Elements, Compound and Mixture

1. **What is Matter?**
   Ans. Matter is a substance which occupies space, has mass and can be preserved by the sense organs.

2. **What is Element?**
   Ans. An element is a pure substance which consists of only type of atoms, which cannot be broken into two or more simple substances by physically or chemically method.

3. **Write the differences between Metals and Non-Metals?**
   Ans.

Basis for Comparison	Metals	Non-Metals
Number of electrons	Contains 1,2 or 3 electrons in valence shell (except hydrogen)	Contains 4, 5, 6 or 7 electrons in valence shell.
Conducting property	Good conductors	Bad conductors
Tensile strength	High	Low
Melting and Boiling point	High	Comparatively very low
Existence in periodic table	Left side	Right side
Nature	Electropositive	Electronegative
Bond	Metallic bond	Covalent bond
State	Generally solid (exception mercury and gallium)	Solid, liquid and gas
Density	High	Low
Forms	Cation	Anion
Malleability and Ductility	These are malleable and ductile	These are non-malleable and non-ductile in nature.
Structure	Hard	Soft

4. **Give some examples of elements which are not follow the properties of Metals and Non-Metals.**
   Ans. i. Mercury is a metal which is liquid in room temperature.
   ii. Bromine is a non-metal which is liquid in room temperature.
   iii. Zinc is a metal which is non-malleable and non-ductile beyond certain temperature.
   iv. Iodine is a non-metal which is lustrous.
   v. Graphite is a non-metal which is lustre and good conductor of electricity.

5. **What are the difference between Metalloids and Noble Gases?**

Ans.

Metalloids	Noble Gases
These elements show the properties of both metals and non-metals	These eliments exist in the gaseous state in the atmosphere.
These are chemically reactive.	These are chemically inert.
These elements are monoatomic, i.e. contain one type of atoms.	These elements are also monoatomic.

6. **What are Molecules?**

Ans. Atoms of the same element or different elements combine to form a molecule. It is the smallest particle of a substance which can exist independently and retain the physical and chemical properties of the substance.

7. **What is Atomicity?**

Ans. It is the number of an element that combine together to form a molecule of that element.

8. **What are monoatomic molecules?**

Ans. The elements which made up of single atoms are known as monoatomic molecules.
Ex: Sodium (Na), Magnesium (Mg), Potassium (K), Helium (He), Neon (Ne), Argan (Ar) etc.

9. **Which are Diatomic Molecules?**

Ans. The molecules which contains two atoms in the same type are called Diatomic Molecules.
Ex: Hydrogen (H_2), Oxygen (O_2), Chlorine (Cl_2), Nitrogen (N_2) Etc.

10. **Which are Triatomic Molecules?**

Ans. The molecules which contains three atoms in the same type are called Diatomic Molecules.
Ex: Ozone (O_3)

11. **Which are Polyatomic Molecules?**

Ans. The molecules which contains more than two atoms in the same type are called Polyatomic Molecules.
Ex: Sulphur (S_4)

12. **What are Compounds?**

Ans. A compound is a pure substance that consists of two or more elements chemically combined in a fixed proportion by mass.
Ex: Water (H_2O), combines with Hydrogen (H_2) and Oxygen (O_2)
Sulfuric Acid (H_2SO_4) Combines with Hydrogen (H_2) and Oxygen (O_2)

13. **Write the characteristics of Compound.**

Ans. The characteristics of compound are:

a. Compound is formed chemically from two or more elements.
b. The elements in the compound are present in different proportion by mass.
c. Compounds are always homogeneous.
d. They have different sets of properties.
e. The constituents of a compound cannot be separated by physical but chemically.

14. What is Mixture?

Ans. A mixture is the combination of two or more elements or compounds or both that
do not react chemically.

15. What are the characteristics of Mixture?

Ans. The Characteristics of Mixture are:

a. Each component of a mixture retains its chemical identity and hence its own properties.
b. Composition of a mixture may vary while that of its components is fixed.
c. It does not have definite melting or boiling points.
d. Mixtures can be separated into these components by using physical methods like decantation, distillation, evaporation, crystallization, sublimation and filtration.

