



Vidya Bhawan Balika Vidyapith

Shakti Utthan Ashram, Lakhisarai – 811311 (Bihar)

Chapter:- 3. Atoms and Molecules.

CLASS:- IXth

SUBTEACHER:-VIKASH KR. RAJAK

SUBJECT:-CHEMISTRY

DATE :-25/05/2020

📖 Topic:- Laws of Chemical Combination.

➤ **LAWS OF CHEMICAL COMBINATION:-**

There are three important laws of chemical combination.

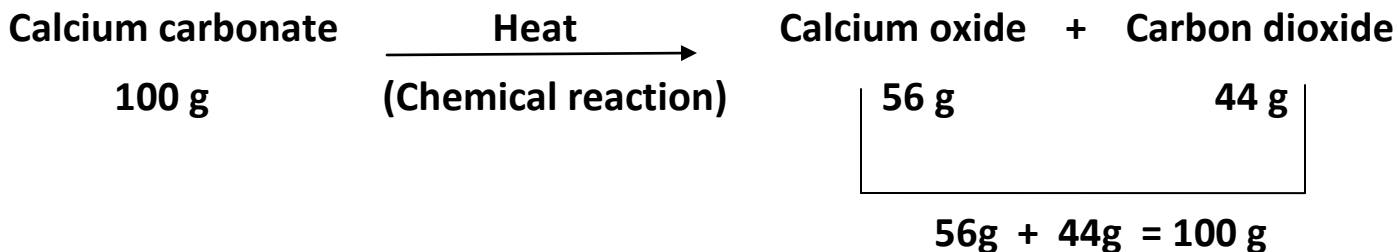
1. Law of conservation of mass (or matter),
2. Law of constant proportions, and
3. Law of multiple proportions.

The laws of chemical combination are the experimental laws which have been formulated by scientists after performing a large number of experiments involving various types of chemical reactions. These experimental laws ultimately led to the idea of 'atoms' being the 'smallest unit' of matter. The laws of chemical combination played a significant role in the development of Dalton's atomic theory of matter.

👉 **LAW OF CONSERVATION OF MASS:-**

Law of conservation of mass was given by Lavoisier in 1774. According to the law of conservation of mass: Matter is neither created nor destroyed in a chemical reaction. The substances which combine together (or react) in a chemical reaction are known as 'reactants' whereas the new substances formed (or produced) as a result of chemical reaction are called 'products'. The law of conservation of mass means that in a chemical reaction, the total mass of products is equal to the total mass of reactants. There is no change in mass during a chemical reaction. Since there is no gain or loss in mass in a chemical reaction, the mass remains conserved.

- **Example:-** When calcium carbonate is heated, a chemical reaction takes place to form calcium oxide and carbon dioxide. If 100 grams of calcium carbonate are decomposed completely then 56 grams of calcium oxide and 44 grams of carbon dioxide are formed. This can be written as :



calcium carbonate is the reactant and it has a mass of 100 g. Calcium oxide and carbon dioxide are the products and they have a total mass of $56\text{ g} + 44\text{ g} = 100\text{ g}$. The total mass of products (100 g) is equal to the total mass of reactant (100 g), there is no change of mass during this chemical reaction. The mass remains the same or conserved.

Sample Problem 1. Sodium carbonate reacts with ethanoic acid to form sodium ethanoate, carbon dioxide and water. In an experiment, 5.3 g of sodium carbonate reacted with 6 g of ethanoic acid to form 8.2 g of sodium ethanoate, 2.2 g of carbon dioxide and 0.9 g of water. Show that this data verifies the law of conservation of mass.

Sample Problem 2. Calcium carbonate decomposes, on heating, to form calcium oxide and carbon dioxide. When 10 g of calcium carbonate is decomposed completely, then 5.6 g of calcium oxide is formed. Calculate the mass of carbon dioxide formed. Which law of chemical combination will you use in solving this problem?