\sin\beta)}$

$r = \sqrt{\frac{(0.4619)(15.01)}{0.500}[\cos 30 + (0.200)\sin 30°]}$

$v = 3.66\ m/s$

8. a) $w = mgh$

$w = (800\ kg)(9.8\ m/s^2)(14.0) = 109,760\ J$

b) $w = \Delta K = \frac{1}{2}mv^2$

$w = \frac{1}{2}(800)(18)^2$

$w = 400(324)$

$w = 129,600\ J$

c) $P = \frac{w_{total}}{t}$

$P = \frac{239,360}{60}$

$w_{total} = 109,760 + 129,600$

$w_{total} = 239,360\ J$

$P = 3.99\ KW$

d) $129,600\ J - 109,760\ J = 19,840\ J$

000091624 Sebastián Pablo Garcia Gonzalez

9) a) $mgh = \frac{1}{2}mv^2$

$gh = \frac{1}{2}v^2$

$v = \sqrt{2gh}$

$v = \sqrt{2(9.8)(3.00)}$

$V = 7.67\ m/s$

b) $N = mg$

$N = (2.00)(9.80)$

$N = 19.6\ N$

$f_K = \mu_K N$

$f_K = (0.250)(19.6)$

$f_K = 4.90\ N$

$W_f = -f_K L$

$W_f = -(4.90)(1.50)$

$W_f = -7.35\ J$

$E_i = (2.00)(9.80)(3.00)$

$E_i = 58.8\ J$

$E_f = E_i + W_f$

$E_f = 58.8 - 7.35$

$E_f = 51.45\ J$

c) $E_e = \frac{1}{2}Kx^2$

$51.45 = \frac{1}{2}(400)x^2$

$51.45 = (200)x^2$

$x = \sqrt{0.25725}$

$x = 0.507\ m$

$x = 0.507(100$ 50.7cm

---

10) a) $F_x = At^2$

$A = \frac{F_x}{t^2}$

$A = \frac{781.25}{(1.25)^2}$

$A = 500\ N/s^2$

b) $J = \int_{t_1}^{t_2} F_x\,dt$

$J = \int_{2}^{3.5} 500t^2\,dt$

$J = 500\left(\frac{t^3}{3}\right)$

$J = 500\left[\frac{t^3}{3}\right]_2^{3.5}$

$J = \frac{500}{3}(34.875)$

$J = 5812.5\ N\cdot s$

c) $J = \Delta p$

$J = m\Delta v$

$\Delta v = \frac{J}{m}$

$\Delta v = \frac{5812.5}{2150}$

$\Delta v = 2.70\ m/s$

00037225 Rocío Irene Rubalcaba Guerrero

| | |
|---|---|
| 1. | d |
| 2. | a |
| 3. | c |
| 4. | b |
| 5. | d |
| 6. | c |

7. Datos

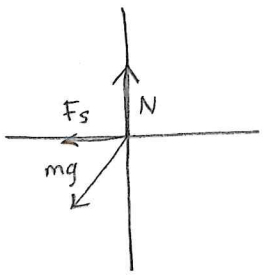
$m = 0.500\ kg$

$\beta = 30°$

$\mu_s = 0.200$

$h = 0.800\ m$

2.




