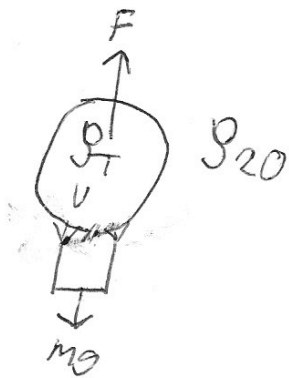


4.5



$$p_T < p_{20}$$

$$V = 100 \text{ m}^3$$

$v_1 = v_2$ (Archimedes principle)

$$F = mg = p_{20} V g - p_T V g \stackrel{v_1 = v_2}{=} (p_{20} - p_T) V g$$

$$mg = (p_{20} - p_T) V g \Leftrightarrow p_T = p_{20} - \frac{m}{V}$$

$$p_T = \frac{p \cdot M}{R T_T} \Leftrightarrow T_T = \frac{p \cdot M}{R p_T} = \frac{p \cdot M}{R \left(p_{20} - \frac{m}{V} \right)}$$

$$p_{20} = \frac{p \cdot M}{R T_{20}} \quad T_T = \frac{p \cdot M}{R \left(\frac{p \cdot M}{R T_{20}} - \frac{m}{V} \right)}$$

$$T_T = \frac{1,013 \cdot 10^5 \text{ Pa} \cdot 29 \cdot 10^{-3} \text{ kg/mol}}{8,314 \text{ J/(mol}\cdot\text{K)} \cdot \left(\frac{1,013 \cdot 10^5 \text{ Pa} \cdot 29 \cdot 10^{-3} \text{ kg/mol}}{8,314 \text{ J/(mol}\cdot\text{K)} \cdot 293 \text{ K}} - \frac{25 \text{ kg}}{100 \text{ m}^3} \right)}$$

$$= 362 \text{ K} (- 273 \text{ K} = 89,6^\circ \text{K} \approx 97^\circ \text{C})$$

97°C
 ~~97°K~~