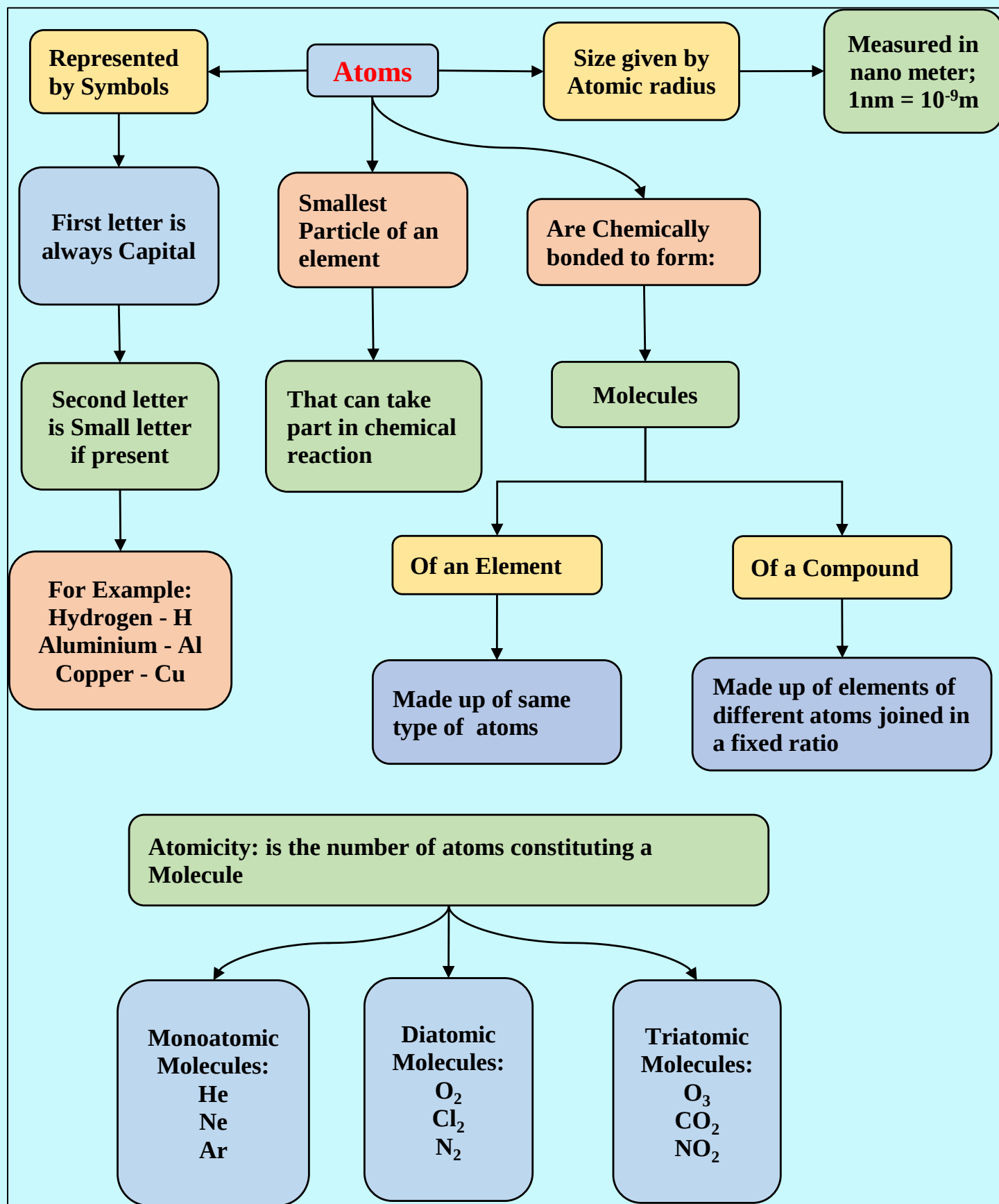
