

Language of Chemistry

1. What is Symbol?

Ans. The abbreviated name which represents one atom of an element usually expressed by the initial capital letter plus another significant letter of the element in English, Greek or Latin in small letter.

2. Why is the symbol S for sulphur, but Na for sodium and Si for silicon?

Ans. In most cases, the first letter of the name of the element is taken as the symbol for that element and written in capitals (e.g. for sulphur, we use the symbol S). In cases where the first letter has already been adopted, we use a symbol derived from the Latin name (e.g. for sodium/Natrium, we use the symbol Na). In some cases, we use the initial letter in capital together with a small letter from its name (e.g. for silicon, we use the symbol Si).

3. What is Atom?

Ans. Atom is the smallest particle of an element which can take part in a chemical reaction. It may or may not exist free in nature.

4. What is Molecule?

Ans. A molecule is defined as the smallest possible particle of a substance which has all the properties of that substance and can exist freely in nature or a molecule is a discrete group of atoms bonded together in a specific arrangement.

5. What is Atomicity of an element?

Ans. Atomicity refers for the number of atoms present in one molecule of an Element.

6. What is Valency?

Ans. The valency of an element is defined as the number of hydrogen atoms, or the number of chlorine atoms, or twice the number of oxygen atoms that combine with one atom of the given element.

7. What is Radical?

Ans. A radical is an atom or a group of atoms (of the same or different elements) that carries a positive or a negative charge and behaves like a single unit.

Positively charged radicals are termed as basic radicals or cations Ex: NH_4^+ whereas

The negatively charged radicals are referred to as acidic radicals or anions. Ex: OH^-

It is to be noted that basic radicals are electropositive ions, while the acidic radicals are electronegative ions.

8. What is Valency of a Radical?

Ans. The valency of a radical is usually equal to the number of charges present on it. Depending upon their valences, radicals are also referred to as monovalent, bivalent, trivalent and tetravalent.

9. What is Compound?

Ans. The symbolic representation of a molecule of a compound is called the chemical formula or simply formula of that compound.

10. Which information we get from a Chemical Formula of a compound?

Ans. The chemical formula of a compound provides following information:

- (i) The elements present in chemical combination in the given compound.
- (ii) The number of atoms of each element present in one molecule of the given compound.
- (iii) The ratio by mass in which the constituent atoms combine during the formation of that compound.

11. Describe the methods of writing a Chemical Formula?

Ans. The method used to write the formula of a compound is called Criss-cross method. It is carried out in the following steps.

- (i) Write the symbols of basic radical (cation) and acidic radical (anion) side by side. The basic radical, i.e., the radical having positive charge is written first.
- (ii) Write the valency of each radical on the top of its symbol. While doing so, ignore the + and - signs.
- (iii) Divide the valency numbers by their highest common factor (if any) to get a simple ratio.
- (iv) Interchange the valency numbers and write them on the lower right side of the symbols. The number 1 does not need to be written.

12. What is Stock Notation?

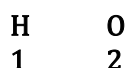
Ans. when the metal forming the compound is capable of exhibiting variable valences, the valency of the metal is written in Roman numbers in parenthesis after the name of metal. This type of representation is called Stock Notation.

13. What are the rules to write Chemical Formulae with an example?

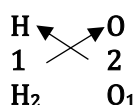
Ans. Let us take the example of water. Water molecules are made of hydrogen atoms and oxygen atoms. The combining capacity of oxygen is 2 and that of hydrogen is 1.

The basic rules to write the Chemical Formulae are

- i. Write the symbols of the elements that form the compound, with their valency under them.



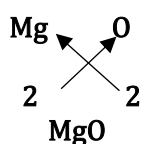
- ii. Interchange the valences and write them as subscripts.



- iii. Omit 1 as subscript.



- iv. If the subscripts of the elements are the same, they may be generally be omitted.
Ex: MgO



14. What is Chemical Equation?

Ans. The mutual interaction of one substance with the other is called a Chemical Reaction.

A chemical reaction may involve several reactants and Products.

