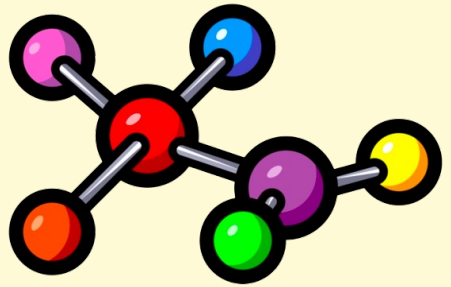
CLASS 9- SCIENCE

CHAPTER 3- ATOMS AND MOLECULES

PART 1- LAWS OF CHEMICAL COMBINATION

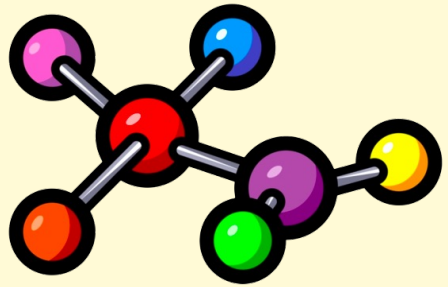


INTRODUCTION-

- Around 500 B.C. Maharishi Kanad, an Indian philosopher, postulated that if we go on dividing matter (*padarth*), then we get smaller particles.

- A stage comes when no further division is possible and those smallest particles obtained were named *parmanu*.

- Ancient Greek philosophers, Democritus and Leucippus suggested the same theory and named these indivisible particles as ‘atoms’.

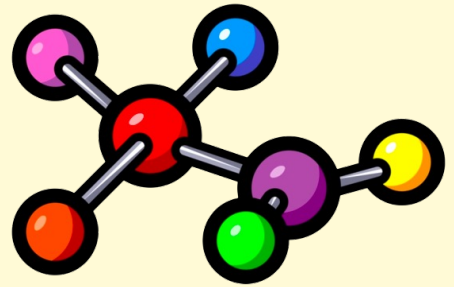


LAWS OF CHEMICAL COMBINATION-

- Antoine L. Lavoisier laid the foundation of chemical sciences by establishing two important laws of chemical combination.

- The process of combination of two or more elements to form new compounds is governed by certain laws known as the 'Laws of Chemical Combination'.

- The two laws were given by Lavoisier and Joseph L. Proust.



1. LAW OF CONSERVATION OF MASS-

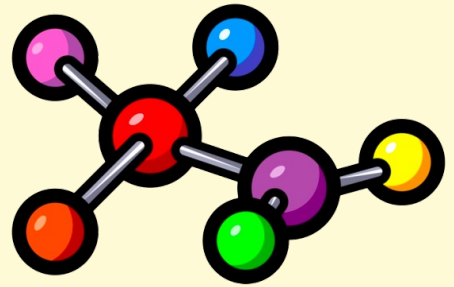
- Law of conservation of mass states that mass can neither be created nor destroyed in a chemical reaction.

- This means that during a chemical reaction the total mass of the reactants is equal to the total mass of the products.

- If A + B = C + D

  (reactants) (products)

then, total mass of reactants (A+B) is equal to the total mass of the products (C+D).

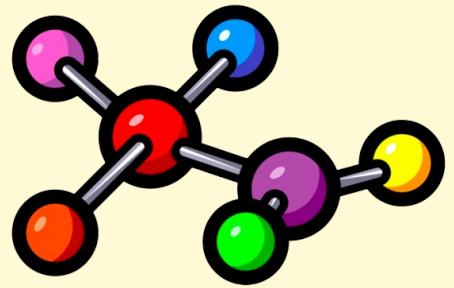


2. LAW OF CONSTANT PROPORTION-

- The law of constant proportion states that in a chemical substance the elements are always present in definite proportions by mass.

- This means that the compounds composed of two or more elements always have the same elements in the same proportion.

- In case of water (H_2O), the ratio of the mass of hydrogen to the mass of oxygen is always 1:8

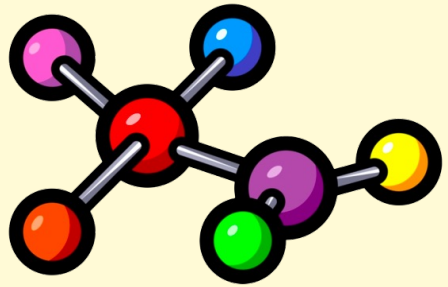


DALTON'S ATOMIC THEORY-

- In 1808, British chemist John Dalton proposed his atomic theory based on the laws of chemical combination.

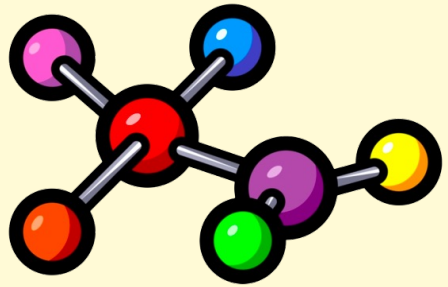
- The atomic theory provided the explanation for these two laws i.e. the law of conservation of mass and the law of constant proportion.

- Later on, some drawbacks in the Dalton's atomic theory led to its failure.



POSTULATES OF DALTON'S ATOMIC THEORY-

- All matter is made up of very tiny particles called atoms.
- Atoms are indivisible particles, which cannot be created or destroyed in a chemical reaction.
- Atoms of a given element are identical in mass and chemical properties.
- Atoms of different elements have different masses and chemical properties.
- Atoms combine in the ratio of small whole numbers to form compounds.
- The relative number and kinds of atoms are constant in a given compound.

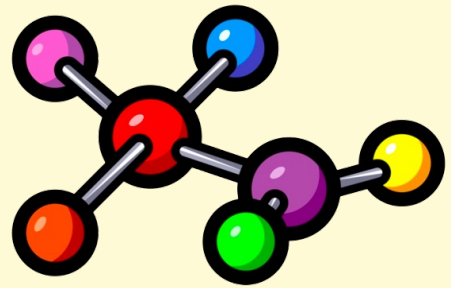


DRAWBACKS OF DALTON'S ATOMIC THEORY-

- Dalton had said that atoms were indivisible but later it was found that atoms can be divided into three subatomic particles, namely electrons, protons and neutrons.

- Dalton had stated that atoms of same elements have identical mass and properties but was proved wrong by the discovery of isotopes (atoms of same element with different masses).

- Dalton had also said that atoms of different elements have different mass and properties but was again proved wrong by the discovery of isobars (atoms of different elements with same masses).



THANK YOU