Oops! Missing gravity. Should be z_1 g

Similarly that should be z_2 g

BERNOULLI EQUATION

$$\frac{P_1}{\rho} + \frac{V_1^2}{2} + z_1 = \frac{P_2}{\rho} + \frac{V_2^2}{2} + z_2$$

$V_2 = 0$

$z_1 = z_2$ STAGNATION

$$V_1 = \sqrt{\frac{2(P_2 - P_1)}{\rho}}$$

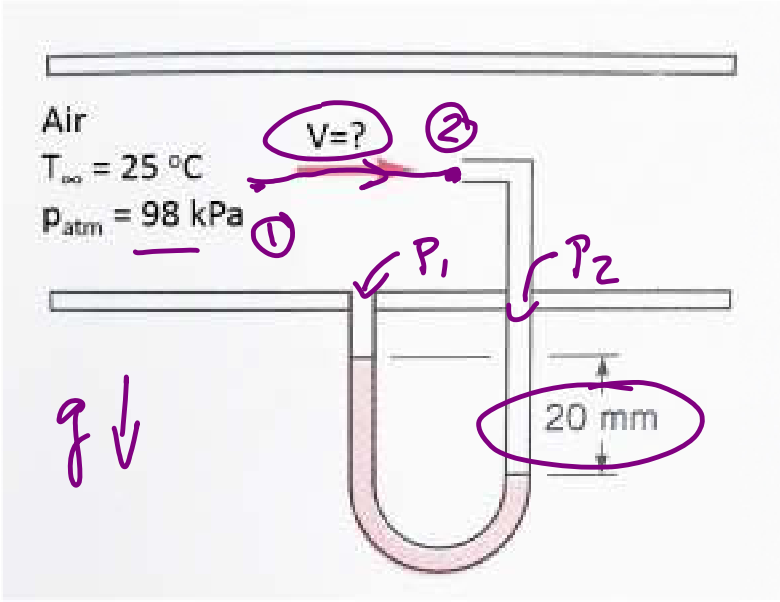
$\rho \leftarrow$ AIR

$$\rho = \frac{P}{RT} = \frac{98 \times 10^3 \ N/m^2}{287 \frac{N\text{-}m}{kg\,K}(25+273)K} = 1.146 \ kg/m^3$$

$$P_2 - P_1 = \gamma_m h$$

Example

A Pitot Tube is connected to a manometer to measure the air velocity in a wind tunnel. If the specific gravity of the manometer fluid is SG=0.85, what is the air speed?



$p_2 - p_1$ FROM MANOMETER

$$p_2 - p_1 = \gamma_m h = SG\,\gamma_w h = 0.85\,(9790\ N/m^3)(0.020m)$$

$$= 166.4\ N/m^2 \quad (N = kg\,m/s^2)$$

$$V_1 = \sqrt{\frac{2(p_2 - p_1)}{\rho}} = \sqrt{\frac{2(166.4\ N/m^2)}{1.146\ kg/m^3}} = 17.0\ m/s$$

ANS