

# Chapter 3 – Quick Revision Sheet

## Atoms and Molecules



### Why do we study Atoms & Molecules?

Everything you see looks continuous, but matter is actually made of tiny particles. These particles are called atoms and molecules. Atoms build elements, molecules build substances, and chemistry starts right here. If you get this idea clear, the whole chapter becomes easy.



### Conservation of Mass — *Exam Favourite*

In a chemical reaction, mass never disappears and nothing new is created. The total mass before the reaction is exactly the same as the total mass after the reaction. If mass seems to change, the reaction was open and gases escaped — not magic, just chemistry.



### Law of Constant Proportions — *One Line Rule*

A pure chemical compound always contains the same elements combined in the same fixed ratio by mass, no matter from where or how it is prepared. For example, water always contains hydrogen and oxygen in the mass ratio of 1:8. This law does not apply to mixtures, where the composition can vary.



## **Atoms — *The Basic Building Blocks***

An atom is the smallest particle of an element that participates in chemical reactions. Atoms are extremely small and generally cannot exist independently. Most atoms combine with other atoms to form molecules, except noble gases such as helium and neon which are already stable and can exist freely.



## **Molecules & Atomicity — *Easy Marks Zone***

A molecule is the smallest particle of a substance that can exist independently and show all its properties. Molecules may be formed from atoms of the same element, like oxygen ( $O_2$ ), or from atoms of different elements, like water ( $H_2O$ ). The number of atoms present in a single molecule is called atomicity.



## **Chemical Symbols — *Don't Lose Marks Here***

Every element is represented by a chemical symbol, which is a short form of its name. The first letter of a symbol is always written in capital and the second letter, if present, is written in small. Some symbols come from Latin names, such as Na for sodium and Fe for iron, which students should remember carefully.



### **Atomic Mass — *Relative, Not Real***

Atomic mass tells us how heavy an atom is compared to 1/12th of a carbon-12 atom. It's not the actual mass, but a comparison scale. Carbon-12 is fixed at 12 u, and all other atoms are measured relative to it.



### **Molecular & Formula Mass — *Simple Logic***

Molecular mass is the sum of the atomic masses of all atoms present in a molecule. In ionic compounds where molecules do not exist independently, the term formula mass is used instead. For example, the molecular mass of water is 18 u, while the formula mass of sodium chloride is 58.5 u.



### **Percentage Composition — *Scoring Topic***

Percentage composition shows how much each element contributes to a compound's mass. Divide the mass of the element by the molar mass of the compound and multiply by 100. This concept frequently appears in numericals and case-based questions.