16. What is Homogeneous Mixture?

Ans. Homogeneous Mixture are the mixtures in which two or more elements or compounds or both are uniformly distributed mixed.
Ex: Homogeneous mixture of salt and water, homogeneous mixture of alcohol and water, air, brass etc.

17. What are Heterogeneous Mixture?

Ans. Heterogeneous Mixture the mixtures in which two or more elements or compounds or both uniformly mixed,
Ex: Oil and water, sand and water, iron and sulphur etc.

18. What are the difference between Homogeneous and Heterogeneous Mixture?

Ans.

Homogeneous Mixture	Heterogeneous Mixture
Constituents are uniformly distributed	Constituents arc not uniformly distributed.
The properties and composition are same throughout the mixture.	The properties and c01nposition change throughout the mixture.
Examples: (i) Brass [Alloy of Cu + Zn] (H) Salt solution (iii) Air	Examples: (i) Iron and sulphur (ii) Sand and water (iii) Oil and water

19. Why the separation of components of Mixture is necessary?

Ans. The separation of components of a mixture is necessary to:

i. get pure and useful substances for manufacturing other useful products.
ii. remove undesirable and harmful substances.

20. On which factors the separation of mixture depends?

Ans. Separation of mixture used to separate the components of a mixture depends on the following factors:

a. The physical static of the components of the mixture and
b. The difference in the physical properties (i.e., density and solubility, melting and boiling points, volatile nature, sublime nature, magnetic nature etc.) of the components of the mixture.

21. Write down the methods which are used to separate the components of mixture.
Ans.

Type of Mixture	Process	Definition
Solid - Solid	Sublimation	we can separate one sublimate solid from non-sublimable Solid.
	Magnetic Separation	We can separate magnetic solid from non-magnetic solid.
	Solvent Extraction	We can separate soluble solid from an insoluble solid.
	Fractional Crystallisation	This method involves the separation of two soluble solids
Solid - Liquid	Filtration	It involves the separation of insoluble solid from liquid Component
	Sedimentation and Decantation	By this method the insoluble solid is separated from liquid.
	Evaporation	Soluble solid is separated from liquid component.
	Distillation	This is the best method for separating a liquid from a solution of the soluble solid.
Liquid - Liquid	Separating Funnel	Separating funnel finds its use in separating the immiscible lighter liquid heavier liquid.
	Fractional Distillation	Mixture of two miscible liquids with different boiling points are separated by Fractional Distillation
Complex Mixture	Chromatography	It is the method to separate the various components of mixture
	Centrifugation	It is a process of separating finely suspended particles in a liquid by rotating it at a high speed in a closed container.

22. Write the differences between compound and mixture.

Ans.

Sl. No.	Differentiating Property	Compound	Mixture
1	Definition	Compound are substances which are formed by chemically combining two or more elements.	Mixtures are substances that are formed by physically mixing two or more substances.
2	Types	Compounds are three types which are covalent compounds, metallic compounds and ionic compounds. Note: Compounds can also be classified as organic or inorganic compounds based on the presence of carbon atom.	Mixtures are mainly of two types i.e. homogenous mixtures and heterogeneous mixtures.
3	Substance Category	Compounds fall under pure substances.	Mixtures fall under impure substances.
4	Composition Details	The chemical composition of compounds is always fixed.	A mixture can have a variable composition of the substances forming it.
5	Nature	Compounds are always homogeneous in nature	Mixtures can either be homogeneous or heterogeneous in nature.
6	Separation of Constituents	The constituents of a compound can only be separated by either chemical or electrochemical methods (like extraction).	The constituents of a mixture can be easily separated by physical methods (like filtration).
7	Properties	The properties of compounds are peculiar to itself as the constituents of a compound lose their original properties.	The constituents of a mixture do not lose their properties and so, the properties of a mixture are generally the sum of the properties of its constituents.
8	New Substance	A new substance is formed after the constituents are chemically combined. So, a compound has different properties from its constituents.	No new substance is formed in mixtures and its properties depends upon the properties of its constituents.
9	Melting and Boiling Points	The melting and boiling points of a compound is always defined.	The melting and boiling points of a mixture is not defined.
10	Example	Water, salt, baking soda, etc.	Oil and water, sand and water, smog (smoke + fog), etc.