STRUCTURE OF THE ATOM BOHR'S ATOMIC MODEL, ATOMIC NUMBER AND MASS NUMBER

✤ BOHR'S ATOMIC MODEL:-

BOHR MODEL OF AN ATOM

Rutherford's Model of the atom was unable to explain certain observations with regard to the atom that is stability of the atom and the occurence of the atomic spectra.

Neil's Bohr accepted Rutherford's idea that the positive charge and most of the mass of atom is concentrated in its nucleus with the electrons present at some distance away. It is a quantum mechanical model. This model was based on quantum theory of radiation or plank theory and classical law of physics.

According to Bohr's Theory :

Electrons revolve around the nucleus in well-defined orbits or shells each shells having a definite amount of energy associated with the electrons in it. Therefore these shells are also called energy levels.



- The energy associated with the electrons in an orbit increase as the radius of the orbit increase. These shell also known as K, L, M, N.....starting from the one closest to the nucleus.
- An electron in a shell can move to a higher or lower energy shell by absorbing or releasing a fixed amount of energy.
- The amount of energy absorbed or emitted is given by differences energies associated with the two levels. Thus

Ques. Draw a sketch of Bohr's model of an atom with three shells. [NCERT]

✤ ATOMIC NUMBER:-

ATOMIC NUMBER AND MASS NUMBER

Atomic number (Z) : Protons are present in the nucleus of an atom. It is the number of protons of an atom, which determine its atomic number. It is denoted by 'Z'. Thus atomic number = No. of protons = No. of electrons for hydrogen Z = 1 because in hydrogen atom only one proton is present in the nucleus.

Therefore, the atomic number is defined as the total number of protons present in the nucleus of an atom.

Ex. ₆C¹²

means atomic number of carbon is 6. Nucleus of carbon has 6 protons. Nucleus of carbon has 6 unit positive charge. There are 6 electrons, revolving round the nucleus of carbon. Ex :

The mass number of magnesium is 12. The total number of protons and neutrons in the nucleus of magnesium is 24 number of protons is 12.

Number of neutrons is = 24 - 12 = 12.

Mass Number (A) : The mass number of an atom is defined as the sum of the total number of protons and neutrons present in the nucleus of an atom. For example, mass of carbon is 12u because it has 6 proton and 6 neutron that is 6u + 6u = 12u.

Mass number : Number of protons + number of neutron for eg.

The notation for an atom the atomic number, mass number and symbol of the element are to be written as follows.

Chemistry

[NCERT]

Class-IX

Symbol of element: _z X ^A	SYMBOL	A	$\mathbf{Z} = \mathbf{P}$	N
	Li	6	3	3
A b Mass No	С	12	6	6
A P Mass No.	Ν	14	7	7
Z P Atomic No.	0	16	8	8
	Mg	24	12	12

For example-Nitrogen is written as.

Ques. If number of electrons in an atom is 8 and number of protons is also 8, then

- (i) what is the atomic number of atom
- (ii) what is the charge of the atom **[NCERT]**

Ques. Find out the mass number of oxygen and sulphur atom.