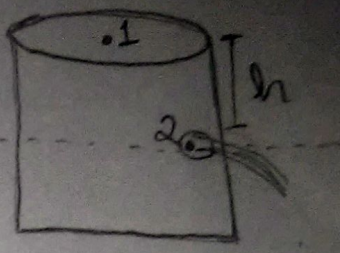
teste 1

0,4

a) $\underbrace{p_1}_{=p_{atm}} + \rho g h_1 + \frac{1}{2}\rho \overbrace{v_1^2}^{0} = \underbrace{p_2}_{=p_{atm}} + \rho g h_2 + \frac{1}{2}\rho v_2^2$



$\left(v_1 = \frac{v_2 A_2}{A_1}\text{, como } A_1 \gg A_2 \rightarrow v_1 \cong 0\right)$

$p_{atm} + \rho g \underbrace{(h_1 - h_2)}_{=h} = p_{atm} + \frac{1}{2}\rho v_2^2 \rightarrow \boxed{v_2 = \sqrt{2gh}} = 5{,}42 \text{ m/s}$ //

$\boxed{v_{vazão}} = v_2 \cdot A_2 = 5{,}42 \frac{m}{s} \cdot \pi (2.10^{-3})^2 m^2 = 68{,}11.10^{-6} \frac{m^3}{s}$ //

0,3 $= 68{,}11.10^{-6} \frac{\cancel{m^3}}{\cancel{s}} \cdot 10^3 \frac{L}{\cancel{m^3}} \cdot 60 \frac{\cancel{s}}{min} = \boxed{4{,}1 \text{ L/min}}$ //

b) $v_1 A_1 = v_2 A_2 \rightarrow \boxed{v_1} = \frac{v_2 A_2}{A_1} = \frac{68{,}11.10^{-6}}{\pi 1^2} = 21{,}68.10^{-6} \text{ m/s}$

$= 21{,}68.10^{-6} \frac{\cancel{m}}{\cancel{s}} \cdot 10^3 \frac{mm}{\cancel{m}} \cdot 60 \frac{\cancel{s}}{min} = \boxed{1{,}3 \text{ mm/min}}$ //

0,3

c) Considerando p'_2 nas proximidades de p_2,

$\rho g h_1 + \underbrace{p_{atm}}_{p_1} + \frac{1}{2}\rho \overbrace{v_1^2}^{\rightarrow 0} = \rho g h'_2 + p'_2 + \frac{1}{2}\rho v'^2_2$

$p'_2 = \underbrace{\rho g (h_1 - h'_2) + p_{atm}}_{\text{pressão hidrostática}} - \frac{1}{2}\rho v'^2_2$

Então $p'_2 = p_{hidrostática} - \frac{1}{2}\rho v'^2_2 < p_{hidrostática}$ //