



1 1,0 H Hydrogène											2 4,0 He Hélium
3 6,9 Li Lithium	4 9,0 Be Bérylium									9 19,0 F Fluor	10 20,2 Ne Néon
5 10,8 B Bore	6 12,0 C Carbone	7 14,0 N Azote	8 16,0 O Oxygène					17 35,5 Cl Chlore	18 40,0 Ar Argon		
11 23,0 Na Sodium	12 24,3 Mg Magnésium	13 27,0 Al Aluminium	14 28,1 Si Silicium	15 31,0 P Phosphore	16 32,1 S Soufre						

Autre masse molaire :

$$M(\text{Ca}) = 40,0 \text{ g/mol}$$

$$M(\text{Fe}) = 55,8 \text{ g/mol}$$

$$M(\text{Cu}) = 63,5 \text{ g/mol}$$

Nombre d'Avogadro : $N_A = 6,02 \times 10^{23} \text{ mol}^{-1}$ **Remarque :**

On indique le nombre de **chiffres significatifs (CS)** à prendre ne compte : non nécessaire pour comprendre les calculs de cette fiche. Pour plus d'informations à ce sujet, suivez ce [lien](#).

Exercice 1 : Compléter le tableau suivant

Nom	Formule	Masse molaire moléculaire
Méthane	CH_4	$M(\text{CH}_4) = M(\text{C}) + 4 \times M(\text{H}) = 12,0 + 4 \times 1,0 = 16,0 \text{ g/mol}$
Saccharose	$\text{C}_{12}\text{H}_{22}\text{O}_{11}$	$M(\text{C}_{12}\text{H}_{22}\text{O}_{11}) = 12 \times M(\text{C}) + 22 \times M(\text{H}) + 11 \times M(\text{O}) = 342,0 \text{ g/mol}$
Dioxyde de carbone	CO_2	$M(\text{CO}_2) = M(\text{C}) + 2 \times M(\text{O}) = 12,0 + 2 \times 16,0 = 44,0 \text{ g/mol}$
Ammoniac	NH_3	$M(\text{NH}_3) = M(\text{N}) + 3 \times M(\text{H}) = 14,0 + 3 \times 1,0 = 17,0 \text{ g/mol}$

Exercice 2 :

$$1/ \quad M(\text{CuSO}_4) = M(\text{Cu}) + M(\text{S}) + 4 \times M(\text{O}) = 63,5 + 32,1 + 4 \times 16,0 = 159,6 \text{ g/mol} \quad (4\text{CS})$$

$$2/ \quad n(\text{CuSO}_4) = \frac{m(\text{CuSO}_4)}{M(\text{CuSO}_4)} = \frac{2,3}{159,6} = 1,4 \times 10^{-2} \text{ mol} \quad (2\text{CS})$$

Exercice 3 :

$$3/ \quad m(\text{Fe}) = M(\text{Fe}) \times n(\text{Fe}) = 55,8 \times 0,30 = 17 \text{ g} \quad (2\text{CS})$$

$$4/ \quad N(\text{Fe}) = n(\text{Fe}) \times N_A = 0,30 \times 6,02 \times 10^{23} = 1,8 \times 10^{23} \text{ atomes de Fer} \quad (2\text{CS})$$

Exercice 4 :

$$5/ \quad M(\text{NaCl}) = M(\text{Na}) + M(\text{Cl}) = 23,0 + 35,5 = 58,5 \text{ g/mol} \quad (3\text{CS})$$

$$6/ \quad m(\text{NaCl}) = M(\text{NaCl}) \times n(\text{NaCl}) = 58,5 \times 0,15 = 8,8 \text{ g} \quad (2\text{CS})$$

$$7/ \quad n(\text{NaCl}) = \frac{m(\text{NaCl})}{M(\text{NaCl})} = \frac{23,4}{58,5} = 0,400 \text{ mol} \quad (3\text{CS})$$

