• Matter

Anything which has mass and occupies space is called matter.

For example, book, pencil, water, air are composed of matter as we know that they have

mass and they occupy space.

• Classification of Matter

There are two ways of classifying the matter:

(A) Physical classification

(B) Chemical classification

(A) Physical Classification:

Matter can exist in three physical states:

1. Solids 2. Liquids 3. Gases

1. Solids: The particles are held very close to each other in an orderly fashion and there is not much freedom of movement.

Characteristics of solids: Solids have definite volume and definite shape.

2. Liquids: In liquids, the particles are close to each other but can move around. Characteristics of liquids: Liquids have definite volume but not definite shape.

3. Gases: In gases, the particles are far apart as compared to those present in solid or liquid states. Their movement is easy and fast.

Characteristics of Gases: Gases have neither definite volume nor definite shape. They completely occupy the container in which they are placed.

(B) Chemical Classification:

Based upon the composition, matter can be divided into two main types:

1. Pure Substances 2. Mixtures.

1. Pure substances: A pure substance may be defined as a single substance (or matter) which cannot be separated by simple physical methods.

Pure substances can be further classified as (i) Elements (ii) Compounds

(i) Elements: An element consists of only one type of particles. These particles may be atoms or molecules.

For example, sodium, copper, silver, hydrogen, oxygen etc. are some examples of elements. They all contain atoms of one type. However, atoms of different elements are different in nature. Some elements such as sodium . or copper contain single atoms held together as their constituent particles whereas in some others two or more atoms combine to give molecules of the element. Thus, hydrogen, nitrogen and oxygen gases consist of molecules in which two atoms combine to give the respective molecules of the element.

(ii) Compounds: It may be defined as a pure substance containing two or more elements combined together in a fixed proportion by weight and can be decomposed into these elements by suitable chemical methods. Moreover, the properties of a compound are altogether different from the constituting elements.

The compounds have been classified into two types. These are:

(i) Inorganic Compounds: These are compounds which are obtained from non-living sources such as rocks and minerals. A few

examples are: Common salt, marble, gypsum, washing soda etc.

(ii) Organic Compounds are the compounds which are present in plants and animals. All the organic compounds have been found to contain carbon as their essential constituent. For example, carbohydrates, proteins, oils, fats etc.

2. Mixtures: The combination of two or more elements or compounds which are not chemically combined together and may also be present in any proportion, is called mixture. A few examples of mixtures are: milk, sea water, petrol, lime water, paint glass, cement, wood etc.

Types of mixtures: Mixtures are of two types:

(i) Homogeneous mixtures: A mixture is said to be homogeneous if it has a uniform composition throughout and there are no visible boundaries of separation between the constituents.

For example: A mixture of sugar solution in water has the same sugar water composition throughout and all portions have the same sweetness.

(ii) Heterogeneous mixtures: A mixture is said to be heterogeneous if it does not have uniform composition throughout and has visible boundaries of separation between the various constituents. The different constituents of a heterogeneous mixture can be seen even with naked eye.

For example: When iron filings and sulphur powder are mixed together, the mixture formed is heterogeneous. It has greyish-yellow appearance and the two constituents, iron and sulphur, can be easily identified with naked eye.

• Differences between Compounds and Mixtures

Compounds

1. In a compound, two or more elements are combined chemically.

2. In a compound, the elements are present in the fixed ratio by mass. This ratio cannot change.

3. CompoUnds are always homogeneous i.e., they havethe same composition throughout.

4 In a compound, constituents cannot be separated by physical methods

5. In a compound, the constituents lose their identities i.e., i compound does not show the characteristics of the constituting elements.

Mixtures

1. In a mixture, or more elements or compounds are simply mixed and not combined chemically.

2. In a mixture the constituents are not present in fixed ratio. It can vary

3. Mixtures may be either homogeneous or heterogeneous in nature.

4. Constituents of mixtures can be separated by physical methods.

5, In a mixture, the constituents do not lose their identities i.e., a mixture shows the characteristics of all the constituents .

We have discussed the physical and chemical classification of matter. A flow sheet representation of the same is given below.