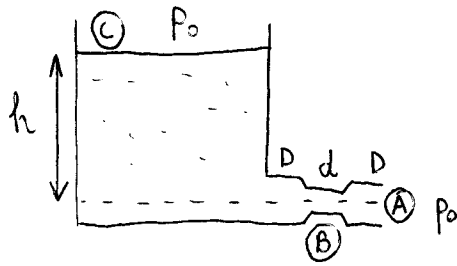


20.)

$$h = 1\text{ m} \quad D = 5\text{ cm} \quad d = 4\text{ cm} \quad \rho = 1000 \frac{\text{kg}}{\text{m}^3}$$



a) (i)  $v_A = ?$       b)  $p_B = ?$

(ii)  $\frac{\Delta V}{\Delta t} = ?$

$$p + \frac{1}{2} \rho v^2 + \rho g h = \text{all}$$

$$A v = \text{all}$$

a) (i)

$$p_A + \frac{1}{2} \rho v_A^2 + \rho g h_A = p_C + \frac{1}{2} \rho v_C^2 + \rho g h_C \quad p_A = p_B = p_0 \quad v_C \approx 0$$

$$p_0 + \frac{1}{2} \rho v_A^2 + 0 = p_0 + 0 + \rho g h$$

$$v_A = \sqrt{2gh} = \underline{\underline{4,427 \frac{\text{m}}{\text{s}}}}$$

(ii)

$$\frac{\Delta V}{\Delta t} = \frac{A v \Delta t}{\Delta t} = A v \quad A_A v_A = \frac{D^2}{4} \pi v_A = \frac{0,05^2}{4} \pi \cdot 4,427 = 0,0087 \frac{\text{m}^3}{\text{s}} = \underline{\underline{8,7 \frac{\text{l}}{\text{s}}}}$$

b)

$$A_A v_A = A_B v_B$$

$$v_B = \frac{A_A}{A_B} v_A = \frac{D^2}{d^2} v_A = \frac{25}{16} \cdot 4,427 \frac{\text{m}}{\text{s}} = 6,917 \frac{\text{m}}{\text{s}}$$

$$p_0 + \frac{1}{2} \rho v_A^2 = p_B + \frac{1}{2} \rho v_B^2$$

$$p_B = p_0 - \frac{1}{2} \rho (v_B^2 - v_A^2)$$

$$p_B = 10^5 \text{ Pa} - 500 \frac{\text{kg}}{\text{m}^3} (6,917^2 - 4,427^2) \frac{\text{m}^2}{\text{s}^2} = \underline{\underline{85877 \text{ Pa}}}$$