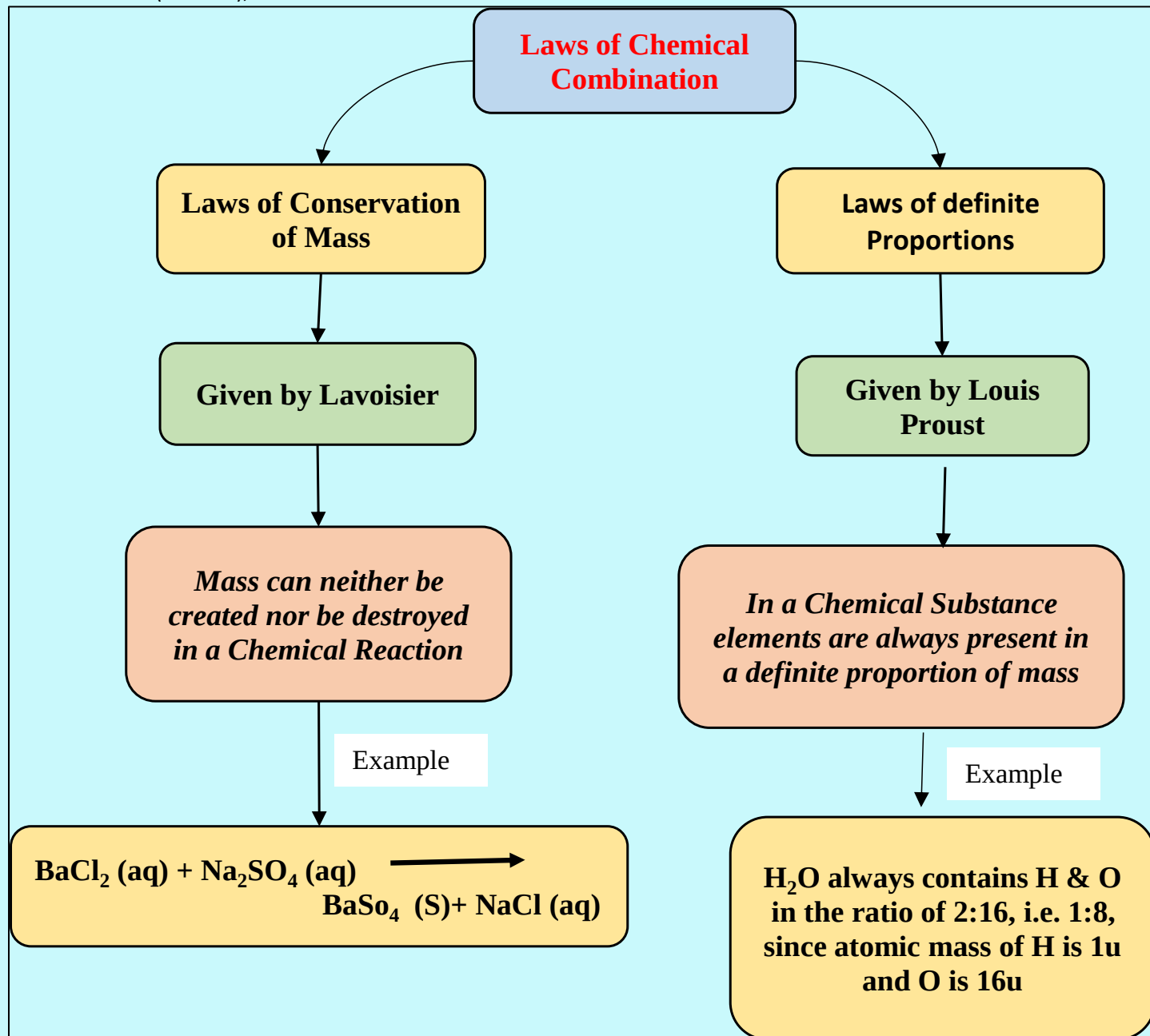
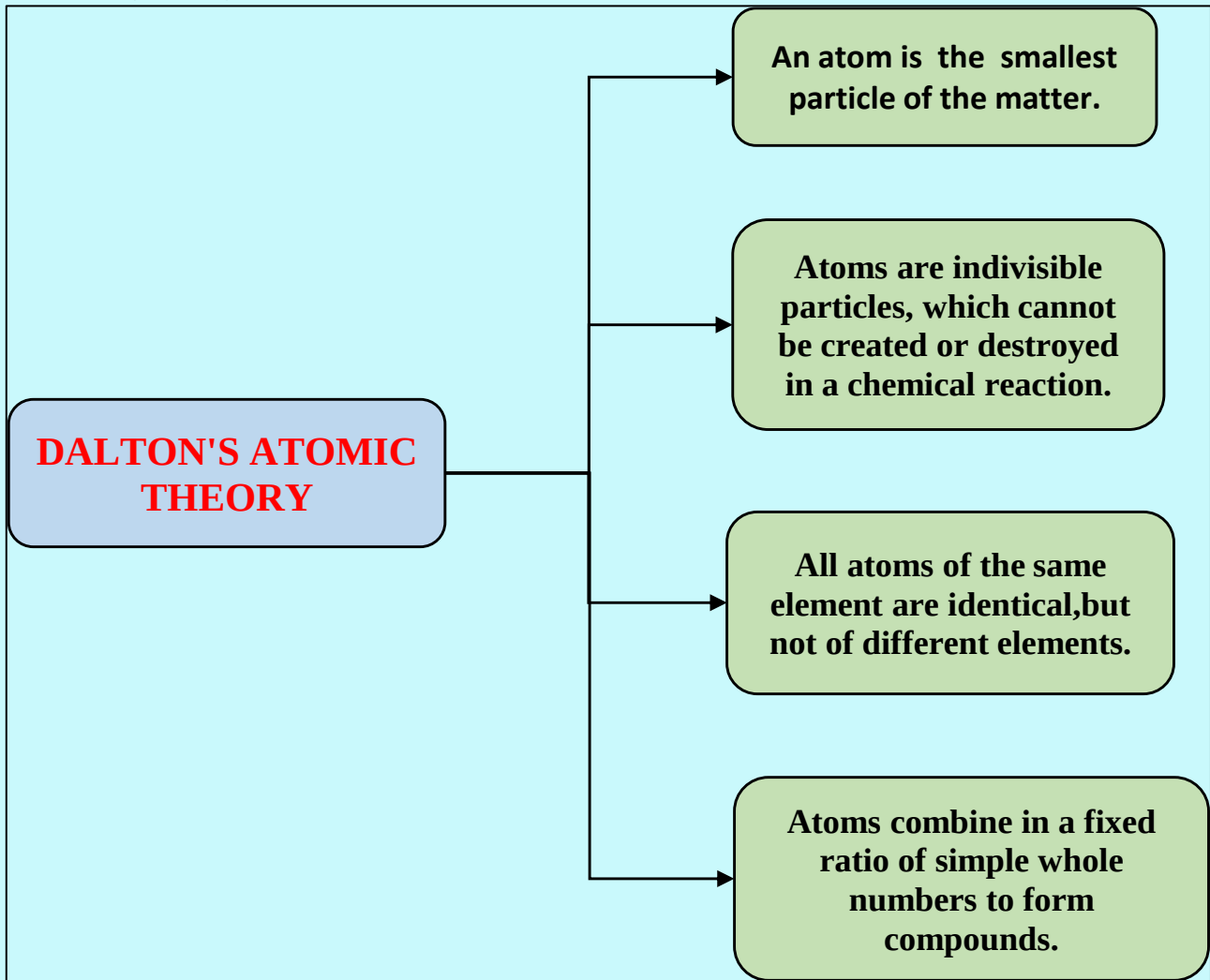
