

Unidades Químicas de Masas

1. Peso de un Átomo

$$\text{Peso 1 átomo } x = \frac{\text{PA}(x)}{N_A} \text{ g} = \text{PA}(x) \cdot \text{UMA}$$

UMA \rightarrow Unidad de Masa Atómica

$$1,67 \times 10^{-24} \text{ g}$$

2. Peso Atómico (PA) \rightarrow Adimensional

$$\therefore \text{PA}(\text{H}) = 1 \quad \therefore \text{PA}(\text{Al}) = 27 \quad \therefore \text{PA}(\text{K}) = 39$$

$$\therefore \text{PA}(\text{C}) = 12 \quad \therefore \text{PA}(\text{Si}) = 28 \quad \therefore \text{PA}(\text{Ca}) = 40$$

$$\therefore \text{PA}(\text{N}) = 14 \quad \therefore \text{PA}(\text{P}) = 31 \quad \therefore \text{PA}(\text{Fe}) = 56$$

$$\therefore \text{PA}(\text{O}) = 16 \quad \therefore \text{PA}(\text{S}) = 32 \quad \therefore \text{PA}(\text{Ag}) = 108$$

$$\therefore \text{PA}(\text{Na}) = 23 \quad \therefore \text{PA}(\text{Cl}) = 35,5 \quad \therefore \text{PA}(\text{Au}) = 197$$

3. Peso Atómico Promedio (Masa Atómica Relativa)

	A_1	A_2	A_3	
Isótopos \rightarrow	z	z	z	E
% Abundancia \rightarrow	%1	%2	%3	100%
Proporción \rightarrow	P_1	P_2	P_3	

$$\text{PA}(E) = \frac{A_1 \%1 + A_2 \%2 + A_3 \%3}{100}$$

$$\text{PA}(E) = \frac{A_1 P_1 + A_2 P_2 + A_3 P_3}{P_1 + P_2 + P_3}$$

4. Mol: Es la unidad de cantidad de sustancia de una determinada especie química.

$$1 \text{ mol} = \frac{6,023 \times 10^{23}}{N_A} \begin{cases} \rightarrow \text{Átomos} \\ \rightarrow \text{Moléculas} \\ \rightarrow \text{Iones} = \text{Unidad Fórmula} \\ \rightarrow \text{P}^+, \text{e}^- \end{cases}$$

Avogadro

5. Átomo-gramo (at-g)

$$1 \text{ at-g}(E) \rightarrow \text{PA}(E) \text{ g} \rightarrow 6,023 \times 10^{23} \text{ Átomos}$$

$$\therefore 1 \text{ at-g}(\text{S}) \rightarrow 32 \text{ g} \rightarrow 6,023 \times 10^{23} \text{ Átomos}$$

$$\therefore 1 \text{ at-g}(\text{S}) \rightarrow 32 \text{ g} \rightarrow 6 \times 10^{23} \text{ Átomos}$$

$$\therefore 1 \text{ at-g}(\text{S}) \rightarrow 32 \text{ g} \rightarrow N_A \text{ Átomos}$$

$$\therefore 1 \text{ at-g}(\text{S}) \rightarrow 32 \text{ g} \rightarrow 1 \text{ mol de Átomos}$$

6. Peso Molecular o Masa Molar (PM o M) \rightarrow Adimensional

Compuestos Moleculares \rightarrow $(\text{NH} + \text{NH})$

$$\therefore \text{CO}_2 \rightarrow \text{PM} = 1(12) + 2(16) = 44$$

$$\therefore \text{SO}_3 \rightarrow \text{PM} = 80$$

7. Peso Fórmula (PF) \rightarrow Adimensional

Compuestos Iónicos \rightarrow $(\text{M} + \text{NH})$

$$\therefore \text{NaCl} \rightarrow \text{PF} = 58,5$$

$$\therefore \text{Fe}_2\text{O}_3 \rightarrow \text{PF} = 160$$

8. Molécula-gramo (mol-g)

$$1 \text{ mol-g}(\text{C}) \rightarrow \text{PM}(\text{C}) \text{ g} \rightarrow 6,023 \times 10^{23} \text{ Moléculas}$$

$$\therefore 1 \text{ mol-g}(\text{CO}_2) \rightarrow 44 \text{ g} \rightarrow 6 \times 10^{23} \text{ Moléculas}$$

9. Peso Fórmula-gramo (PF-g)

$$1 \text{ PF-g}(\text{C}) \rightarrow \text{PF}(\text{C}) \text{ g} \rightarrow 6,023 \times 10^{23} \text{ Iones}$$

$$\therefore 1 \text{ PF-g}(\text{NaCl}) \rightarrow 58,5 \text{ g} \rightarrow N_A \text{ Iones}$$

