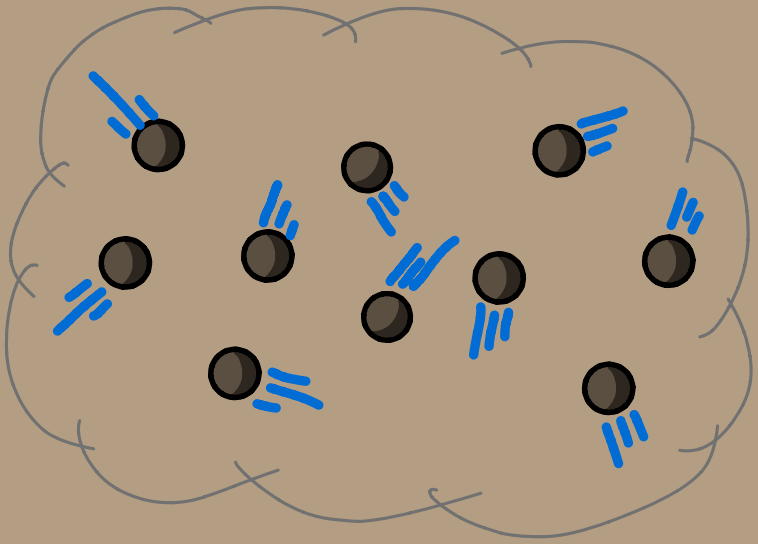
Estudo dos Gases



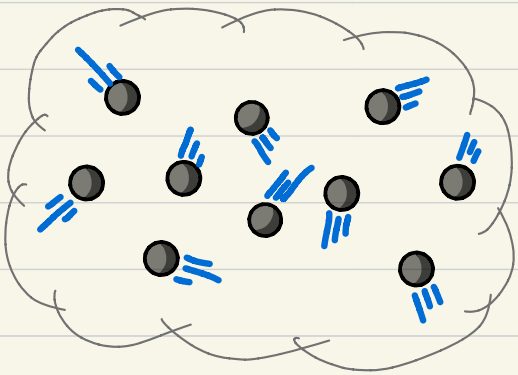
201

20/05

Estudo dos Gases

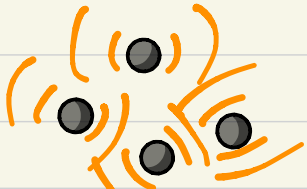
1. O Gás Ideal.

É aquele cuja única interação de suas partículas se dá por meio das colisões elásticas.



↔ Variáveis de Estado

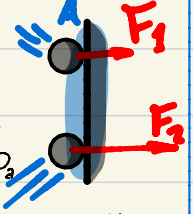
- **Temperatura**



Agitação Térmica.

- **Pressão**

$p = \frac{F}{A}$

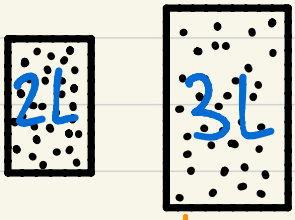


$1 atm \rightarrow 10^5 Pa$

$[p]_{SI} = \frac{N}{m^2} = Pa$ (pascal)

