Language of Chemistry

1. **What does a symbol represent?**
   Ans. A symbol represent a specific element or one atom of an element.
   A symbol also represents the weight of the element equal to its atomic weight.

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. **Write the full form of IUPAC. Name the elements represented by the following symbols:**
   Au, Pb, Sn, Hg
   Ans. The full form of IUPAC is International Union of Pure and Applied Chemistry.
   Names of the elements:
   Au - Gold
   Pb - Lead
   Sn - Tin
   Hg - Mercury

4. **What is meant by atomicity?**
   Ans. The number of atoms of an element that join together to form a molecule of that element is known as its atomicity.

5. **What is called Valency?**
   Ans. The number of hydrogen atoms which can combines with or displace one atom of the element or radical so as to form a compound.
   The valency of all metals and hydrogen is considered positive.
   The valency of all non-metals or groups of Non-Metals are considered negative.

6. **What is Variable Valency?**
   Ans. Certain materials exhibits more than one Valency. This is known as Variable Valency.
   The reason behind Variable Valency is an atom of an element can sometimes lose more electrons than are present in its Valence Shell and exhibits Variable Valency.
   Ex: Copper (Cu) has valency is either 1 or 2.
   The outermost shell of Copper (2,8,18,1) has one electron and the penultimate shell contains 18 electrons. However, the penultimate shell has not attained stability and one or more electrons sometimes jump to the outermost shell and valanced electron is increased. So, the new configuration is (2,8,17,2). Therefore, Cupper shoes Cu^{+1}, Cu^{+2}

7. **What is Radical?**
   Ans. A radical is a group of atoms of elements that behaves like a single unit and shows the valency.
   Positive Radical – NH_4^+,
   Negative Radical – OH^-

8. **What is Chemical Formula?**
   Ans. A chemical formula is a way of presenting information about the chemical proportions of atoms that constitute a particular chemical compound or molecule, using chemical element symbols, numbers, and sometimes also other symbols, such as parentheses, dashes, brackets, commas and plus and minus signs.

9. **What is the significance of formula?**
   Ans. Significance of the molecular formula:
   a. It represents both molecule and molecular mass of the compound.
   b. It represents the respective number of different atoms present in one molecule of the compound.
   c. It represents the ratios of the respective masses of the elements present in the compound.

10. **What is Compound?**
    Ans. A compound is a Pure substance composed of two or more elements in a fixed proportion.
    Example: H_2O

11. **What are the characteristics of Compound?**
    Ans. The characteristics of Compound are
    a. Components in a compound are present in a definite proportion.
    b. It has a homogeneous composition.
    c. Particles in a compound are of one kind.
    d. A compound is made up of one or more atoms of the same or different elements.
    e. In a compound the elements are present in a fixed ratio by mass.
    f. A compound can be divided into simpler substances by a chemical process.
    g. The physical and chemical properties of a compound are completely different from those of its constituents.

12. **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.

       H O
       1 2

    ii. Interchange the valences and write them as subscripts.

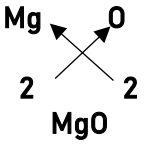
       H O
       1 2
       H_2 O_1

iii. Omit 1 as subscript.

H_2O

iv. If the subscripts of the elements are the same, they may be generally be omitted.

Ex: MgO



13. What is Chemical Equation?

Ans. A chemical equation is a symbolic representation of chemical reaction in the form of symbols and formulae where in the reactant entities are given on the left-hand side and the product entities on right hand side.

$$\text{Eg. } CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$$

14. 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.

e.g. $KNO_3 \rightarrow KNO_2 + O_2$

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

$2KNO_3 \rightarrow 2KNO_2 + O_2$

15. What information we get from any chemical reaction?

Ans. A chemical equation tells us about

a. The chemical nature of reactants and products.
b. The nature of elements and radicals involved.
c. The direction of the reaction i.e. Irreversible (⟶), Reversible (⟷)
d. The state of matter in which substance is present. i.e. Solid Liquid, Gas.

16. What are the Limitations of Chemical Reaction?

Ans. Following are the limitations of a chemical equation:

(i) A chemical equation does not tell us the physical state of the reactants and the products in the reaction.

(ii) It does not tell us the actual concentration or dilution of the reactants used in the reaction.

(iii) It does not tell whether the reaction starts at its own or some heat is required to start the reaction.

(iv) It does not tell whether the reaction is violent in nature or not.

(v) The time taken by the reaction to complete itself is also not known.

17. **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})

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

18. 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})

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

19. **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

20. **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.