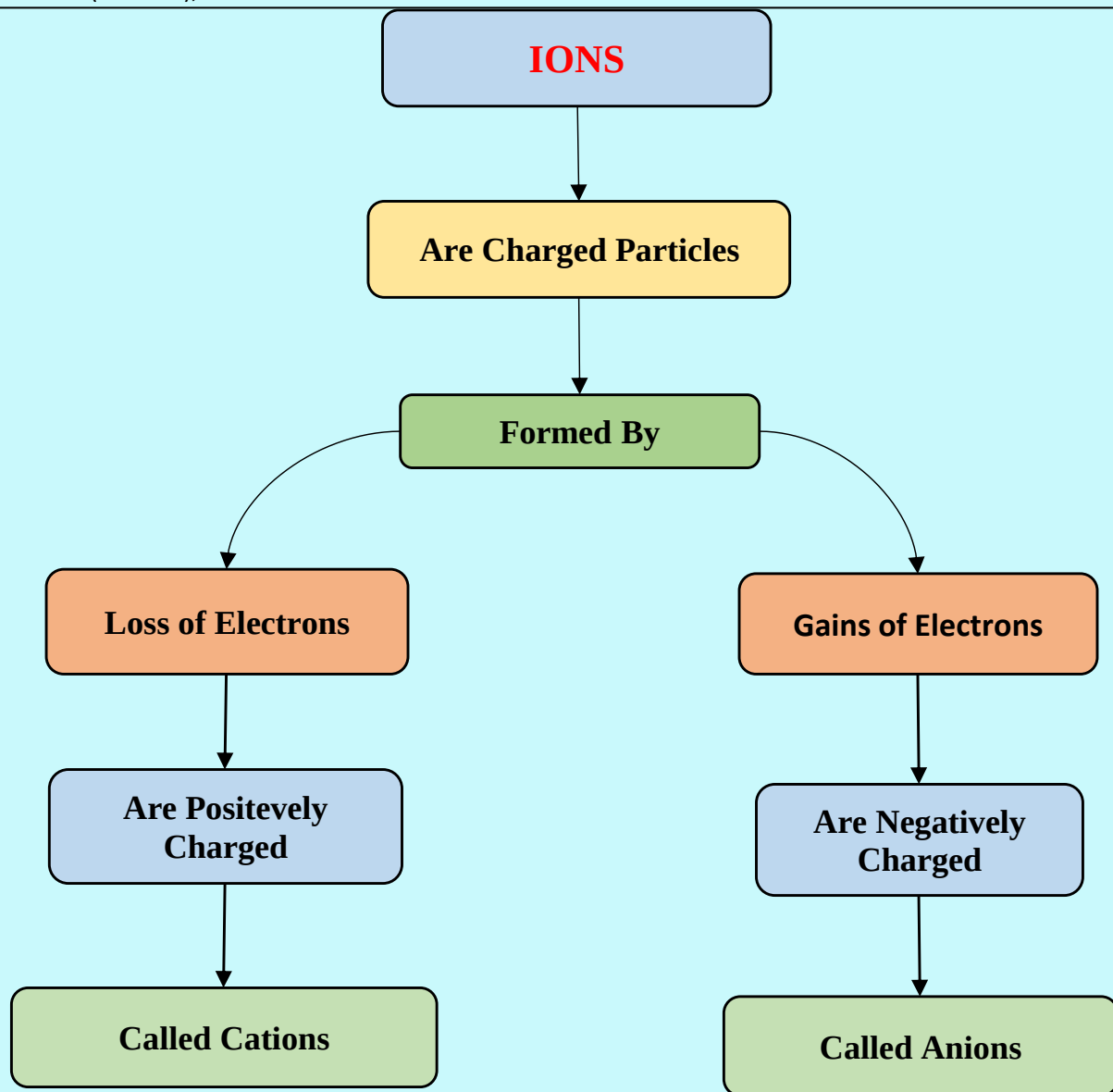


