UNIVERSIDAD DE SAN CARLOS DE GUATEMALA
FACULTAD DE INGENIERIA
ESCUELA DE CIENCIAS
DEPARTAMENTO DE FISICA
PRIMER SEMESTRE 202

REG. ACADEMICO: 202100081 **CUI:** 3020696740101

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1

Datos

$P_m = 1240\ Kg/m^3$

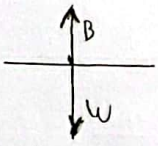
$P_a = 101{,}500$

4atmosfera

$P_{man} = Pgh$

$g = 9.8\ m/s$

$P_a = P_{man} + 1atm$



$P_{man} = 3atm * \frac{101500\ Pa}{1atm}$

$\frac{304500}{(1240)(9.8)} = 25.06$

$\boxed{25.06m}$

#2

Datos

$I = 12$

$W_0 = 8$

$W_f = 5$

$(I + I_2)W_f = I W_0$

$I_2 = \frac{(12)(8)}{5} - 12 = 7.2$

$\boxed{7.2}$

3

Datos

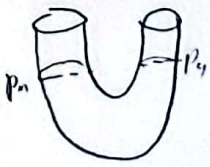
$h = 0.15m$

$\Delta h = 12m$

$P_0 = Pb$

$P_{Mg}\ g \cdot b = P \cdot g \cdot h_2$

$P_{Mg} = 13600$



$P = \frac{(13600)(0.15)}{0.03} = \boxed{6{,}8000\ Kg/m^3}$

4

Cable de acero

$L = 75 \quad A = 5$

$M = 20000\ Kg$

$OL = 1.5$

$Y = 2.1 \cdot 10^{11}$

$A = 5cm \cdot \left(\frac{1}{100}\right)^2 = 5 \cdot 10^{-4}$

$T = m(atg)$

$T = (20000)(11.3)$

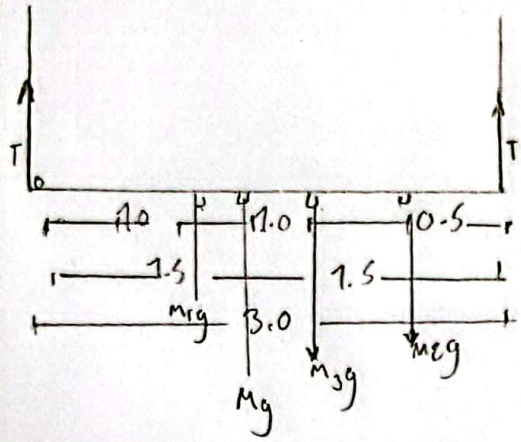
$T = 226000$

$\Delta L = \frac{75(226000)}{(5.4 \cdot 10^{-4})(2.1 \cdot 10^{11})}$

$\Delta L = 0.149$

$\boxed{\Delta L = 0.149}$

#5



$\curvearrowleft +\sum \tau_o = 0$ $\begin{cases} M_g = 1000N, & m_2 g = 1000N \\ m_1 g = 750N & m_3 g = 500N \end{cases}$

$3T - 1 \cdot m_1 g - 1.5 M_g - 2 m_3 g - 2.5 m_2 g = 0$

$3T = 1(750) + 1.5(1000) + 2(500) + 2.5(1000)$

$3T = 5750$

$T = \frac{5750}{3} = 1916.67 \approx 1917$ **1917 N**

#6

$l = 0.10$ 0.40 $(0.1)^3$

$Vol = 400 \cdot 10^{-6}$

$m = (13600)(400 \cdot 10^{-6})$

$m = 5.44$

$P = \frac{5.44}{0.1^3}$

$P = 5440$ **P = 5440**

#7

$V = 12 m^3$, $\Delta t = 30 min \left(\frac{60s}{1 min}\right) = 1800s$ $A_2 = 10 cm^2 \cdot \left(\frac{1m}{100 cm}\right)^2 = 0.001 m^2$

$Q = \frac{V}{\Delta t} = \frac{12}{1800} = 6.667 \times 10^{-3} m^3/s$; $Q = A_2 V_2 \Rightarrow V_2 = \frac{Q}{A_2} = \frac{6.667 \times 10^{-3}}{0.001} = 6.67 m/s$

