

$$1.) G_0 = 625 \text{ N}$$

$$G_B = 98 \text{ N}$$

$$p = 2,60 \cdot 10^5 \text{ Pa}$$

$$p = \frac{F}{A} \Rightarrow A = \frac{F}{p}$$

$$A = ?$$

$$A = \frac{\frac{1}{2}(G_0 + G_B)}{p} = 4,76 \cdot 10^{-4} \text{ m}^2$$

$$2.) m = 16 \text{ kg}$$

$$A = 0,50 \text{ m} \times 0,15 \text{ m}$$

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

$$p = \frac{F}{A} = \frac{m(g+a)}{A}$$

$$p = ?$$

$$A = 0,50 \times 0,15 = 0,075 \text{ m}^2$$

$$F = m(g+a) =$$

$$p = \frac{16 \cdot (1,5 + 9,81)}{0,50 \times 0,15} = 2400 \text{ Pa}$$

$$3.) p_a = 1,013 \cdot 10^5 \text{ Pa}$$

$$\rho_T = 1200 \text{ kg/m}^3$$

$$h_1 = 0,15 \text{ m}$$

$$h_2 = 0,10 \text{ m}$$

$$p_k = ?$$

- tekučina se diše u
cevači, dok se tlakovi
ne izjednače

$$p_a = p_k + \rho g h \Rightarrow p_k = p_a - \rho g h$$

$$p_{k1} = 9,95 \cdot 10^4 \text{ Pa}$$

$$p_{k2} = 1,001 \cdot 10^5 \text{ Pa}$$

4.) $p_1 = 1,90 \text{ bar}$

a) $h = 6,50 \text{ m}$

$p_2 = ?$

b) $h_2 = ?$ voda ne isječe

-slavina zatvorena $\Rightarrow$ voda je statički fluid

a) $p_1 = p_2 + \rho g h \Rightarrow p_2 = p_1 - \rho g h = \underline{\underline{1,26 \text{ bar}}}$

b) ako ne isječe voda onda je $p_2 = 0$

$p_1 = \cancel{p_2} + \rho g h \Rightarrow h = \frac{p_1}{\rho \cdot g} = \underline{\underline{19,4 \text{ m}}}$

5.) $m = 5,2 \cdot 10^5 \text{ kg}$

$h_0 = 15,0 \text{ m}$

$h_2 = 7,30 \text{ m}$

$p_A, p_B = ?$

$\rho = \frac{m}{V} \Rightarrow V = \frac{m}{\rho}$

$\frac{4}{3} r^3 \pi = \frac{m}{\rho}$

$r^3 = \frac{3m}{4\pi\rho}$

$r = 5,00 \text{ m}$

$\rightarrow$ odnosi odnosi

$p = p_{atm} + \rho g h$

a) $h_A = 15,0 + 2r$

$h_A = 15,0 + 2 \cdot 5,0 = 25,0 \text{ m}$

$\cancel{p_{atm}} + p_A = \cancel{p_{atm}} + \rho g h_A \Rightarrow$

$\rho g h_A = p_A =$

$= 1000 \cdot 9,81 \cdot 25,0 =$

$= \underline{\underline{2,45 \text{ bar}}}$

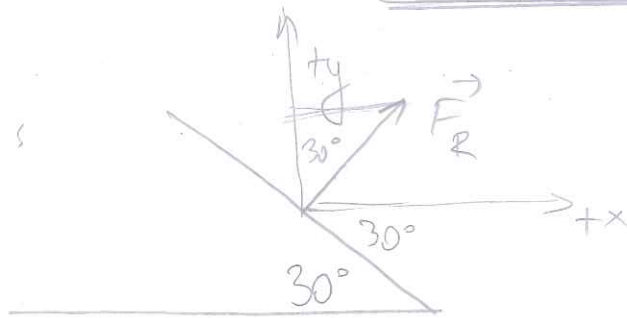
b) $h_B = 15,0 + 10,0 - 7,30 = 17,7 \text{ m}$

$\rho g h_B = 1,73 \text{ bar}$

$$\Delta p = 75,0 \text{ mm Hg} = 25,0 \text{ mm Hg} \cdot \frac{1,013 \cdot 10^5 \text{ Pa}}{760,0 \text{ mm Hg}}$$