3. ATOMS AND MOLECULES









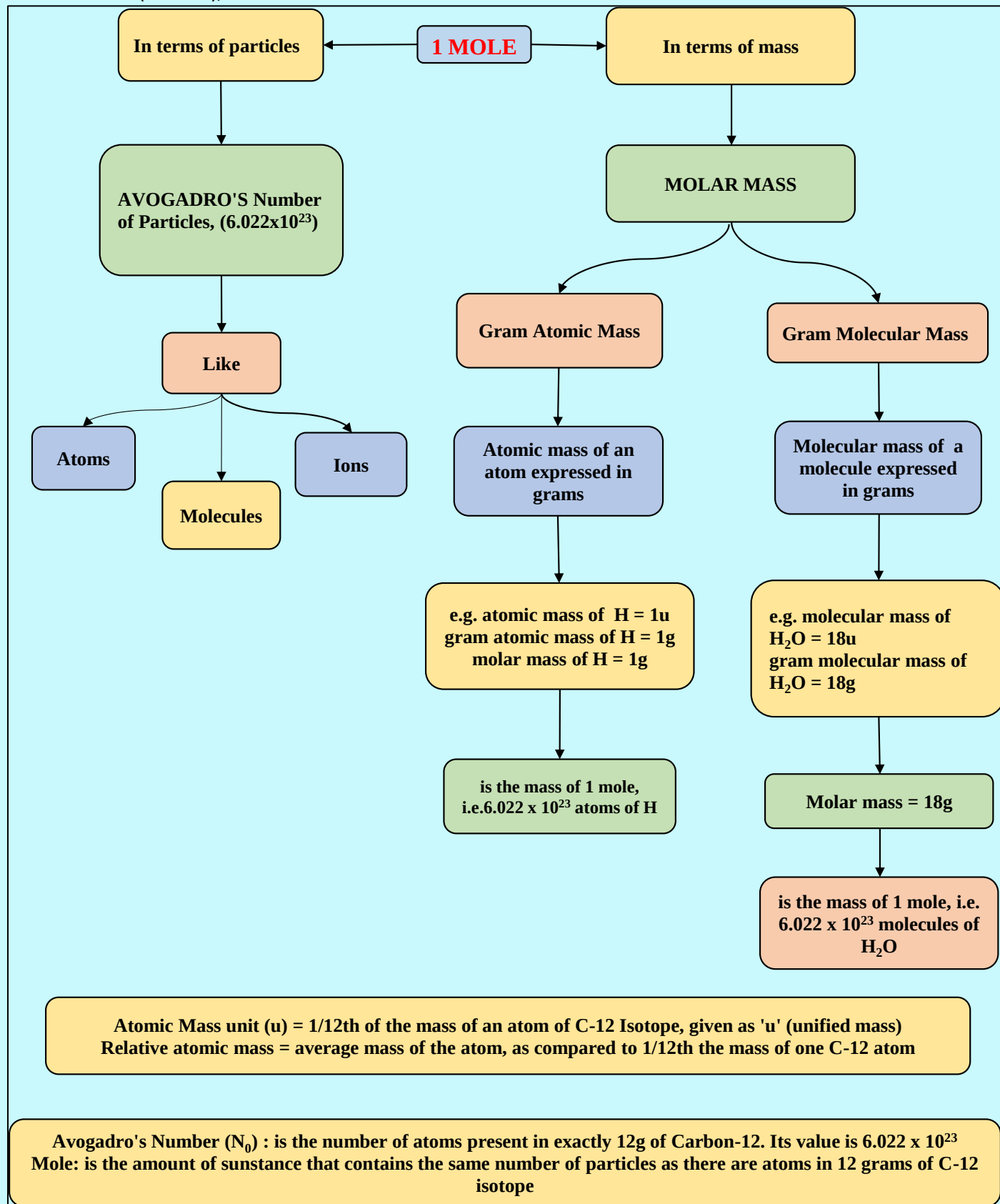
Polyatomic Ion: It is a group of atoms carrying a charge, For example:

SO_4^{-2} ----> Sulphate Ion

NO_3^- ----> Nitrate Ion

Valency: It is the combining capacity of an element.

Note : You must learn valencies of ions (Refer NCERT text book, table 3.6, page no. 37)

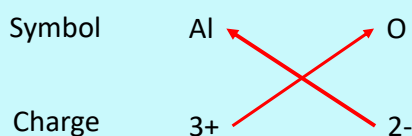


Chemical Formula:

Chemical Formula of a compound is the symbolic representation of its composition.

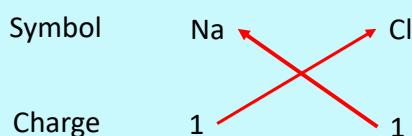
Rules of writing a chemical formula.

1. Write the correct symbols of two elements. In case of a compound of a metal and a non-metal, the name or symbol of the metal is written first.
2. Write the respective valencies or charges below the symbols.
3. To balance the valencies or charges on the ions, **CRISS CROSS THE VALENCY/CHARGE**. And write them as a subscript below the symbols.
e.g. Aluminium Oxide



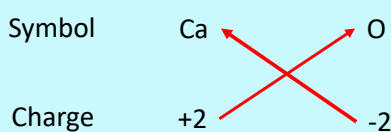
Formula Al_2O_3

When the subscript is number 1, subscript is not written.
e.g. Sodium Chloride



Formula NaCl

4. If there is a common factor between the valencies of element, the valencies are divided by common factor.
e.g. Calcium Oxide



Formula CaO ($2/2 = 1$)

5. In compounds formed with polyatomic ions, the ion is enclosed in a bracket before writing the number indicate the ratio. In case the number of polyatomic ion is one, the bracket is not required, e.g. NaOH , $(\text{NH}_4)_2\text{SO}_4$ etc

List of Important Formulae

1. **% of an element in a compound** = $\text{Mass of an element} / \text{Mass of the compound} \times 100$

2. **Molecular mass** = $\text{Sum of atomic masses of all the elements in a molecule}$

3. **Formula Unit Mass** = $\text{Sum of atomic masses of all the atoms in a formula unit of an ionic compound}$

4.

a. **To convert given mass in grams into moles**

$\text{No. of moles } (n) = \text{given mass in grams } (m) / \text{Molar mass in gram mol}^{-1} (M)$

i.e. $n = m / M$

b. **To convert given number of moles into grams:**

$\text{Mass in grams } (m) = \text{Number of moles } (n) \times \text{Molar mass in gram mol}^{-1} (M)$

i.e. $m = n \times M$

c. **To convert given number of moles of atoms into number of atoms:**

$\text{Number of Atoms } (N) = \text{Number of moles } (n) \times \text{Avogadro's number } (N_0)$

i.e. $N = n \times N_0$

d. **To convert given number of moles of molecules into number of atoms:**

$\text{Number of Molecules } (N) = \text{Number of moles } (n) \times \text{Avogadro's number } (N_0)$

i.e. $N = n \times N_0$

e. **To convert given number of atoms or molecules into moles:**

$\text{Number of Moles } (n) = \text{Given number of atoms or molecules } (N) / \text{Avogadro's number } (N_0)$

i.e. $n = N / N_0$