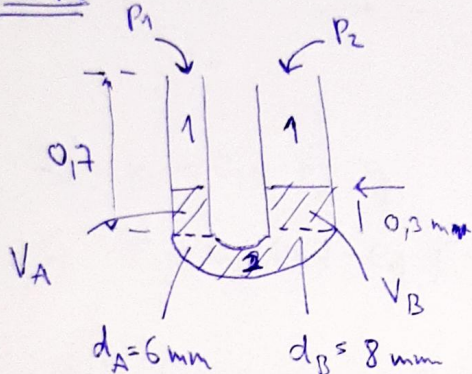


3-1

$$\rho_1 = 819 \text{ kg/m}^3 \text{ (oil)}$$

$$\rho_2 = 998,2 \text{ kg/m}^3 \text{ (water @ } 20^\circ\text{C)}$$

$$P_1 = P_2$$



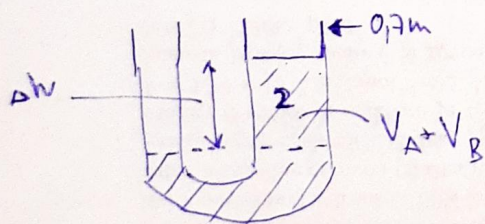
$$V_A = \frac{\pi d_A^2}{4} \cdot 0,3 = 8,482 \times 10^{-6} \text{ m}^3$$

$$V_B = \frac{\pi d_B^2}{4} \cdot 0,3 = 1,508 \times 10^{-5} \text{ m}^3$$

$$(0,008)^2$$

$$V_A + V_B = 2,356 \times 10^{-5} \text{ m}^3$$

a) limit $P_1 > P_2$

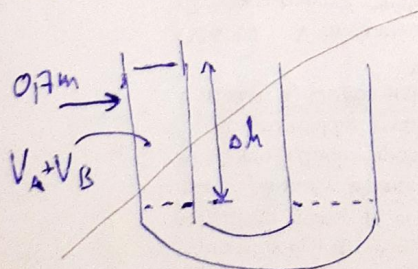


$$V_A + V_B = \frac{\pi d_B^2}{4} \cdot \Delta h$$

$$2,356 \times 10^{-5} = \frac{\pi}{4} \cdot 0,008^2 \cdot \Delta h$$

$$\Delta h = 0,4687 \text{ m} < 0,7 \text{ m} \text{ vejde se}$$

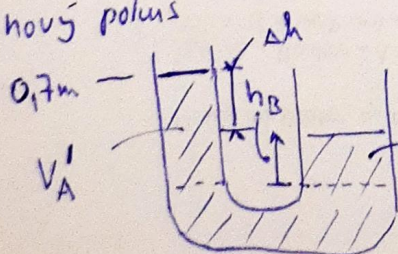
b) limit $P_2 > P_1$



$$V_A + V_B = \frac{\pi d_A^2}{4} \Delta h$$

$$\Delta h = 0,8333 \text{ m} > 0,7 \text{ m} \text{ to by přeteklo}$$

nový polus



$$V_A' = \frac{\pi \cdot (0,006)^2}{4} \cdot 0,7 = 1,979 \times 10^{-5} \text{ m}^3$$

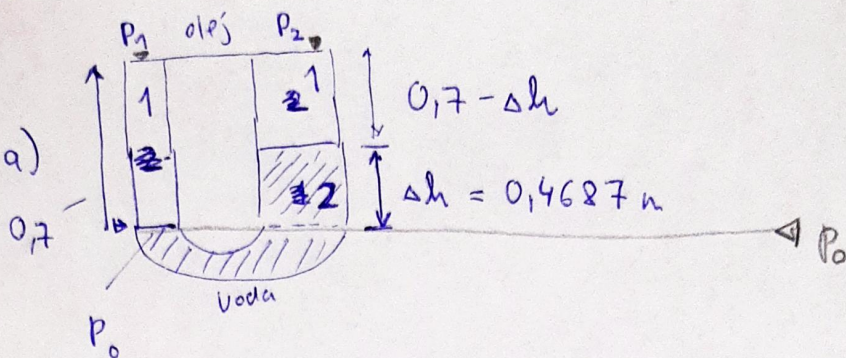
$$V_A + V_B - V_A' = 3,77 \times 10^{-6} \text{ m}^3$$

$$h_B = 3,77 \times 10^{-6} / \left(\frac{\pi \cdot 0,008^2}{4} \right) = 0,075 \text{ m}$$

$$\Delta h = 0,7 - h_B = 0,625 \text{ m}$$

$$P_1 > P_2$$

ad a)



str. 2

$$P_1 = P_0 - 0,7 \cdot \rho_1 \cdot g$$

$$P_2 = P_0 - 0,4687 \cdot \rho_2 \cdot g - (0,7 - 0,4687) \cdot \rho_1 \cdot g$$

$$P_1 - P_2 = (-0,7 \rho_1 g) + 0,4687 \rho_2 g + (0,7 - 0,4687) \rho_1 g$$

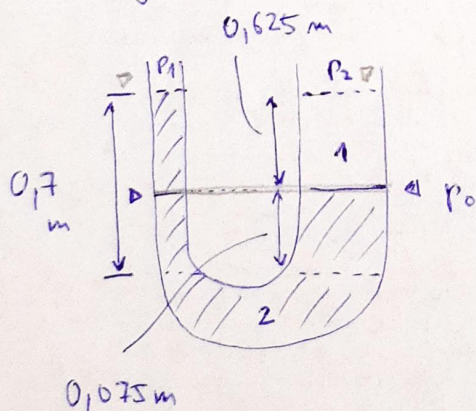
$$= 0,4687 \rho_2 g - 0,4687 \rho_1 g =$$

$$= 0,4687 \cdot (\rho_2 - \rho_1) \cdot 9,81 = 0,4687 \cdot (998,2 - 819) \cdot 9,81$$

$$= 824,0 \text{ Pa} = \underline{\underline{0,824 \text{ kPa}}}$$

$$P_2 > P_1$$

ad b)



$$P_1 = P_0 - 0,625 \cdot \rho_2 \cdot g$$

$$P_2 = P_0 - 0,625 \cdot \rho_1 \cdot g$$

$$P_2 - P_1 = -0,625 \rho_1 g + 0,625 \rho_2 g$$

$$P_2 - P_1 = -0,625 \cdot (\rho_1 - \rho_2) g$$

$$P_2 - P_1 = 0,625 (\rho_2 - \rho_1) g$$

$$= 0,625 \cdot (998,2 - 819) \cdot 9,81$$

$$= 1099 \text{ Pa} = \underline{\underline{1,1 \text{ kPa}}}$$