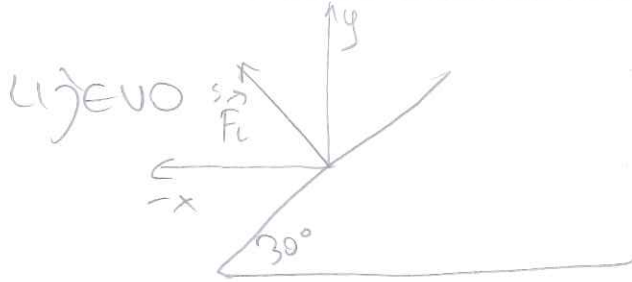
$$F_2 = ? \quad = \underline{1,00 \cdot 10^4 \text{ Pa}}$$

DESNO:



$$F_{Rx} = F_R \sin 30^\circ$$

$$F_{Ry} = F_R \cos 30^\circ$$



$$F_{Lx} = -F_L \sin 30^\circ$$

$$F_{Ly} = F_L \cos 30^\circ$$

UKUPNO: zbroj

$$(F_R = F_L = F) \quad \begin{cases} F_x = F_R \sin 30^\circ - F_L \sin 30^\circ = 0 \\ F_y = F_R \cos 30^\circ + F_L \cos 30^\circ = 2F \cos 30^\circ \end{cases}$$

$$p = \frac{F_{uk}}{A} \Rightarrow F_{uk} = p \cdot A \Rightarrow \text{izvans samo vertikalnu komponentu sile}$$

$$F_{uc} = 2F \cos 30^\circ = 2 \cdot p \cdot A \cdot \cos 30^\circ$$

$$= 2 \cdot 1,00 \cdot 10^4 \text{ Pa} \cdot (14,5 \times 4,21) \cdot \cos 30^\circ$$

$$= \underline{1,06 \cdot 10^6 \text{ N}} \quad \text{vertikalno gore}$$

$$8.) \quad \begin{aligned} p_{\text{auge}} &= 3,54 \cdot 10^6 \text{ Pa} \\ l &= 3,5 \text{ m} \\ r &= 0,150 \text{ m} \end{aligned}$$

$$M = ?$$

$$p_{\text{auge}} = p_{\text{atm}} + p_{\text{klup}}$$

$$p_{\text{klup}} = p_{\text{auge}} - p_{\text{atm}} = \frac{F_{\text{klup}}}{A}$$

$$F_{\text{klup}} = p_{\text{klup}} \cdot A$$

$$M = F_{\text{klup}} \cdot l_{\text{klup}} = (p_{\text{auge}} - p_{\text{atm}}) \cdot (r^2 \pi) \cdot l$$

$$M = \underline{\underline{8,50 \cdot 10^5 \text{ N} \cdot \text{m}}}$$

$$9.) \quad k = \text{~~1600~~ } 1600 \text{ N/m}$$

$$m_k = 40,0 \text{ kg}$$

$$A_1 = 15 \text{ cm}^2$$

$$A_2 = 65 \text{ cm}^2$$

$$\Delta x = ?$$

$$F_1 = k \cdot \Delta x$$

$$p_1 = p_2 \Rightarrow \frac{F_1}{A_1} = \frac{F_2}{A_2}$$

$$F_1 = F_2 \cdot \frac{A_1}{A_2} = m_k \cdot g \cdot \frac{A_1}{A_2}$$

$$\Delta x = \frac{F_1}{k} = \frac{1}{k} \cdot m_k g \frac{A_1}{A_2} = \underline{\underline{5,7 \cdot 10^{-2} \text{ m}}}$$

$$10.) r_v = 0,150 \text{ m}$$

$$h_v = 0,120 \text{ m}$$

$$m_v = 7,00 \text{ kg}$$

$$\rho_{\text{ulje}} = 725 \text{ kg/m}^3$$

$$h_2 = ?$$

-dijelovi 2 sile uspona,
u vodi na h_1 i ulju na
 h_2 visinu valjka

ako pluta tačno

$$F_{uz_{uk}} = G$$

$$F_{uk} = F_{uz_v} + F_{uz_{ulje}} =$$

$$= \rho_v \cdot g \cdot V_1 + \rho_{\text{ulje}} \cdot g \cdot V_2$$

$$F_{uk} = G = m \cdot g$$

$$\cancel{\rho_v \cdot g \cdot V_1} + \cancel{\rho_{\text{ulje}} \cdot g \cdot V_2} = m \cdot g \quad / : \rho_v$$

