



$$V_1 = 1,76 \frac{\text{m}}{\text{s}}$$

a)  $Q_1 = 31,06 \frac{\text{l}}{\text{s}} = 0,031 \frac{\text{m}^3}{\text{s}}$       $Q_1 = A_1 \cdot V_1 \Rightarrow A_1 = \frac{0,031 \cdot 3,14}{1} = 0,018 \text{m}^2 \Rightarrow V_1 = \frac{0,031}{0,018} = 1,76 \frac{\text{m}}{\text{s}}$

(20)

$$\Pi_A + \frac{V_1^2}{2g} = \Pi_B + \frac{V_2^2}{2g} + \sum_{\text{loc}} \frac{V_2^2}{2g} + \lambda_1 \cdot \frac{L_1}{D_1} \cdot \frac{V_1^2}{2g}$$

$$\Pi_A = 3,03 + \frac{1,76^2}{19,62} + 0,5 \cdot \frac{1,76^2}{19,62} + 0,02 \cdot \frac{303}{0,15} \cdot \frac{1,76^2}{19,62}, \quad \Pi_A = 3,03 + 0,16 + 0,079 + 6,46$$

$$\Pi_A = 9,73 \text{ m}$$

b)  $\Pi_A + \frac{V_1^2}{2g} = z_{\text{loc}} + \sum_{\text{loc}} \frac{V_{\text{loc}}^2}{2g} + \sum_{\text{loc}} \frac{V_2^2}{2g} + \lambda_2 \cdot \frac{L_2}{D_2} \cdot \frac{V_2^2}{2g} + \frac{V_{\text{loc}}^2}{2g}$       $L_1^2 + (z_{\text{loc}} - z_{\text{in}})^2 = L_2^2 \Rightarrow \dots$

$$9,73 = 3,33 + 4 \cdot 0,05 \cdot 0,05 V_2^2 + 0,5 \cdot 0,05 V_2^2 + 0,03 \cdot \frac{103}{0,1} \cdot 0,05 V_2^2 + 0,02 V_2^2$$

$$9,73 = 3,33 + 0,04 V_2^2 + 0,025 V_2^2 + 4,55 V_2^2 + 0,02 V_2^2$$

$$6,4 = 8,44 V_2^2 \quad V_2^2 = 1,18$$

$$V_2 = 1,08 \frac{\text{m}}{\text{s}}$$

$$\Rightarrow A_2 = 0,0079 \text{m}^2$$

$$V_{\text{loc}} = 4 V_2$$

$$Q_2 = A_2 \cdot V_2 = 0,0079 \cdot 1,08 = 0,00857 \frac{\text{m}^3}{\text{s}}$$

(20)

$$Q_2 = 8,6 \frac{\text{l}}{\text{s}}$$



