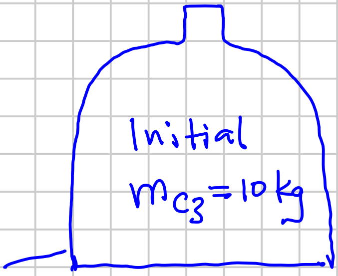
Qs related to 1-component p-T, p-V diagrams
2-component —— " ——

@ End of each Usage



Volume Tank = 25 L

Known:

(a) $T_{outside} \sim T_{tank\ inside}$

(b) m_{C_3} (cumulative) used up

$m_{C_3} = 10\ kg$

$V_{C_3} = 25\ L \cdot \underbrace{\frac{m^3}{1000\ L}}_{\times 1} = 0.025\ m^3$

Initially (no usage)

(a) p Use ideal gas eq. - need T?

(c) V_g / V_t

Hints: Conserve!
Assume | Ask

$T = 0\,°C$

- Either: Gas + Liquid $p = p_v(T)$, Use Table
Gas-like Assume $pV \cong nRT$
Liquid-Like

$T = 0\,°C \quad p_v = 4.769$ bara

$m = 10\ kg = m_g + m_L$

$$V \cong 0.025\,m^3 = V_g + V_L$$

$$(T, p_v) \;@\; \begin{cases} \rho_L = \dfrac{m_L}{V_L} = 527.22\ kg/m^3 \\ \rho_g = \dfrac{m_g}{V_g} = 10.325\ kg/m^3 \end{cases}$$

Assume all $(1-\epsilon_g)$ is Liquid $\Rightarrow V_L^* = 0.018\ m^3$

Assume all $(1-\epsilon_L)$ is Gas $\Rightarrow V_g^* = 0.97\ m^3$

$$\boxed{V_L^* < V_{tank} < V_g^*}$$ – Check

$\Rightarrow$ 2-phases

$$0.025\,m^3 = V_{tank} = V_L + V_g$$

$$m_L / \rho_L \checkmark + m_g / \rho_g \checkmark$$

Amran

$$\frac{m_L}{\rho_L} + \frac{(m - m_L)}{\rho_g} = 0.025$$

$$\Rightarrow m_L \Rightarrow m_g$$

$$\Downarrow \qquad \Downarrow$$

$$V_L \qquad V_g$$

$$V_g^* < V_{tank} \Rightarrow p < p_v(T)$$