$$V_1 + \frac{\rho_{\text{ulje}}}{\rho_v} V_2 = \frac{m}{\rho_v}$$

$$V_1 + 0,725 V_2 = 7,00 \cdot 10^{-3} \text{ m}^3$$

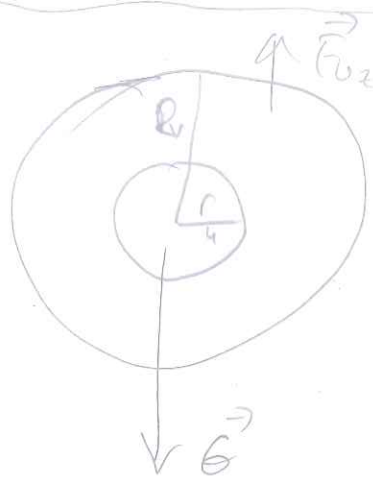
$$(V = V_1 + V_2 = r_v^2 \pi \cdot h_v = 8,48 \cdot 10^{-3})$$

$$V_1 = 8,48 \cdot 10^{-3} - V_2$$

$$V_2 = 5,38 \cdot 10^{-3} \text{ m}^3$$

$$V_2 = r_v^2 \pi \cdot h_2 \Rightarrow h_2 = \frac{V_2}{r_v^2 \pi} = \underline{\underline{2,6 \cdot 10^{-2} \text{ m}}}$$

11.) $m_s = 1 \text{ kg}$
 $\rho_s = 2600 \text{ kg/m}^3$
 $R_v, r_u = ?$



$$F_{02} = G$$

$$\rho_v \cdot g \cdot V_v = m_s g$$

$$V_v = \frac{m_s}{\rho_v} = \frac{4}{3} R_v^3 \pi \Rightarrow R_v = \sqrt[3]{\frac{3m_s}{4\pi\rho_v}} = \underline{\underline{6,20 \cdot 10^{-2} \text{ m}}}$$

$$m_s = \rho_s \cdot V_s = \rho_s \cdot (V_2 - V_1) = \rho_s \cdot \left(\frac{4}{3} R_v^3 \pi - \frac{4}{3} r_u^3 \pi \right)$$

$$m_s = \frac{4}{3} \pi \rho_s \cdot (R_v^3 - r_u^3)$$

$$R_v^3 - r_u^3 = \frac{3m_s}{4\pi\rho_s}$$

$$r_u^3 = R_v^3 - \frac{3m_s}{4\pi\rho_s} \Rightarrow r_u = \underline{\underline{5,28 \cdot 10^{-2} \text{ m}}}$$