6.67 m/s

#8

$L, R, F, \Delta L$

$2L, 2R, KF, \Delta L$

$Y = \frac{FL}{\pi R^2 \Delta L} = \frac{KF(2L)}{\pi (2R)^2 \Delta L} \rightarrow \frac{1}{R^2} = \frac{2K}{4R^2} \rightarrow 1 = \frac{K}{2} \rightarrow K = 2$

K = 2

#9

$K = 250$ $m = 5$ $\rho = 925$ $P = 1000$

$\sum F_y = 0$ $E + mg + PK = 0$

$PK = E - mg$

$K \Delta x^2 = \rho g V - mg$

$V = \frac{8}{925} = 0.0110$

a) $\rightarrow x = \sqrt{\frac{(1000)(9.8)(0.011) - (5)(9.8)}{250}}$

$x = 0.343$

b) $\Rightarrow Kx^2 = (250)(0.343)^2 = 29.41$

a) 0.343
b) 29.41

#10

$a = 1.00$ $m = 80g = 0.080 kg$

$M = 50.0 kg$

$L = 48 kg m^2/s$

$\vec{L} = \vec{r} \times m\vec{v}$

$|L| = mrv \cdot \sin(90°)$

$v = \frac{L}{m \cdot \frac{a}{2}} = \frac{48}{(0.08)(0.5)} = 1200 m/s^2$

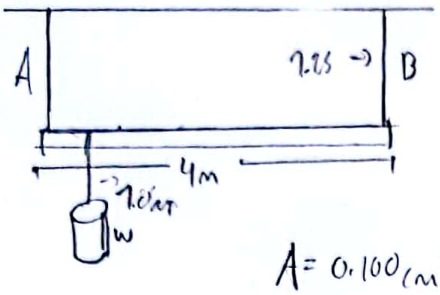
$I_1 = M \cdot a^2/3 = \frac{(50)(1)^2}{3} \rightarrow I_1 = 16.67 kg \cdot m^2$

$I_2 = mR^2 = m\left(\frac{a}{2}\right)^2 = (0.08)(0.5)^2 \rightarrow I_2 = 0.02 kg m^2$

$L = I\omega \rightarrow \omega = \frac{L}{I_1 + I_2} = \frac{48}{16.67 + 0.02} = 2.88 rad/s$

a) 1200 m/s²
b) 2.88 rad/s

#11



$w = 100{,}000N$

Dato	Unidad	Cable A	Cable B
A	cm^2	0.100	?
Y	N/m^2	2×10^{11}	1.5×10^{11}

$A = 0.100 cm^2 \times \left(\frac{1m}{100cm}\right)^2 = 1 \times 10^{-3} m^2$

$Y = \frac{F}{A} \rightarrow \sigma = Y\varepsilon_0$

$\frac{F}{A} = Y\varepsilon_0$

$\varepsilon_0 = \frac{F}{AY}$

$\varepsilon_0 = \frac{F}{AY} = \frac{100{,}000}{(1 \times 10^{-3})(2 \times 10^{11})}$

0.000500

#12

$P = 20N$

$T = 16$

$\sum F_y = 0$

$T + E - P = 0 \quad m = \frac{P}{g} = \frac{20}{9.8} = 2.04$

$P_{gl} = P - T$

$v = \frac{P-T}{Pg} = \frac{20-16}{(1000)(9.8)} = 4.082 \times 10^{-4} H$

4.082×10^{-4}

#13

$H_1 = 122.5 \quad r = 0.02$

$h = \frac{v^2}{2g}$

$h_1 = \frac{10^2}{2(98)} = 5.10 m$

$Q = \pi(0.02)^2(10) = 0.0126$

$t = \sqrt{\frac{2(122.5)}{9.8}}$

$t = 5$

$\Delta x = \frac{5}{0.5} = 10$

a) 5.10
b) 10

$t = \frac{V}{Q} = \frac{0.6}{0.0126} = 47.6 s$ b

a) 5.10
b) 47.6 s