

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

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## Atoms and Molecules

### **Absolute mass or Actual atomic mass:**

It is found that, the actual atomic mass of a carbon-12 atom is equal to  $1.9926 \times 10^{-23} \text{g}$ .

$$\text{Therefore, } 1u = \frac{1.9926 \times 10^{-23}}{12} \text{g} = 1.6605 \times 10^{-24} \text{g}$$

Thus by multiplying the relative atomic mass with  $1.6605 \times 10^{-24} \text{g}$  we can get the absolute or actual mass of an atom.

### **Example -1 - Find the absolute mass oxygen.**

#### **Solution:**

The atomic mass of oxygen is 16u we know  $1u = 1.6605 \times 10^{-24} \text{g}$

Therefore, Absolute mass of oxygen =  $1.6605 \times 10^{-24} \times 16 \text{g}$

$$= 26.568 \times 10^{-24}$$

$$= 2.6568 \times 10^{-25} \text{g}$$

### **Example – 2 – Find the absolute mass of Sodium.**

**Solution:**

The atomic mass of Sodium is 23u

We know  $1\text{u} = 1.6605 \times 10^{-24} \text{ g}$

Therefore, Absolute mass of Sodium =  $1.6605 \times 10^{-24} \times 23 \text{ g}$

$$= 38.191 \times 10^{-24}$$

$$= 3.8191 \times 10^{-25} \text{ g}$$

**Example – 3 – Calculate the absolute mass of hydrogen atom.****Solution:**

The atomic mass of hydrogen is 1u

We know  $1\text{u} = 1.6605 \times 10^{-24} \text{ g}$

Therefore, Absolute mass of hydrogen =  $1.6605 \times 10^{-24} \times 1 \text{ g}$

$$= 1.6605 \times 10^{-24} \text{ g}$$

**Example 4. Calculate the absolute or actual mass of Nitrogen atom.****Solution:**

The atomic mass of Nitrogen is 14u We know 1u

$$= 1.6605 \times 10^{-24} \text{ g}$$

Therefore, Absolute mass of hydrogen =  $1.6605 \times 10^{-24} \times 14 \text{ g}$

$$= 23.247 \times 10^{-24} \text{ g}$$

$$= 2.3247 \times 10^{-25} \text{ g}$$

## EXISTENCE OF ATOMS

Atoms of most of the elements exist in the form of molecule or ion, since they are most reactive. For example, hydrogen, oxygen, chlorine, etc. However, atoms of some elements, which are non-reactive, exist in free-state in nature. For example helium, neon, argon, etc.

Usually atoms are exist in following two forms -

- In the form of molecules
- In the form of ions

## INTEXT QUESTIONS PAGE NO. 35

**Q2. Why is it not possible to see an atom with naked eyes?**

**Answer:** The size of an atom is so small that it is not possible to see it with naked eyes. Also, the atom of an element does not exist independently.

## MOLECULE

Molecule is the smallest particle of a compound. Atoms exist in free states in the form of molecule.

- A molecule may be formed by the combination of two or more similar atoms of an element, such as oxygen molecule is formed by the combination of two oxygen atoms, molecule of hydrogen which is formed by the combination of two hydrogen atoms.

- Molecules may be formed by the combination of atoms of two or more different elements. For example molecule of water. It is formed by the combination of two atoms of hydrogen and one atom of oxygen. Molecule of Nitric oxide or nitrogen monoxide. It is formed by the combination of one nitrogen atom and one oxygen atom.

- A molecule takes part in chemical reaction.

Most of the atoms exist in the form of molecule. Molecules are formed by the combination of two or more elements.

Example: Molecule of hydrogen ( $H_2$ ), Molecule of oxygen ( $O_2$ ), Molecule of nitrogen ( $N_2$ ), etc.

- Molecules of elements

- Molecules of Compounds

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