12.) $A_2 = 1,8 \cdot 10^{-4} \text{ m}^2$

$$v_2 = 0,85 \text{ m/s}$$

$$h = 0,10 \text{ m}$$

$$A_2 = ?$$

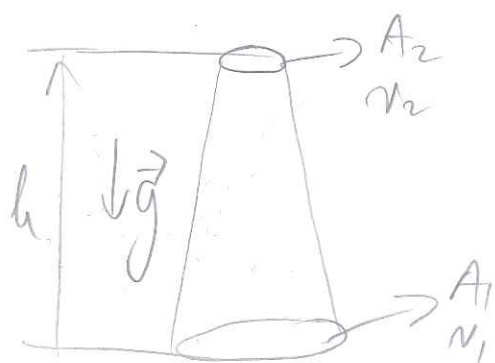
$$A_1 v_1 = A_2 v_2$$

$$v_1^2 = v_2^2 + 2as$$

$$v_1^2 = v_2^2 + 2gh$$

$$A_1 = \frac{A_2 v_2}{v_1} = \frac{A_2 v_2}{\sqrt{v_2^2 + 2gh}}$$

$$A_1 = 9,3 \cdot 10^{-5} \text{ m}^2$$



$$B) \quad t = 3600 \text{ s}$$

$$r_2 = 0,020 \text{ m}$$

$$r_1 = 0,080 \text{ m}$$

$$v_1 = 3,0 \text{ m/s}$$

$$a) \quad m_{H_2O} = ?$$

$$b) \quad v_2 = ?$$

$$\rho = \frac{m}{V} \Rightarrow V = \frac{m}{\rho}$$

$$Q = \frac{V}{t} = \frac{\frac{m}{\rho}}{t} = \frac{m}{\rho \cdot t}$$

$$m_1 = Q \cdot \rho \cdot t = (A_2 \cdot v_2) \cdot \rho \cdot t$$

$$= A_1 \cdot v_1 \cdot \rho \cdot t =$$

$$= r_1^2 \pi \cdot v_1 \cdot 1000 \cdot 3600$$

$$= \underline{2,2 \cdot 10^5 \text{ kg}}$$

$$b) \quad m_1 = 3m_2$$

$$m_2 = \frac{m_1}{3} = 7,3 \cdot 10^4 =$$

$$= r_2^2 \pi \cdot v_2 \cdot 1000 \cdot 3600$$

$$v_2 = \frac{7,3 \cdot 10^4}{r_2^2 \pi \cdot 1000 \cdot 3600} =$$

$$v_2 = 16 \text{ m/s}$$

$$14.) \quad \rho_F = 1,3 \text{ kg/m}^3$$

$$A_2 = 0,0700 \text{ m}^2 \rightarrow v_2$$

$$A_1 = 0,0500 \text{ m}^2$$

$$p_2 - p_1 = 120 \text{ Pa}$$

$$a) \quad v_2 = ?$$

$$b) \quad Q = ?$$

$$b) \quad Q = A_1 v_1 = A_2 v_2 =$$

$$= 0,07 \cdot 14 = 0,98 \text{ m}^3/\text{s}$$

$$a) \quad A_1 v_1 = A_2 v_2$$

$$v_1 = \frac{A_2 v_2}{A_1} = 1,4 v_2$$

$$p_1 + \frac{1}{2} \rho v_1^2 = p_2 + \frac{1}{2} \rho v_2^2$$

$$p_1 + \frac{1}{2} \rho \cdot (1,4 v_2)^2 = p_2 + \frac{1}{2} \rho v_2^2$$

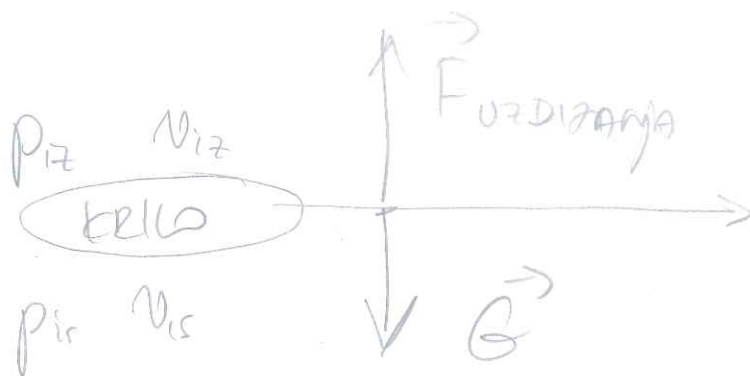
$$v_2 = \sqrt{\frac{2(p_2 - p_1)}{\rho \cdot (1,4)^2 - 1}} = \underline{14 \text{ m/s}}$$

15.] $A = 16 \text{ cm}^2$

$v_{iz} = 62 \text{ m/s}$

$v_{is} = 54 \text{ m/s}$

$G = ?$



$$p_{iz} + \frac{1}{2} \rho v_{iz}^2 + \cancel{\rho g h_{iz}} = p_{is} + \frac{1}{2} \rho v_{is}^2 + \cancel{\rho g h_{is}}$$

($h_{iz} = h_{is}$) $\rightarrow$ ket u ravni
 $\hookrightarrow$ zadržano debjina
 bila u odnosu na
 visinu

$$p_{iz} - p_{is} = \frac{1}{2} \rho v_{is}^2 - \frac{1}{2} \rho v_{iz}^2$$

$$G = F_{uzd} = p_{uk} \cdot A = (p_{is} - p_{iz}) \cdot A$$

$$G = \frac{1}{2} \rho (v_{iz}^2 - v_{is}^2) \cdot A = \frac{1}{2} \cdot 1,29 \cdot (62^2 - 54^2) \cdot 16$$

$$G = 9600 \text{ N}$$

17.] $r_1 = 6,5 \text{ mm}$

$n = 12$

$v_1 = 1,2 \text{ m/s}$

a) $Q = ?$

b) $v_2 = ?$

$r_2 = 4,6 \cdot 10^{-4} \text{ m}$

a) $Q = A_1 \cdot v_1 = r_1^2 \pi \cdot v_1$
 $= 1,6 \cdot 10^{-4} \text{ m}^3/\text{s}$

b) $Q = 12 Q_k \Rightarrow Q_k = \frac{Q}{12}$

$$A_2 \cdot v_2 = \frac{Q}{12}$$

$$r_2^2 \pi \cdot v_2 = \frac{Q}{12}$$

$$v_2 = \frac{Q}{12 \pi \cdot r_2^2} = \underline{\underline{20 \text{ m/s}}}$$