$[p]_{USUAL} = atm$

- **Volume**

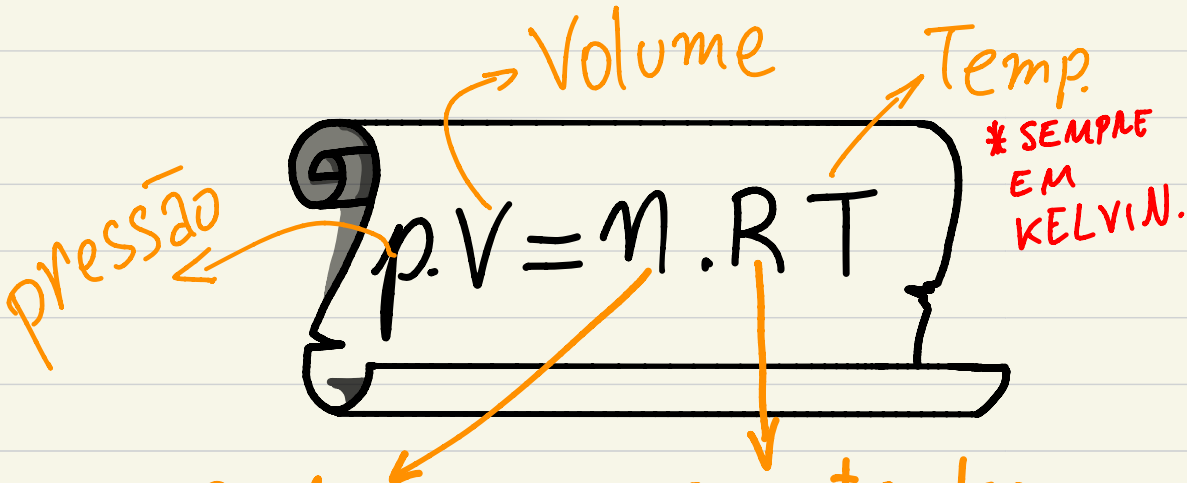


Volume do Recipiente

Obs: Um gás real se aproxima das condições ideais quando sob baixa pressão e alta temperatura.

2. EQUAÇÕES

↩ CLAPEYRON.



1 mol — 6.10^{23}

$n = \frac{m}{M}$

m → massa

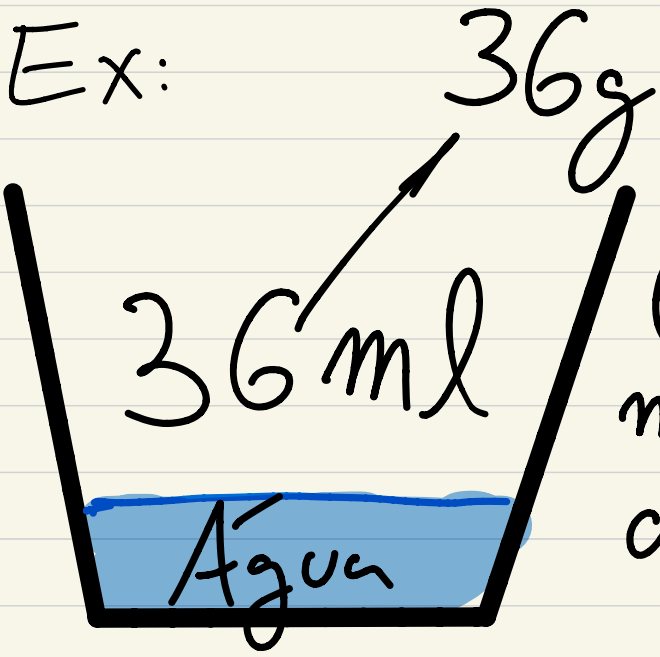
M → massa molar

$R = 0,082 \frac{atm.L}{mol.K}$

$R = 8,31 \frac{J}{mol.K}$

* S.I.

Ex:



Quantas moléculas de H_2O

$2 \times 1 + 16$

$M = 18$

$$n = \frac{m}{M} = \frac{36}{18}$$

$$n = 2\ mol\ (12.10^{23}\ H_2O)$$

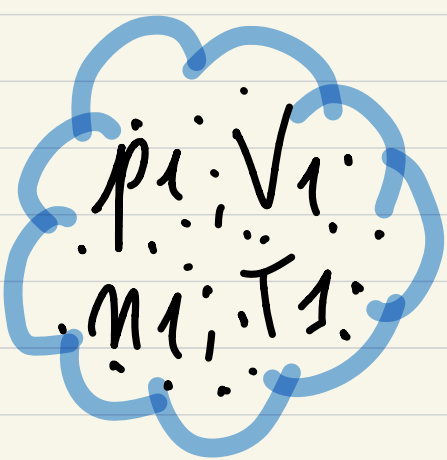
↪ LEI GERAL DOS GASES.

