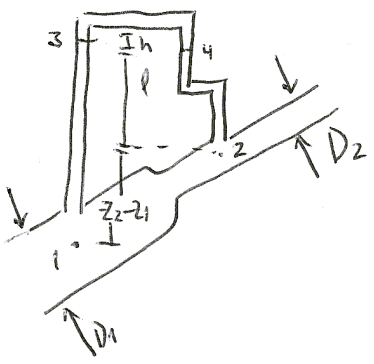
PAUTA P2 EJ 4



Bernoulli:

$$P_1 + \frac{1}{2}\rho v_1^2 + \rho g z_1 = P_2 + \frac{1}{2}\rho v_2^2 + \rho g z_2$$

$$Q = v_1 \cdot A_1 = v_2 \cdot A_2$$

$$v_1 = \frac{4Q}{\pi \cdot D_1^2}$$

$$v_2 = \frac{4Q}{\pi \cdot D_2^2}$$

$$v_1^2 - v_2^2 = \left[(P_2 - P_1) + \rho_{H_2O} g (z_2 - z_1)\right] \frac{2}{\rho_{H_2O}} \quad [1].$$

$$P_1 = P_3 + \rho_{H_2O}\, g (z_2 - z_1 + l + h)$$

$$P_2 = P_4 + \rho_{H_2O}\, g (l)$$

$$P_4 = P_3 + \rho_{AC}\, g \cdot h \Rightarrow P_3 - P_4 = -\rho_{AC} \cdot g \cdot h$$

$$\Rightarrow P_1 - P_2 = \rho_{H_2O} \cdot g (z_2 - z_1 + h) - \rho_{AC}\, g\, h$$

De [1]:

$$Q^2 \left[\left(\frac{4}{\pi \cdot D_1^2}\right)^2 - \left(\frac{4}{\pi \cdot D_2^2}\right)^2\right] = \left[(P_2 - P_1) + \rho_{H_2O} \cdot g (z_2 - z_1)\right] \cdot \frac{2}{\rho_{H_2O}}$$

$$Q = \left[\left(P_2 - P_1 + \rho_{H_2O} \cdot g \cdot (z_2 - z_1)\right) \frac{2}{\rho_{H_2O}}\right]^{1/2} \frac{\pi}{4} \sqrt{\frac{1}{D_1^4} - \frac{1}{D_2^4}}$$

Reemplazando $P_2 - P_1$:

$$Q = \sqrt{\frac{\left(\rho_{AC} \cdot g \cdot h - \rho_{H_2O} \cdot g \cdot h\right) \cdot \frac{2}{\rho_{H_2O}}}{\frac{1}{D_1^4} - \frac{1}{D_2^4}}} \cdot \frac{\pi}{4}$$