

# Chapter 4

## Atomic Structure

### LESSON PLAN

#### SPECIFIC OBJECTIVES

The students will learn about

- ❖ atom and its ancient concept
- ❖ Dalton's atomic theory
- ❖ J J Thomson's discovery of electron
- ❖ Eugen Goldstein's discovery of proton
- ❖ J J Thomson's model of an atom
- ❖ Ernest Rutherford's model of an atom and its drawbacks
- ❖ Neils Bohr's model of an atom
- ❖ Chadwick's discovery of neutron
- ❖ atomic number and mass number
- ❖ isotopes
- ❖ properties of an element
- ❖ arrangement of electrons in various energy shells
- ❖ valence electrons; attaining stable electronic configuration
- ❖ valency; radicals

#### Teaching Aids

**Pictures/charts/models/animation** on the concept of atomic theory, discovery of three particles; Goldstein's experiment; Thomson's model of an atom; Rutherford's model of an atom; Neils Bohr's model of an atom; isotopes of elements and their symbols, mass and atomic numbers (as given in chapter); arrangement of electrons in various energy shells; attaining stable electronic configuration; valency; radicals

#### Teaching Strategy

- ❖ Teacher will start the chapter by revising the account of atom taught in previous class.
- ❖ Teacher will explain the ancient concept of atom and will discuss Dalton's atomic theory.
- ❖ Teacher will explain J J Thomson's discovery of electron by defining cathode rays.

- ❖ Teacher will discuss discovery of proton by Eugen Goldstein and will define anode rays.
- ❖ Teacher will discuss J J Thomson's model of an atom.
- ❖ Now, teacher will ask the students to solve 'Check Point 1'.
- ❖ Teacher will explain Rutherford's  $\alpha$ -scattering experiment and his model of an atom.
- ❖ Teacher will also discuss the drawbacks of Rutherford's model of an atom.
- ❖ Teacher will discuss Neils Bohr's model of an atom by explaining energy levels around the nucleus of an atom.
- ❖ Teacher will discuss discovery of neutron by Chadwick and will give an idea of comparative mass and charge on three particles.
- ❖ Teacher will explain atomic number and mass number and will discuss how to calculate the number of three particles in an atom.
- ❖ Now, teacher will ask the students to solve 'Check Point 2'.
- ❖ Teacher will explain isotopes, isotopes of hydrogen and isotopes of different elements.
- ❖ Teacher will explain properties of an element.
- ❖ Teacher will discuss arrangement of electrons in various energy shells.
- ❖ Teacher will explain valence electrons and will discuss electronic configuration of various elements.
- ❖ Teacher will discuss attaining stable electronic configuration, valency, variable valency and radicals showing valencies of some cations and anions.
- ❖ Now, teacher will ask the students to solve 'Check Point 3'.
- ❖ At last, teacher will sum up the lesson by going through the points given under the head 'Wrapping It Up'.
- ❖ Teacher will finally help students to answer the questions given under the head 'Test Yourself'.

### Boost Up

- ❖ Teacher can help students to perform the activities given in chapter.
- ❖ Teacher can make students revise new terms given under the head 'Know These Terms'.
- ❖ Teacher can encourage students to learn the facts given under the head 'Something More'.
- ❖ Teacher can show animations related to the topics taught, if possible.
- ❖ Teacher should ask the students to learn the charges present on electron, proton and neutron and the name of their discoverer.
- ❖ Students should be asked to differentiate between atomic number and mass number.
- ❖ Students should be asked to practise the electronic configuration of few elements and learn the valence electrons present in them.
- ❖ Students should be asked to learn the valencies, variable valencies of various elements and charges on various radicals.
- ❖ Students should be asked to study elements, their symbols, mass numbers, atomic numbers, and the number of protons, electrons and neutrons in them.

- ❖ Students should be asked to learn isotopes of various elements with their atomic numbers and variation in their mass numbers.

### Expected Learning Outcomes

The students understand and know:

- ❖ atom and its ancient concept.
- ❖ Dalton's atomic theory.
- ❖ J J Thomson's experiment for discovery of electron.
- ❖ Eugen Goldstein's experiment for discovery of proton.
- ❖ J J Thomson's model of an atom.
- ❖ Ernest Rutherford's model of an atom and its drawbacks.
- ❖ Neils Bohr's model of an atom.
- ❖ Chadwick's explanation for presence of neutrons.
- ❖ atomic number and mass number.
- ❖ isotopes, isotopes of hydrogen and other elements
- ❖ properties of an element.
- ❖ arrangement of electrons in various energy shells.
- ❖ valence electrons; attaining stable electronic configuration.
- ❖ valency; variable valency and radicals.

### Evaluative Questions

The teacher should ask the following questions to evaluate the students.

1. Mention the charge present on proton.
2. Define atomic number. Write the number of protons present in an atom of magnesium (atomic number 12).
3. Find the mass number and number of neutrons in  $^{23}_{11}\text{Na}$ .
4. Calculate the maximum number of electrons in M-shell.
5. Write the electronic configuration of nitrogen (7).
6. What is the difference between anion and cation?
7. What is meant by valency?
8. Define isotopes. Write the isotopes of hydrogen.