



Class - VII Science Classwork Notes June

4. Building Blocks of Matter

I. Technical Words:

1. **Element** - a substance that cannot be broken down into simpler substances by chemical methods.
2. **Compound** - two or more elements combined chemically in a fixed ratio.
3. **Mixture** - the resulting substance formed when two or more elements or compounds are combined physically in any ratio
4. **Atom** - the smallest particle of an element that may or may not exist independently.
5. **Molecule** - the smallest particle of a substance (element or compound) that can exist by itself in nature and is made of one or more atoms
6. **Valency** - the combining capacity of an element.

II. Short answer questions:

1. **Atom is the smallest particle that can exist independently. Is this statement correct? Give reasons.**

A. Atoms of some elements (like sodium) can exist independently. On the other hand, atoms of some other elements (like oxygen, hydrogen) can exist only in groups known as molecules.

2. **Identify the following substances as elements or compounds.**

- a. MgO - compound
- b. Cl - element
- c. NO_2 - compound
- d. O_2 - element

3. **What is the atomicity of the following molecules?**

- a. CO_2 - 3
- b. $\text{C}_6\text{H}_{12}\text{O}_6$ - 24
- c. HCl - 2
- d. NaHCO_3 - 6

4. Define valency. What is its importance?

The valency of an element is a number that denotes its combining capacity. Elements combine in fixed ratios (based on their valencies) to form compounds.

5. What is a variable valency? Give examples.

Some elements have variable valency which means they have more than one valency. Depending on the nature of the reaction, the elements with variable valency differ in their capacity to combine with other elements. For example, iron has a valency of 2 as well as 3 and nitrogen has a valency of 3 as well as 5.

IV. Long Answer Questions:

1. Describe the method of writing the chemical formula of a compound with an example.

- a. . Steps involved in writing the chemical formula of a compound (MgCl_2) is as follows:
 - i. Start by writing the symbol of the elements. Magnesium chloride has the elements, magnesium (Mg) and chlorine (Cl).
 - ii. Below their symbols, write their valencies (valency of Mg and Cl is 2 and 1, respectively).
 - iii. Interchange the numbers and write them as subscripts to the right of the symbols.
 - iv. If the numbers in the subscript are divisible by a common number, divide the numbers and use only the quotient.
 - v. If the quotient is 1, it need not be written in the final formula.



2. Write down the differences between:

- a. elements and compounds
- b. compounds and mixtures

Elements	Compounds
Elements are simple substances that cannot be broken down into still simpler substances. They are made up of the same kind of atoms.	Compounds are formed by the chemical combination of two or more elements in a definite ratio. They are made up of the same kind of molecules.
A molecule of an element has one or more atoms	A molecule of a compound is formed

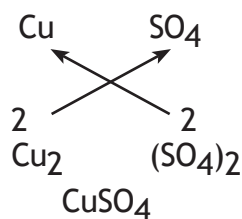
of same kind. For example, oxygen (O ₂) and ozone (O ₃).	when atoms of different elements combine chemically in a fixed ratio. For example, carbon dioxide (CO ₂) and water (H ₂ O).
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Compounds	Mixtures
The components are combined chemically in a fixed ratio. For example, CO ₂ .	A mixture is formed when two or more elements or compounds are physically mixed in any ratio. For example, air and salt water.
The components of a compound usually cannot be separated by physical methods. It can only be separated by chemical methods.	The components of a mixture can usually be separated by physical methods.
The properties of a compound are different from those of its components.	The properties of individual components of a mixture do not change.

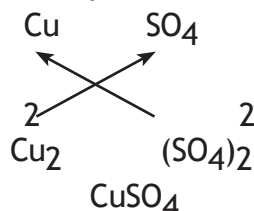
3. Derive the chemical formulae of the following compounds:

- Carbon tetrachloride
- Copper sulphate
- Ammonium chloride

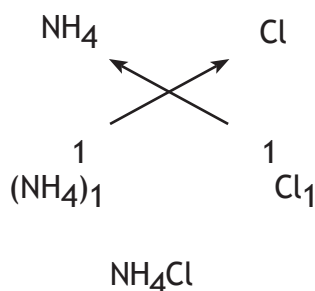
a. Carbon tetrachloride



b. Copper sulphate



c. Ammonium chloride



4. Find out the valencies for each of the elements/groups in the following compounds:

Ammonia: NH_3

valency of H = 1; valency of N = 3

Sodium bicarbonate: NaHCO_3

valency of Na = 1; valency of HCO_3 = 1

v. Image - based Question

Look at the four diagrams representing different substances.

a. Identify them as elements, compounds or mixtures.

b. What can you say about the components of the mixtures?

a. Element: A and B; Compound: C and D;
Mixture: C, E and F

b. Components of a mixture are physically mixed together in any ratio. In a mixture, the components retain their individual properties.

VI. Assertion and Reasoning Type Questions :

Note :- Mark the correct choices as

- (a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are correct but Reason is not the correct explanation Of Assertion.
- (c) Assertion is correct but Reason is incorrect.
- (d) Both Assertion and Reason are incorrect

1.Assertion: An atom is the smallest particle in an element that has the properties of the element.

Reason: Molecules are formed by the combination of two or more atoms.

Ans : Option B

2.Assertion (A) : Atoms and molecules are the building blocks of matter.

Reason (R) : Atom is the ultimate particle of an element which may or may or may not have independent existence.

Ans : C