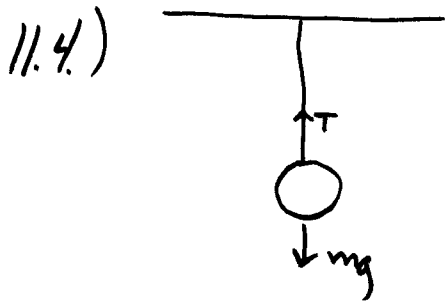


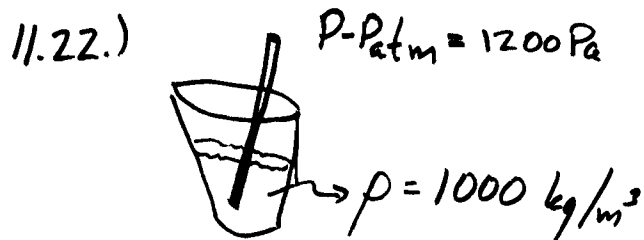
# HW #10



11.4.)  $T = 120 \text{ N} \Rightarrow mg = 120 \text{ N}$   
 $m = \rho V$       $\rho = 8470 \text{ kg/m}^3$   
 $mg = \rho V g = \rho \frac{4}{3} \pi r^3 g = 120 \text{ N}$   
 $r^3 = \frac{120}{\frac{4}{3} \pi \rho g}$       $r = \underline{7.0 \text{ cm}}$

11.14.)  $P = 0.960 * 10^5 \text{ Pa}$  from  $1.013 * 10^5 \text{ Pa}$   
 Area of window =  $6.2 \text{ m}^2$

$$F = P_1 A - P_2 A = (P_1 - P_2) A = \underline{3.3 * 10^4 \text{ N outward}}$$



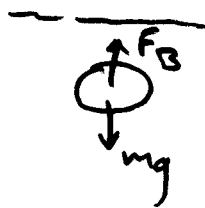
$$P - P_{\text{atm}} = \rho g h$$

$$h = \frac{P - P_{\text{atm}}}{\rho g} = \frac{1200}{9800} = \underline{0.12 \text{ m}}$$

11.48.)  $Wt_{\text{air}} = 2 Wt_{\text{water}}$       $\rho_{\text{solid}} = 5000 \text{ kg/m}^3$       $\frac{V_{\text{solid}}}{V_{\text{tot}}}$  ?

$$V_T = V_s + V_H \quad m = \rho_s V_s + \rho_H V_H$$

$$mg = 2(mg - F_B) \quad F_B = \rho_W V_T g$$



$$mg = 2mg - 2\rho_W V_T g \rightarrow 0 = m - 2\rho_W V_T$$

$$\rho_s V_s + \rho_H V_H - 2\rho_W V_s - 2\rho_W V_H = 0 \rightarrow (\rho_s - 2\rho_W) V_s + (\rho_H - 2\rho_W) V_H = 0$$

$$V_H = V_T - V_s \quad (\rho_s - 2\rho_W) V_s + (\rho_H - 2\rho_W) V_T - (\rho_H - 2\rho_W) V_s = 0$$

# HW # 10 (pg 2)

$$11.48 \text{ cont.}) (\rho_s - 2\rho_w - \rho_H + 2\rho_w)V_s + (\rho_H - 2\rho_w)V_T = 0$$

$$(\rho_s - \rho_H)V_s = (2\rho_w - \rho_H)V_T$$

$$\frac{V_s}{V_T} = \frac{2\rho_w - \rho_H}{\rho_s - \rho_H}$$

$$\begin{aligned}\rho_w &= 1000 \text{ kg/m}^3 \\ \rho_H &= 1.2 \text{ kg/m}^3 \\ \rho_s &= 5000 \text{ kg/m}^3\end{aligned}$$

$$\underline{\frac{V_s}{V_T} = \frac{2}{5} = 0.4}$$

$$11.62.) P_1 + \frac{1}{2}\rho v_1^2 + \rho g y_1 = P_2 + \frac{1}{2}\rho v_2^2 + \rho g y_2$$

$$P_1 - P_{\text{atm}} = 9.7 \times 10^4 \text{ Pa} \quad v_1 = 2.1 \text{ m/s}$$

$$y_2 - y_1 = 4.0 \text{ m} \quad v_2 = 3.7 \text{ m/s}$$

a.)  $P_2 - P_{\text{atm}}?$

$$P_2 - P_{\text{atm}} = P_1 - P_{\text{atm}} + \frac{1}{2}\rho(v_1^2 - v_2^2) + \rho g(y_1 - y_2)$$

$$\underline{P_2 - P_{\text{atm}} = 5.3 \times 10^4 \text{ Pa}}$$

b.)  $v_1 = v_2 = 0 \quad P_1 - P_{\text{atm}} = 1.1 \times 10^5 \text{ Pa}$

$$P_2 - P_{\text{atm}} = P_1 - P_{\text{atm}} + \rho g(y_1 - y_2) = \underline{7.1 \times 10^4 \text{ Pa}}$$