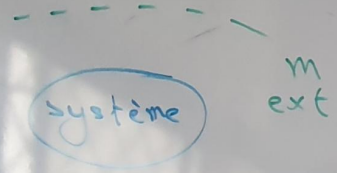
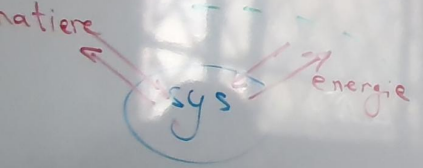
# Thermodynamique

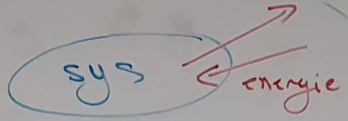
Système, milieu extérieur:



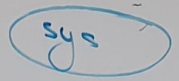

- système ouvert




- système fermé




- système isolé




Variable d'état.

Pression P

Volume V

Température T

## Loi de Boyle-Mariotte

$P \propto \frac{1}{V}$ $\quad T = cte$

$P \nearrow \; V \searrow$ , $P \searrow \; V \nearrow$

$\Rightarrow \boxed{P.V = cte}$

## Loi de Charles:

$P = cte$ $\quad \nearrow T \; \searrow \quad V \nearrow \searrow$

$\boxed{\frac{V}{T} = cte}$

## Loi de Lussac:

$V = cte$

$T \nearrow \swarrow \quad P \nearrow \swarrow$

$\boxed{\frac{P}{T} = cte}$

$T = cte \Rightarrow P.V = cte$

$P = cte \Rightarrow \frac{V}{T} = cte$

$V = cte \Rightarrow \frac{P}{T} = cte$

## Loi des gaz parfaits

$P.V = n.R.T$

P : pression, V : volume, n : mole, R : cst des g.p, T : Température

$V_1 = 10\ mL$ $\quad P_1 = 1\ atm$

$V_2 = ??$ $\quad P_2 = 3,5\ atm$

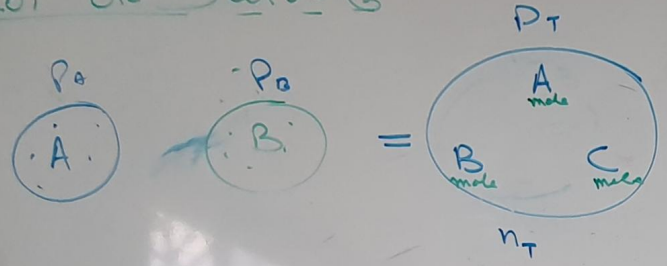
$\Big\}\ T =$

$P \cdot V = cte \Rightarrow P_1 V_1 = P_2 \cdot \boxed{V_2}$

$$V_2 = \frac{P_1 V_1}{P_2} = \frac{1\ \cancel{atm} \cdot 10\ mL}{3,5\ \cancel{atm}}$$

$$\boxed{V_2 = 2,8\ mL}$$

## Loi de Dalton




$$\begin{cases} P_{tot} = \sum P_i = P_A + P_B \dots \\ \text{fraction molaire : } X_i = \frac{n_i}{n_T} \end{cases}$$

$$P_i = X_i \cdot P_{TOT}$$

Pression partielle

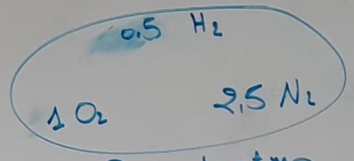
## Exercice 4

$$P_{H_2} = X_{H_2} \cdot P_T$$

$$P_{H_2} = \frac{n_{H_2}}{n_T} \cdot P_T$$

$$P_{H_2} = \frac{0,5 \text{ mole}}{4 \text{ mole}} \cdot 1 \text{ atm}$$

$$P_{H_2} = 0,125 \text{ atm}$$




$P_T = 1$ atm

$n_T = n_{H_2} + n_{O_2} + n_{N_2}$

$n_T = 0,5 + 1 + 2,5$

$n_T = 4$ mole