Chemistry Study Materials for Class 9
(NCERT Based Revision notes of Chapter -03)

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Atoms and Molecules

INTEXT QUESTIONS PAGE NO. 32

Q1. In a reaction, 5.3 g of sodium carbonate reacted with 6 g of ethanoic acid. The products were 2.2 g of carbon dioxide, 0.9 g water and 8.2 g of sodium ethanoate. Show that these observations are in agreement with the law of conservation of mass.

Sodium carbonate + ethanoic acid → sodium ethanoate

+ carbon dioxide + Water

Answer:

In the given reaction, sodium carbonate reacts with ethanoic acid to produce sodium ethanoate, carbon dioxide, and water.

Sodium carbonate + ethanoic acid → sodium ethanoate +

carbon dioxide + Water

Mass of sodium carbonate = 5.3 g (Given)

Mass of ethanoic acid = 6 g (Given)

Mass of sodium ethanoate = 8.2 g (Given)

Mass of carbon dioxide = 2.2 g (Given)

Mass of water = 0.9 g (Given)

Now, total mass before the reaction = (5.3 + 6) g = 11.3 g

And, total mass after the reaction = (8.2 + 2.2 + 0.9) g = 11.3 g

Therefore,

Total mass before the reaction = Total mass after the reaction

Hence, the given observations are in agreement with the law of conservation of mass.

Q2. Hydrogen and oxygen combine in the ratio of 1:8 by mass to form water. What mass of oxygen gas would be required to react completely with 3 g of hydrogen gas?

Answer: It is given that the ratio of hydrogen and oxygen by mass to form water is 1:8.

Then, the mass of oxygen gas required to react completely with 1 g of hydrogen gas is 8 g. Therefore, the mass of oxygen gas required to react completely with 3 g of hydrogen gas is 8 × 3 g = 24 g.

Q3. Which postulate of Dalton's atomic theory is the result of the law of conservation of mass?

Answer: The postulate of Dalton's atomic theory which is a result of the law of conservation of mass is: Atoms are indivisible particles, which can neither be created nor destroyed in a chemical reaction.

Q4. Which postulate of Dalton's atomic theory can explain the law of definite proportions?

Answer: The postulate of Dalton's atomic theory which is a result of the law of conservation of mass is: Atoms are indivisible particles, which can neither be created nor destroyed in a chemical reaction.

ATOMS

On the basis of Dalton's Atomic On the basis of Dalton's Atomic Theory atom can be defined as the smallest particles of matter are called atoms.

Characteristics of atoms:

- Atom is the smallest particle of matter.
- All elements are made of tiny particles called atom.
- Atoms are very small in size and cannot be seen through naked eyes.
- Atom does not exist in free-state in nature. But atom takes part in a chemical reaction.
- The properties of a matter depend upon the characteristics of atoms.
- Atoms are the building block of an element similar to a brick which combine together to make a building.
- The size of atoms is indicated by its radius.
- In ancient time atoms was considered indivisible.

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