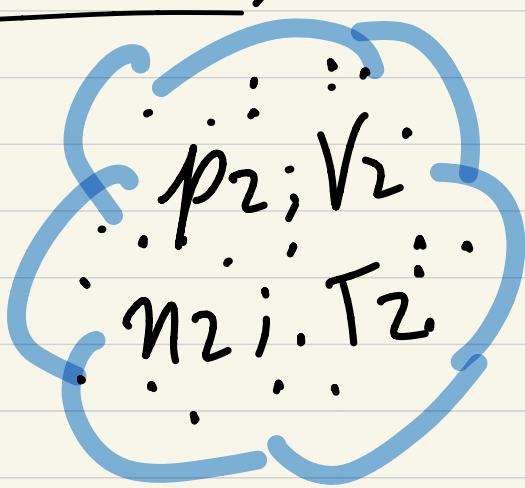
$$p \cdot V = n \cdot R \cdot T$$

$$R = \frac{p \cdot V}{n \cdot T}$$

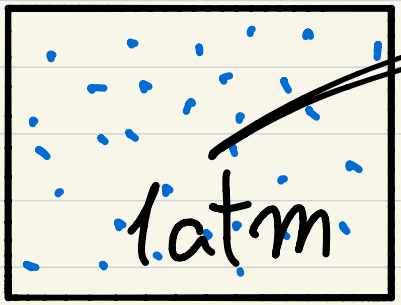
intervalo até 10:15

$$\frac{p_1 \cdot V_1}{n_1 \cdot T_1} = \frac{p_2 \cdot V_2}{n_2 \cdot T_2}$$





Ex:



1 mol
0°C (273K)
R = 0,082 atm.L / mol.K
V = ?

$p.V = n.R.T$

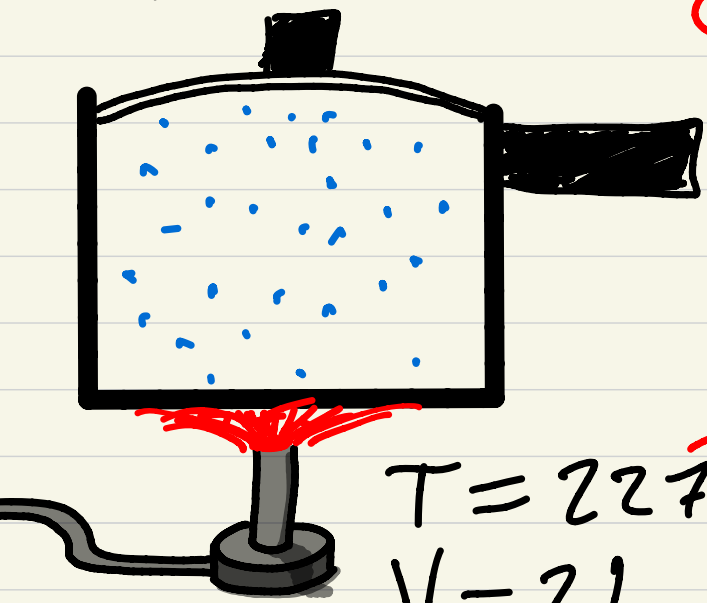
$1.V = 1.0,082.273$

$V = 22,386\ L$

$V \cong 22,4\ L$

ISOVOLUMETRICA

EX:



$+273$ → $(300K)$

$T_0 = 27°C$

$p_0 = 1 atm$

$V_0 = 2L$

$+273$ → $(500K)$

$T = 227°C$

$V = 2L$

$p = ?$

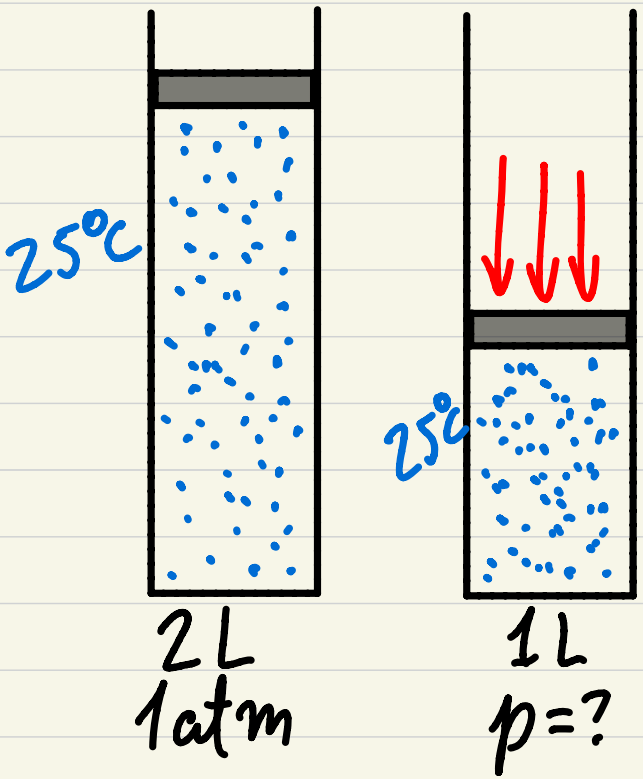
$$\frac{p_1 V_1}{n_1 T_1} = \frac{p_2 V_2}{n_2 T_2}$$

$$\frac{1}{300} = \frac{p}{500}$$

$$p = \frac{5}{3} atm$$

$$p \simeq 1{,}7 atm$$

Ex: ISOTÉRMICA

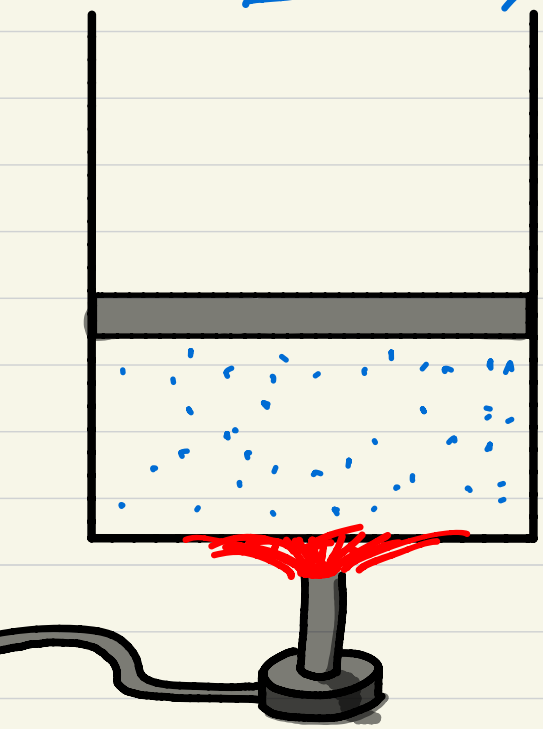


$$\frac{p_1 V_1}{n_1 T_1} = \frac{p_2 V_2}{n_2 T_2}$$

$$1 \cdot 2 = p \cdot 1$$

$$p = 2\ atm$$

Ex: ISOBÁRICA.



$p_0 = 1\,atm$

$T_0 = 27°C\ (300K)$

$V_0 = 2\,L$

$p = 1\,atm$

$T = 327°C\ (600K)$

$V = ?$

$$\frac{p_1 \cdot V_1}{n_1 \cdot T_1} = \frac{p_2 \cdot V_2}{n_2 \cdot T_2}$$

$$\frac{2}{300} = \frac{V}{600}$$

$$V = 4\,L$$