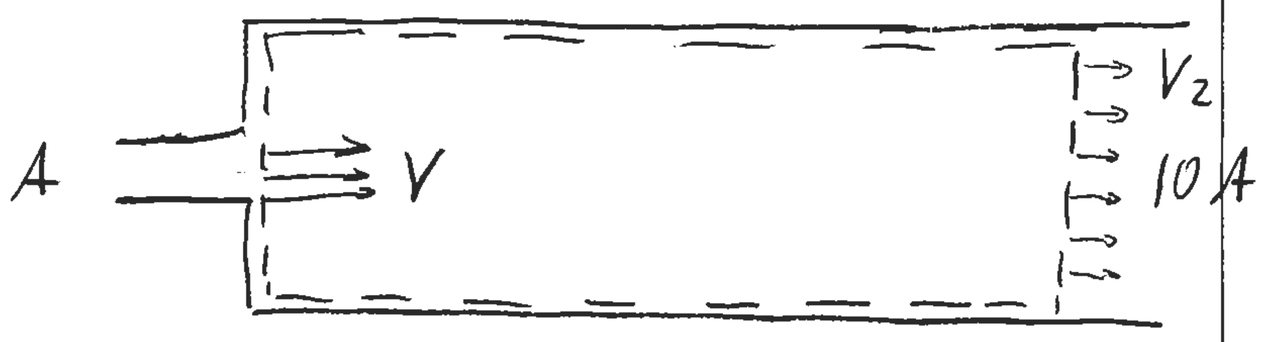
Control Volume:



a) mass conservation

$$\oint \rho \vec{V} \cdot \hat{n}\, dA = -\rho V A + \rho V_2 (10A) = 0 \rightarrow \boxed{V_2 = \frac{1}{10} V}$$

b) momentum conservation

$$0 = \oint \left[p\hat{n} + \rho(\vec{V}\cdot\hat{n})\vec{V} \right] dA = -p_1 \cdot 10A - \rho V^2 A + p_2 \cdot 10A + \rho V_2^2 10A$$

$$0 = (p_2 - p_1) 10A + \rho\left(-V^2 + \frac{1}{10}V^2\right)A$$

$$\boxed{p_2 - p_1 = \frac{9}{100}\rho V^2 A}$$