b. $\Sigma F = ma$

en y → se cancelan

En x → $mgx - Fs = ma$

$mg\cos(30) - 0.49 = 0.500\,a$

$4.24 - 0.49 = 0.500\,a$

$a = 7.5$

$N = mg\,sen(30)$

$N = 2.45\ N$

$Fs = 0.49\ N$

c. $V^2 = V_0^2 + 2\Delta$

$V^2 = 2(7.5)(0.800)$

$V = \sqrt{12}$

$V = 3.4\ m/s$

---

8. $m = 800\ kg$

$d = 14\ m$

$v = 18\ m/s \rightarrow 0.3\ m/min$

a. $W_{total} = K_2 - \cancel{K_1}^{0}$

$K_2 = \frac{1}{2}mv^2$

$K_2 = \frac{1}{2}(800)(0.3)^2 = 36\ J/min$

---

9. $m = 2\ kg$

$h = 3\ m$

$L = 1.50\ m$

$\mu_K = 0.250$

$k = 400\ N/m$

$g = 9.8\ m/s^2$

a) $mgh = \frac{1}{2}mv^2$

$(2)(9.8)(3) = \frac{1}{2}(2)v^2$

$v^2 = 58.8$

$v = 7.66\ m/s$

Rocío Irene Ruballo Guerrero 00037225

b. $N = mg$

$= 19.6\ N$

$F_k = 4.9\ N$

$W = F \cdot d$

$W = (4.9)(1.50)$

$W = 7.35\ J$

$E = K + U$

$E = K_1^{0} + K_2 + U_1 + U_2^{0}$

$E = 58.67 + 58.8$

$E_{red} = 0.43$

c. $\frac{1}{2} m v^{2\,0} = \frac{1}{2} k x^2$

$\frac{1}{2}(2)(0) = \frac{1}{2}(400)x^2$

$200 = x^2$

$x = 14.14\ m$

---

10. $t = 0$

$m = 2150\ kg$

$F_x = At^2$

$F = 781.25,\ t = 1.25\ s$

a. $At^2$

$A = \frac{Fx}{t^2}$

$A = \frac{781.25\ N}{1.25\ s^2}$

$A = 500\ N/s^2$

b. $J = \Delta P$

carnet: 00134424 nombre: Axell Alejandro Girón Posada

1) d
2) b
3) b
4) b
5) d
6) b

7.

$m = 0.5\,kg$

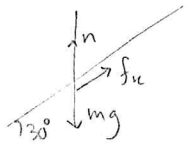
$\beta = 30^\circ$

$M_s = 0.2$

$h = 0.8\,m$

a)

DCL




b)

$\Sigma F_x = mg \operatorname{Sen} 30 - f_s = 0$

$\Sigma F_y = n - mgh = 0$

c) $v_f = 3\,m/s$

$f_s = \mu_s n$

$f_s = 0.98N$

$\Delta u = \frac{1}{2}(0.5)(v_f)^2$

$\Delta E = \frac{1}{4} v_f^2$

8.

$m = 800\,kg$

$w_g = 800 \cdot 9.8 \cdot 14$

$K_i + U_{gi} + \cancel{Er_i}^{0} = K_f + U_{gf} + \cancel{Er_f}^{0}$

$\frac{1}{2} m_i v_i^2 + \cancel{mgh} = \frac{1}{2} \cancel{m_f v_f^2}^{0} + \cancel{m_f g h}^{0}$

$W_{otro} = \frac{1}{2} m_i v_i^2 + m_i g h$

$= 129{,}600 + 109{,}760$

$= 239{,}360\,J$

9.

a) $w_g = mgh$

$= 2(9.8)(3) = 58.8\,N$

$\Delta K = \frac{1}{2} m v_f^2$

$= v_f^2$

$W = \Delta K$

$v_f = \sqrt{58.8}$

$v_f = 7.67\,m/s$

b) $K_i + U_{gi} + \cancel{Er_i}^{0} = K_f + U_{gf} + \cancel{Er_f}$

$7.67 - (0.250)(2)(9.8) = v_f^2 + 200\frac{N}{m}(x)$

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1) C
2) B
3) C
4) B
5) C
6) A

---

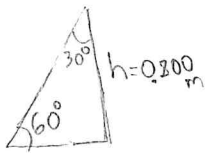
## Ejercicio 7)

Datos:

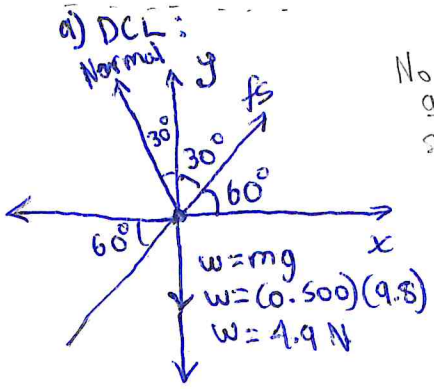
- $m = 0.500\ Kg$
- $\beta = 30°$ con la vertical
- $\mu_s = 0.200$
- $h = 0.800\ m$

