



# Vidya Bhawan Balika Vidyapith

Shakti Utthan Ashram, Lakhisarai – 811311 (Bihar)

Chapter:- 3. ATOMS AND MOLECULES.

CLASS:- IX<sup>th</sup>

SUBTEACHER:-VIKASH KR. RAJAK

SUBJECT:-CHEMISTRY

DATE :-03/06/2020



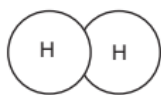
Topic:- Molecules, Molecules of Elements.

## ➤ MOLECULES:-

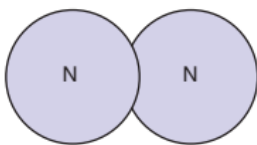
A molecule is an electrically neutral group of two (or more) atoms chemically bonded together. The forces which hold the atoms together in a molecule are called covalent bonds. Thus, a combination of atoms is called a molecule. We know that atoms of most of the elements are very reactive and cannot exist in the free state (as single atoms). This is not so with molecules. Molecules can exist in free state because they are very stable. This gives us another definition of molecule which can be written as follows: A molecule is the smallest particle of a substance (element or compound) which has the properties of that substance and can exist in the free state. Molecules can be formed either by the combination of atoms of the 'same element' or of 'different elements'. Depending on this, there are two types of molecules: molecules of elements, and molecules of compounds. This is discussed below.

## ➤ Molecules of Elements:-

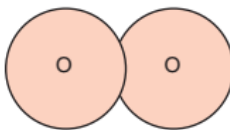
The molecule of an element contains two (or more) similar atoms chemically combined together. Example, a molecule of hydrogen element contains 2 hydrogen atoms combined together, and it is written as  $H_2$ . Hydrogen gas consists of  $H_2$  molecules and not of single atoms H. Hydrogen molecule ( $H_2$ ) is a diatomic molecule because it contains 2 atoms per molecule. Similarly, nitrogen gas exists as  $N_2$  molecules, oxygen gas as  $O_2$  molecules and chlorine gas as  $Cl_2$  molecules. Bromine element, which is a liquid, consists of  $Br_2$  molecules and iodine element, which is a solid, consists of  $I_2$  molecules.



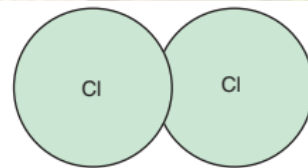
(a) Hydrogen molecule,  $H_2$



(b) Nitrogen molecule,  $N_2$



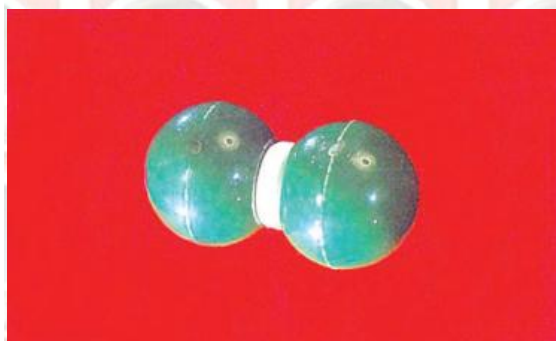
(c) Oxygen molecule,  $O_2$



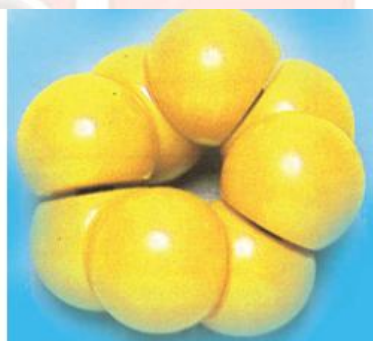
(d) Chlorine molecule,  $Cl_2$

Molecules of elements.

Ozone gas has 3 oxygen atoms combined together, so ozone exists in the form of  $O_3$  molecules. Phosphorus element has 4 phosphorus atoms combined together, so phosphorus exists in the form of  $P_4$  molecules. Solid sulphur element has 8 sulphur atoms joined together; therefore, sulphur exists in the form of  $S_8$  molecules. The noble gases like helium, neon, argon and krypton, etc., exist as single atoms He, Ne, Ar and Kr, respectively. So, their atoms and molecules are just the same. Most of the elements which exist as solids consist of a large cluster of atoms which can be considered to be 'giant molecules' or 'very big molecules'. Example, all the metals consist of giant molecules and they are represented by their symbols.



This is the model of a chlorine molecule. The two green balls represent two chlorine atoms.



A molecule of sulphur contains 8 sulphur atoms.



Graphite is a form of carbon element. Graphite consists of a large cluster of carbon atoms.

Example, the metal elements like sodium, magnesium, aluminium and iron, etc., are represented by their symbols Na, Mg, Al and Fe, etc., they do not have any separate formulae. Carbon element is a solid non-metal which is also represented by its symbol C. The properties of solid elements are not due to their single atoms but due to big cluster of atoms. We will now discuss atomicity of elements. The number of atoms present in one molecule of an element is called its atomicity.

### Home Work (Based on study material of 02-06-20)

Answer the following questions:-

1. Write the significance of the symbol of an elements?
2. How do atom exist?
3. Write the Latin name of following elements.

(i) Gold (ii) Lead (iii) Potassium (iv) Mercury (v) Tin (vi) Sodium

4. Write the Atomic masses of following elements?

(i) Sulphur (ii) Calcium (iii) Iron (iv) Aluminium (v) Copper (vi) Magnesium