Oef 9 p. 107

a) volumewet van Gay-Lussac, want $V \sim T$ $\left(\frac{V}{T} = cte\right)$, dus $p = cte$

b) wet van Boyle en Mariotte, want $T = cte$

c) $p_A = 2{,}0 \cdot 10^5$ Pa $\quad T_A = T_C = 200$K $\quad T_B = 500$K

gg: $V_A = 40$ ml $= 40 \cdot 10^{-3}$ l $= 40 \cdot 10^{-3}$ dm^3 $= 40 \cdot 10^{-3} (10^{-1}\text{ m})^3 = 40 \cdot 10^{-6}$ m^3

$V_C = 80$ ml $= 80 \cdot 10^{-6}$ m^3

gev: toestandsfactoren in B en C:

B: $T_B = 500$K $\quad p_B = p_A = 2{,}0 \cdot 10^5$ Pa

$A \to B$: cte n en cte $p \Rightarrow \frac{V_A}{T_A} = \frac{V_B}{T_B} \Rightarrow V_B = \frac{T_B}{T_A} \cdot V_A$

$= \frac{500\text{K}}{200\text{K}} \cdot 40 \cdot 10^{-6}\text{ m}^3$

$= 100 \cdot 10^{-6}$ m^3

$p_B \cdot V_B = n_B \cdot R \cdot T_B$

$\Downarrow$

$n_B = \frac{p_B \cdot V_B}{R \cdot T_B} = \frac{2{,}0 \cdot 10^5\text{ Pa} \cdot 100 \cdot 10^{-6}\text{ m}^3}{8{,}31 \frac{\text{J}}{\text{mol} \cdot \text{K}} \cdot 500\text{K}}$

$= 0{,}0048$ mol

C: $T_C = 200$K $\quad V_C = 80 \cdot 10^{-6}$ m^3

$A \to C$: cte n en cte $T \Rightarrow p_A \cdot V_A = p_C \cdot V_C$

$\Downarrow$

$p_C = \frac{V_A}{V_C} p_A = \frac{40 \cdot 10^{-6}\text{ m}^3}{80 \cdot 10^{-6}\text{ m}^3} 2{,}0 \cdot 10^5\text{ Pa}$

$= 1{,}0 \cdot 10^5$ Pa

$p_C \cdot V_C = n_C \cdot R \cdot T_C$

$\Downarrow$

$n_C = \frac{p_C \cdot V_C}{R \cdot T_C} = \frac{1{,}0 \cdot 10^5\text{ Pa} \cdot 80 \cdot 10^{-6}\text{ m}^3}{8{,}31 \frac{\text{J}}{\text{mol} \cdot \text{K}} \cdot 200\text{ K}} = 0{,}0048$ mol

d) blauwe isobaar: $n, p = cte \Rightarrow \frac{V_A}{T_A} = \frac{V_D}{T_D}$

$V_D = 120 \cdot 10^{-6}\ m^3$

$\Downarrow$

$T_D = \frac{V_D}{V_A} \cdot T_A = 600K$

rode isobaar: $n, p = cte$ $\quad \frac{V_C}{T_C} = \frac{V_E}{T_E}$

$\Downarrow$

$T_E = \frac{V_E}{V_C} \cdot T_C = 300K$

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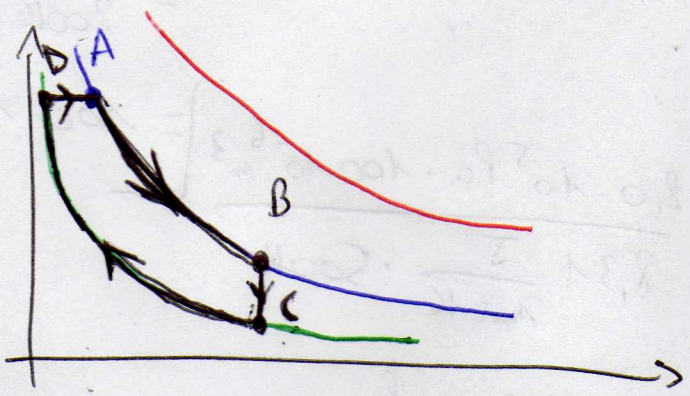

	T	p	V	proces	wet
A → B	=	↘	↗	isotherm	B-M
B → C	↘	↘	=	isochoor	drukwet van G-L
C → D	=	↗	↘	isotherm	B-M
D → A	↗	=	↗	isobaar	volumewet van G-L