Movimiento circular

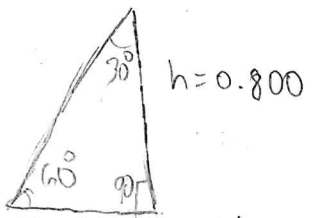
- fs que se opone al movimiento.




a) DCL:




No olvidar que el bloque se encuentra a una altura constante "h"




Se hace uso de Ley del Seno:

$$\frac{R}{Sen(30°)} = \frac{0.800}{Sen(60°)}$$

$$R = \frac{0.800\ Sen(30°)}{Sen(60°)}$$

$$R = 0.46\ m$$

b) Ecuaciones de movimiento.

$a_c = \frac{v^2}{R}$

$$\Sigma F_x = m \cdot a_c$$

$$fs\cos(60°) - Normal\ Sen(30°) = (0.500)\left(\frac{v^2}{0.46}\right)$$

$$\Sigma F_y = 0$$

$$fs\ Sen(60°) + Normal\cos(30°) - 4.9 = 0$$

$$Normal = \frac{4.9 + fs\ Sen(60°)}{\cos(30°)}$$

Atrás

## Ejercicio 8:

Datos:

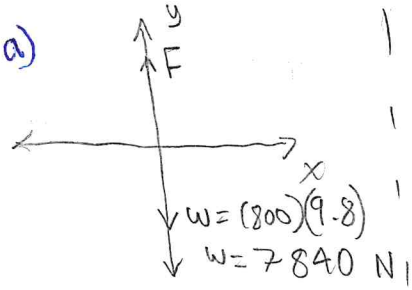
$m = 800\ Kg$ de agua

$t = 60$ segundos (1 minuto)

$h = 14$ metros

$v = 18\ m/s$

a)




$\Sigma F_y = 0$

$F - 7840 = 0$

R// $F = 7840\ J$

$W_{total} = \Delta K$

$\Delta K = K_f - K_i \rightarrow \frac{1}{2}mv_f^2 - \frac{1}{2}mv_0^2$

$W = F \cdot d \cdot \cos\theta$

$W = 7840(14)\cos(0^\circ)$

$W = 109{,}760\ J$

b) $K = \frac{1}{2}mv^2$

$K = \frac{1}{2}(800)(18)^2$

$K = 129{,}600\ J$

R// $129{,}600\ J$

R//

a) $109{,}760\ J$

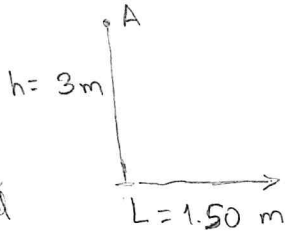
b) $129{,}600\ J$

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## Ejercicio 9:

Datos:

- $m = 2\ Kg$
- $V_i = 0\ m/s$ → porque se suelta del reposo.
- $\mu_K = 0.250$
- Al comprimir el resorte en ese momento el bloque se detiene. $V_f = 0\ m/s$
- Ley de Hooke → $F_{resorte} = K\Delta x$
- $K = 400\ N/m$




$y_i = 3\ m$

$y_f = 0\ m$

R//

a) $7.67\ m/s$

a) $\Delta K = \Delta U$

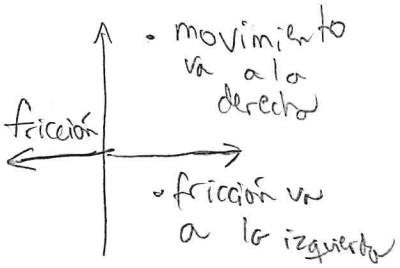
$\Delta K = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2 \longrightarrow \frac{1}{2}(2)v_f^2 - \frac{1}{2}(2)(0)^2$

$\Delta u = mgy_f - mgy_i \longrightarrow (2)(9.8)(0) - (2)(9.8)(3)$

$\frac{1}{2}(2)v_f^2 = -2(9.8)(3)$

$v_f = 7.67\ m/s$

b)




c) Cuando compresión de resorte es máxima

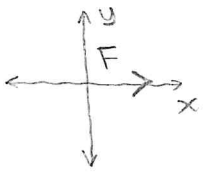
$V = 0\ m/s$

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## Ejercicio 10:

Datos:

- $t = 0s$
- $m = 2150\ Kg$




- $F_x = At^2$
- $t = 1.25s \rightarrow F = 781.25\ N$

a) $F(1.25) = A(1.25)^2$

$781.25 = (1.25)^2 A$

$\frac{781.25}{(1.25)^2} = A$

$A = 500$

Para las unidades:

$N = Kg \cdot \frac{m}{s^2}$

$\frac{Kg\ \frac{m}{s^2}}{\frac{s^2}{1}} = \frac{Kg\ m}{s^4}$

R// $A = 500\ \frac{Kg\ m}{s^4}$

b) Impulso del motor sobre el cohete.

$\Delta t = 1.50s$

- $t_i = 2.00s$
- $t_f = 3.50s$

$F(t) = 500t^2$

$\vec{J} = \int_{t_i}^{t_f} F(t)\,dt$

$J = \int_{2.0}^{3.50} 500t^2\,dt$

$J = 5812.5\ N \cdot s$

R// El impulso es de 5812.5 N.s

R//

a) $A = 500\ \frac{Kg \cdot m}{s^4}$

b) El impulso es de 5812.5 N.s

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(9) Datos:

$m = 2\ kg$ $\quad \mu_k = 2.50$

$h = 3\ m$ $\quad K = 400\ N/m$

$L = 1.50\ m$

a) $mgh = \frac{1}{2}mv^2$ : $(2)9.8)(3) = \frac{1}{2}(2)V^2$

$\sqrt{58.8} = \sqrt{V^2}$

$7.66 = V$

$V = 7.67\ m/s$

b) $W_f = -\mu_k \cdot m \cdot g \cdot L$

$W_f = (-0.250)(2)(9.8)(1.50) = -7.35\ J$

$E_{residual} = mgh + W_f$

$E_{residual} = 58.8 - 7.35 = 51.45\ J$

$E_{residual} = 51.45\ J$

c) $\frac{1}{2}Kx^2 = 51.45$ $\quad x = \sqrt{\frac{2(51.45)}{2100}} = 0.507\ m$

$x = 0.507\ m$

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10) Datos:

$F = 781.25\ N$

$t = 1.25\ s$

$m = 2150\ kg$

a) $A = \frac{F}{t^2} = \frac{781.25}{(1.25)^2} = 500\ N/s^2$

$A = 500\ N/s^2$

b) $J = \int At^2\,dt$:

$$J = \int_2^{3.5} 500t^2\,dt = 500\int_2^{3.5} t^2\,dt$$

$$= 500\,\frac{t^3}{3}\Big|_2^{3.5} = 5812.5$$

$$= 581 \times 10^3\ N\cdot s$$

$J = 581 \times 10^3\ N\cdot s$

c) $\Delta V = \frac{J}{m} = \frac{5812.5}{2150} = 2.70\ m/s$

$\Delta V = 2.70\ m/s$

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(8) Datos:

$m = 800\ kg$

$v = 18\ m/s$

$h = 14\ m$

$g = 9.8\ m/s^2$

a) $W = (800\ kg)(9.8\ m/s^2)(14\ m)$

$W = 109760$

En Joules:

$W = 1.10 \times 10^5\ J$

b) $\Delta K = \frac{1}{2} mv^2$

$\Delta K = \frac{1}{2}(800\ kg)(18\ m/s)^2 = 129,600$

En Joules:

$W = 1.30 \times 10^5\ J$

C) $P = \frac{109760 + 129600}{60} = 3989$ Watts

$\frac{3989}{1000} = 3.989\ KW$

$P = 3\ 99\ KW$

$P = 3.99\ KW$

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1. c
2. b
3. c
4. a
5. d
6. b

7) Datos: $m = 0.500\ kg$ $h = 0.800\ m$
$\beta = 30°$
$\mu_s = 0.200$

a) DCL:

