Chemistry Study Materials for Class 9
(NCERT Questions –Answers of Chapter -04)

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Structure of the Atom

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Q1. Name the three sub-atomic particles of an atom.

Answer: The three sub-atomic particles of an atom are:

(i) Protons (ii) Electrons, and (iii)Neutrons

Q2. Helium atom has an atomic mass of 4 u and two protons in its nucleus. How many neutrons does it have?

Answer: Number of neutrons = Atomic mass - Number of protons

Therefore, the number of neutrons in the atom = 4 - 2 = 2

DISTRIBUTION OF ELECTRONS IN ORBIT OR SHELL:

The distribution of electrons in an orbit is obtained by $2n^2$, where 'n' is number of orbit. Therefore,

Number of electrons in K-shell i.e. in 1st orbit

Here n = 1, therefore, $2n^2 = 2 \times 1^2 = 2$

Thus, maximum number of electrons in K-shell i.e. 1st shell = 2

Number of electrons in L-shell, i.e. in 2ndorbit

Here n = 2, therefore, $2n^2 = 2 \times 2^2 = 8$

Thus, maximum number of electrons in L-shell = 8

Number of electrons in M-shell, i.e. in 3rd orbit

Here n = 3, therefore, $2n^2 = 2 \times 3^2 = 18$

Thus, maximum number of electrons in M-shell = 18

Number of electrons in N-shell, i.e. in 4th orbit

Here n = 4, therefore, $2n^2 = 2 \times 4^2 = 32$

Thus, maximum number of electrons in N-shell = 32

In similar way maximum number of electrons in any shell can be calculated.

ATOMIC NUMBER

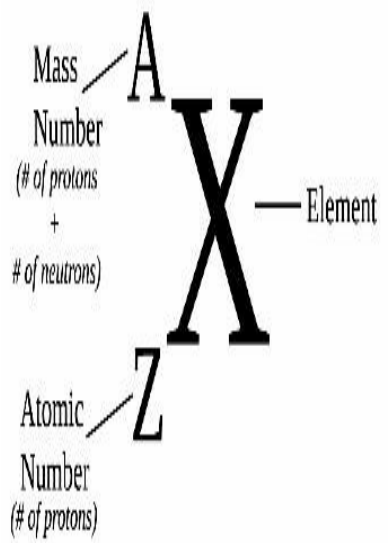
Atomic number is the fundamental properties of an atom.

Every atom is identified by its unique atomic number.

Atomic number is denoted by 'z'.

Atomic number is equal to the number of protons present in an atom.

Since an atom is electrically neutral, thus number of protons and number of electrons are equal to make an atom electrically neutral.



Atomic number = Number of protons = Number of electrons

Example :–

The atomic number of Hydrogen is 1, helium is 2, lithium is 3, beryllium is 4, boron is 5, carbon is 6, nitrogen is 7, oxygen is 8, etc.

Sample exercise:

(1)Atomic number of calcium is 20. Calculate the number of electrons and protons in calcium.

Solution: Since, Atomic number = Number of protons = Number of electrons

Therefore,

Number of electrons in calcium = 20

Number of protons in calcium = 20

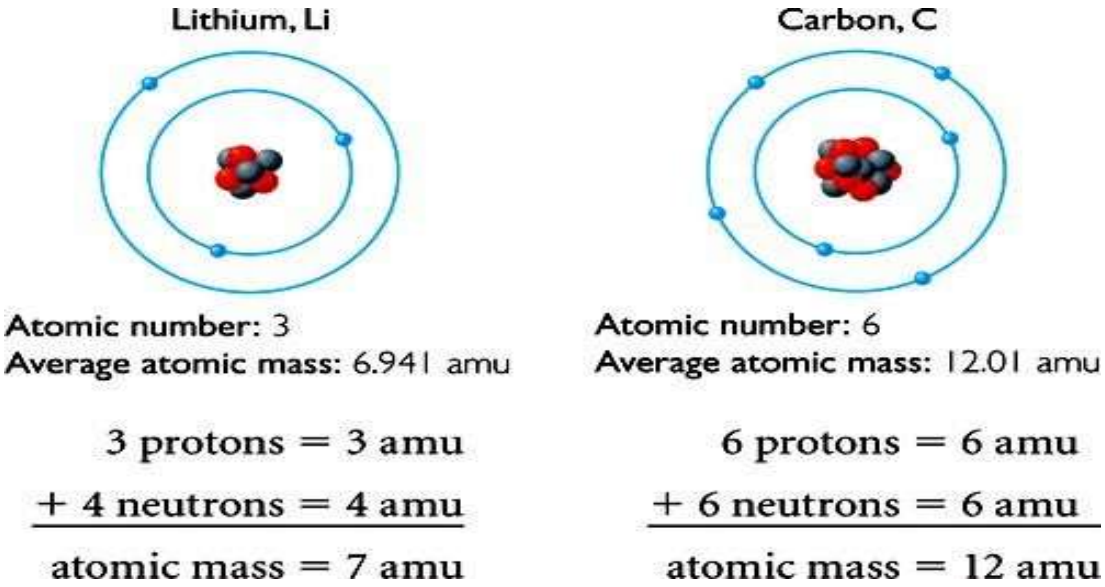
(2)Number of protons in sodium atom is 11, find the atomic number and number of electrons in a sodium atom.

Solution: Since, Atomic number = Number of protons = Number of electrons

Therefore,

Atomic number of sodium = 11

Number of electrons in sodium = 11



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