Exercice 5 :

$$8/ \quad M(\text{C}_3\text{H}_8) = 3 \times M(\text{C}) + 8 \times M(\text{H}) = 3 \times 12,0 + 8 \times 1,0 = 44,0 \text{ g/mol} \quad (3\text{CS})$$

$$9/ \quad n(\text{C}_3\text{H}_8) = \frac{m(\text{C}_3\text{H}_8)}{M(\text{C}_3\text{H}_8)} = \frac{12,98 \text{ kg}}{44,0 \text{ g/mol}} = \frac{12,98 \times 10^3}{44,0} = 295 \text{ mol} \quad (3\text{CS})$$

Exercice 6 :

$$\begin{aligned}
 10/ \quad M(\text{CuSO}_4, 5\text{H}_2\text{O}) &= M(\text{Cu}) + M(\text{S}) + 4 \times M(\text{O}) + 5 \times 2 \times M(\text{H}) + 5 \times M(\text{O}) \\
 &= 63,5 + 32,1 + 4 \times 16,0 + 5 \times 2 \times 1,0 + 5 \times 16,0 \\
 &= 249,6 \text{ g/mol} \quad (4\text{CS})
 \end{aligned}$$

$$11/ \quad n(\text{scp}) = \frac{m(\text{scp})}{M(\text{scp})} = \frac{20}{249,6} = 8,0 \times 10^{-2} \text{ mol} \quad (2\text{CS})$$

$$12/ \quad m(\text{scp}) = M(\text{scp}) \times n(\text{scp}) = 249,6 \times 0,16 = 40 \text{ g} \quad (2\text{CS})$$

Exercice 7 :

$$\begin{aligned}
 13/ \quad M(\text{C}_{12}\text{H}_{22}\text{O}_{11}) &= 12 \times M(\text{C}) + 22 \times M(\text{H}) + 11 \times M(\text{O}) \\
 &= 12 \times 12,0 + 22 \times 1,0 + 11 \times 16,0 \\
 &= 342,0 \text{ g/mol} \quad (4\text{CS})
 \end{aligned}$$

$$14/ \quad n(\text{C}_{12}\text{H}_{22}\text{O}_{11}) = \frac{m(\text{C}_{12}\text{H}_{22}\text{O}_{11})}{M(\text{C}_{12}\text{H}_{22}\text{O}_{11})} = \frac{5 \times 5,6}{342,0} = 0,081871345 = 8,0 \times 10^{-2} \text{ mol} \quad (2\text{CS})$$

$$15/ \text{ Avec } m(\text{C}_{12}\text{H}_{22}\text{O}_{11}) = 5 \times 5,6 = 28 \text{ g} \quad (2\text{CS})$$

$$V(\text{solution}) = 750 \text{ mL} = 0,750 \text{ L} \quad (3\text{CS})$$

$$C_m(\text{C}_{12}\text{H}_{22}\text{O}_{11}) = \frac{m(\text{C}_{12}\text{H}_{22}\text{O}_{11})}{V(\text{solution})} = \frac{28 \text{ g}}{0,750 \text{ L}} = 37,333333333 = 37 \text{ g/L} \quad (2\text{CS})$$

16/ Une dissolution

Exercice 8 :

$$17/ \quad C_m(\text{Ca}) = 170 \text{ mg/L} = 0,170 \text{ g/L} \quad (3\text{CS})$$

$$18/ \quad m(\text{Ca}) = C_m(\text{Ca}) \times V(\text{solution}) = 0,170 \times 1,25 = 0,212 \text{ g} \quad (3\text{CS})$$

$$19/ \quad n(\text{Ca}) = \frac{m(\text{Ca})}{M(\text{Ca})} = \frac{0,212 \text{ g}}{40,0 \text{ g/mol}} = 0,0053 = 5,30 \times 10^{-3} \text{ mol} \quad (3\text{CS})$$

$$20/ \quad C(\text{Ca}) = \frac{n(\text{Ca})}{V(\text{solution})} = \frac{5,30 \times 10^{-3}}{1,25} = 0,00424 = 4,24 \times 10^{-3} \text{ mol/L} \quad (3\text{CS})$$