

To get required column height,  
we must have

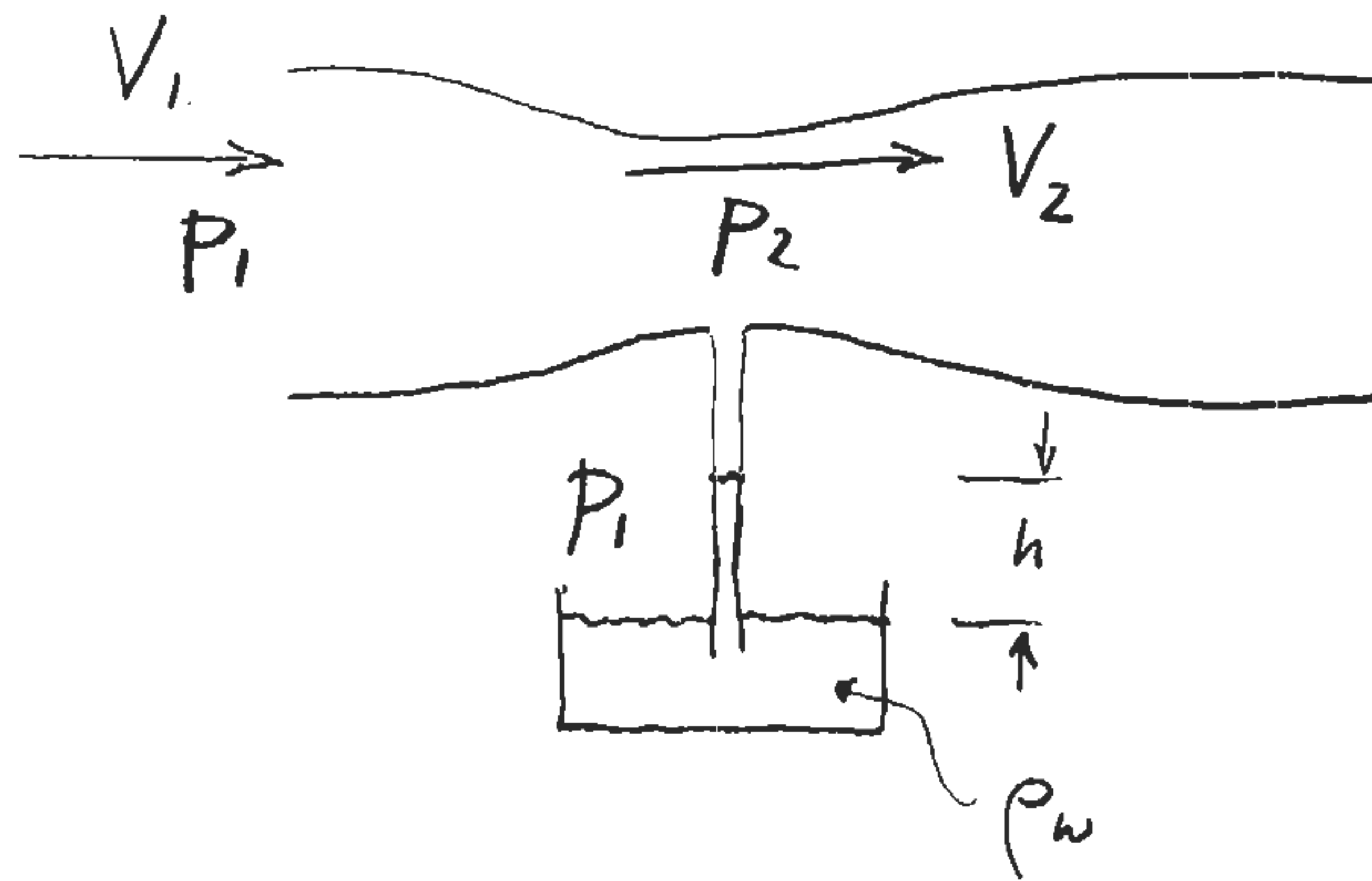
$$P_1 - P_2 = \rho_w g h$$

$$\rho_w = 1000 \text{ kg/m}^3$$

$$g = 9.8 \text{ m/s}^2$$

$$h = 0.1 \text{ m}$$

$$\rightarrow P_1 - P_2 = 980 \text{ Pa}$$



Using Bernoulli:  $P_1 + \frac{1}{2}\rho V_1^2 = P_0 = P_2 + \frac{1}{2}\rho V_2^2$

$$\frac{1}{2}\rho V_2^2 - \frac{1}{2}\rho V_1^2 = P_1 - P_2 = 980 \text{ Pa}$$

Using Continuity:  $V_2 = V_1 \frac{A_1}{A_2} = V_1 \frac{1}{0.7}$

$$\frac{1}{2}\rho V_1^2 \left[ \frac{1}{0.7^2} - 1 \right] = P_1 - P_2$$

$$V_1 = \left( \frac{2(P_1 - P_2)}{\rho \left[ \frac{1}{0.7^2} - 1 \right]} \right)^{1/2} = \frac{2 \cdot 980 \text{ Pa}}{1.226 \text{ kg/m}^3 \left[ \frac{1}{0.7^2} - 1 \right]}$$

$$V_1 = 39 \text{ m/s} = 87.5 \text{ mph}$$