10. Composición Porcentual o centesimal de un elemento.

23×10^{23} Átomos

0.46×10^{23} Átomos

0.2
 $1g Au \xrightarrow{\$10} \$$
 $9 Au \xrightarrow{g Au} = 394$

$\rightarrow 12g He \approx 3NA$

Quedan = $9NA$

Átomos He

"

Átomos He

$O_2 \rightarrow PF = 382$

g Si

Si

Si

$\rightarrow NaCl \rightarrow PF = 58.5$

$m = 20kg (0.67) = 13.4kg$

$58.5kg NaCl \rightarrow 35.5kg Cl$

$13.4kg NaCl \rightarrow X kg Cl$

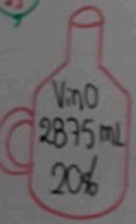
$X = 8.1kg Cl$

10 $CaCl_2 \rightarrow PF = 128$

$128g CaCl_2 \rightarrow 7(6.023 \times 10^{23})$
Átomos Totales

$1280g CaCl_2 \rightarrow X$

$X = 42.14 \times 10^{24}$ Átomos Totales
 $PF = 46$

11  Alcohol Etílico $\rightarrow C_2H_5OH$
(Etanol)

Vetanol = $2875(0.2) = 575mL$

$m_{Etanol} = 575mL \cdot \frac{0.8g}{mL} = 460g$

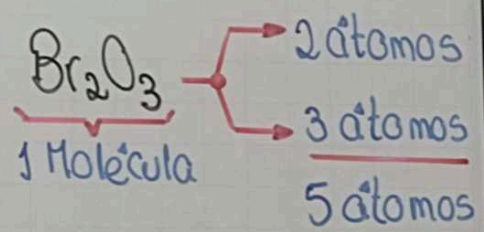
$46g Etanol \rightarrow NA$ Moléculas

$460g Etanol \rightarrow X$

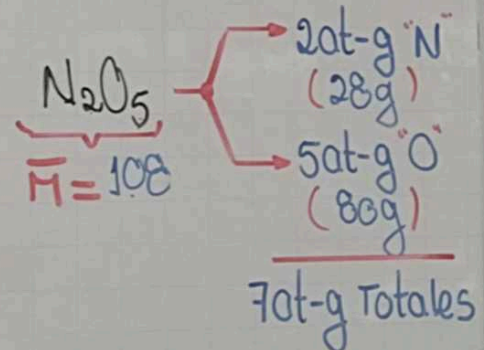
$X = 10NA$ Moléculas

$$\%E = \frac{\#at-g(E) \cdot PA(E)}{PMOPF} \times 100$$

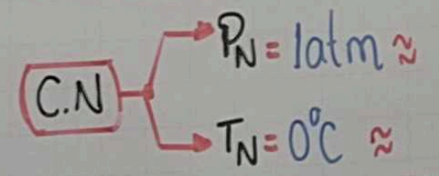
11. Interpretación de Como Particula



Como Masa

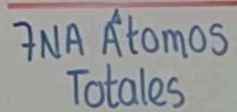
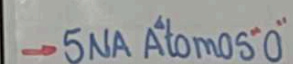
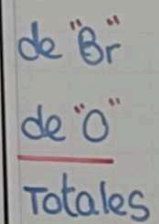


12. Volumen Molar de un gas Normales (C.N)

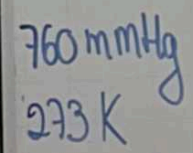


1mol-g(gas) → 22,4 L

Fórmulas



a Condiciones



1 $Peso\ 1\ \frac{Atomo\ Ag}{NA} = \frac{108}{NA} g$

2 $\begin{matrix} 30 & A_2 \\ M & M \end{matrix}$
68% 32%
 $30,96 = \frac{30(68) + A_2(32)}{100}$
 $A_2 = 33$

3 $PA(E) = \frac{40,2(1K) + 40,4(3K) + 40,6(5K)}{9K}$

$PA(E) = 40,48$

4 $23g\ Na \rightarrow 1mol$
 $115g\ Na \rightarrow X\ moles$
 $X = 5\ moles$

5 $197g\ Au \rightarrow 6,023 \times 10^{23} \text{ Átomos}$
 $m = 39,9g\ Au \xrightarrow{0,2} 1,2046 \times 10^{23} \text{ Átomos}$
 $m = 39,9g\ Au \xrightarrow{\$10} \$399$