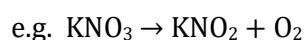
15. What are Reactants and Products?

Ans. Reactants are those substances which react with one another to bring about the chemical reaction.

Products are those substances which are produced on account of the chemical reaction.

16. Why should an equation be balanced? Explain with the help of a simple equation.

Ans. According to the law of conservation of mass, 'matter can neither be created nor can it be destroyed'. This is possible only if the total number of atoms on the reactants side is equal to the total number of atoms on the products side. Thus, a chemical reaction should always be balanced.



In this equation, the number of atoms on both sides is not the same, and the equation is not balanced.

The balanced form of this equation is



17. What information we get from any chemical reaction?

Ans. A chemical equation tells us about

- The chemical nature of reactants and products.
- The nature of elements and radicals involved.
- The direction of the reaction i.e. Irreversible (\longrightarrow), Reversible (\longleftrightarrow)
- The state of matter in which substance is present. i.e. Solid Liquid, Gas.

18. $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$

Which information we get from this equation

Ans. This equation provides following information

- The whole number ratio of the molecules of N_2 , H_2 and NH_3 is 1 : 3 : 2. This means that if 1 molecule of nitrogen is made to take part in the reaction, it will combine with 3 molecules of hydrogen and will form 2 molecules of ammonia.
- Above chemical equation suggests that 28 parts by mass of nitrogen combine with $3 \times 2 = 6$ parts by mass of hydrogen to form $2 \times 17 = 34$ parts by mass of ammonia. In other words, we can say that 28 g of nitrogen react with 6 g of hydrogen to form 34 g NH_3 .
- All the reactants and products in the above reaction are in gaseous states. The volume of a gas is found to be proportional to the number of its molecules. Hence, the above equation suggests that one volume of nitrogen reacts with three volumes of hydrogen to form two volumes of ammonia.

19. What are the Limitations of Chemical Reaction?

Ans. Following are the limitations of a chemical equation:

- (i) The physical state of the reactants and products.
- (ii) The strength of an acid or a base solution used in the reaction.
- (iii) The conditions (such as temperature, pressure, catalyst used if any) governing the fate of reaction.
- (iv) The heat evolved or absorbed in the reaction.
- (v) The rate of the chemical reaction.
- (vi) Formation of a precipitate.
- (vii) Formation of a gas coming out.
- (viii) The reversibility or irreversibility of the reaction.

20. Why should a chemical equation be balanced?

Ans. According to the Law of conservation of mass, the matter can neither be created nor destroyed in a chemical change, i.e., the total mass of products obtained in a chemical reaction is the same as the total mass of reactants taking part in the reaction. Moreover, according to Dalton's atomic theory, atom is indestructible and is the unit of a chemical reaction. This implies that the number of atoms of each kind should remain the same before and after a chemical reaction. When a chemical equation follows this condition, it is said to be a balanced equation.

Thus, a balanced chemical equation is that equation in which the number of atoms of each kind on the left-hand side is the same as of those on the right-hand side.

For example,

**21. What is Relative Atomic Mass (RAM)?**

Ans. RAM of an element is the number of times one atom of an element is heavier than $1/12$ the mass of an atom of Carbon (C^{12})

$$\text{RAM} = \frac{\text{Mass of one atom of the element}}{\frac{1}{12} \text{ mass of one atom of Carbon } (\text{C}^{12})}$$

22. What is Relative Molecular Mass (RMM)?

Ans. RMM of an element compound is the number of times one molecule of the substance is heavier than $1/12$ the mass of an atom of Carbon (C^{12})

$$\text{RAM} = \frac{\text{Mass of one molecule of the substance}}{\frac{1}{12} \text{ mass of one atom of Carbon } (\text{C}^{12})}$$

23. What is Gram Atomic Mass?

Ans. The relative atomic mass of an element expressed in gram is known as Gram Atomic Mass or Gram Atom of an element

24. What is Gram Molecular Mass?

Ans. The relative molecular mass of an element expressed in gram is known as Gram Molecular Mass or Gram Molecule of an element.