

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

Ganesh Kumar

Date:- 02/08/2021

Structure of the Atom

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Q1. How will you find the valency of chlorine, sulphur and magnesium?

Answer: If the number of electrons in the outermost shell of the atom of an element is less than or equal to 4, then the valency of the element is equal to the number of electrons in the outermost shell. On the other hand, if the number of electrons in the outermost shell of the atom of an element is greater than 4, then the valency of that element is determined by subtracting the number of electrons in the outermost shell from 8.

The distribution of electrons in chlorine, sulphur, and magnesium atoms are

Cl - 2, 8, 7 S- 2, 8, 6 and Mg -2, 8, 2 respectively.

Therefore, the number of electrons in the outer most shell of chlorine, sulphur, and magnesium atoms are 7, 6, and 2 respectively.

Thus, the valency of chlorine = $8 - 7 = 1$

The valency of sulphur = $8 - 6 = 2$

The valency of magnesium = 2

Q1. If number of electrons in an atom is 8 and number of protons is also 8, then (i) what is the atomic number of the atom? and (ii) what is the charge on the atom?

Answer:

- (i) The atomic number is equal to the number of protons. Therefore, the atomic number of the atom is 8.
- (ii) Since the number of both electrons and protons is equal, therefore, the charge on the atom is 0.

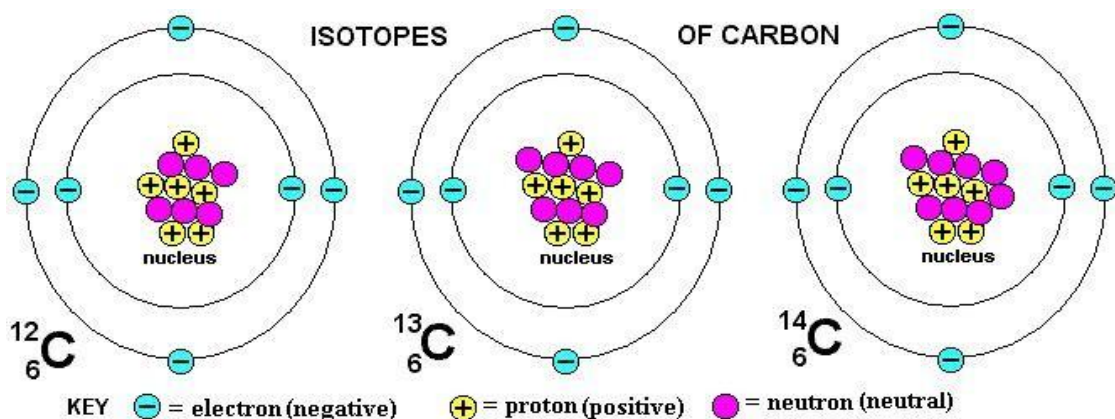
Q2. With the help of Table 4.1, find out the mass number of oxygen and sulphur atom.

Answer: Mass number of oxygen = Number of protons + Number of neutrons
 $= 8 + 8 = 16$

Mass number of sulphur = Number of protons + Number of neutrons
 $= 16 + 16 = 32$

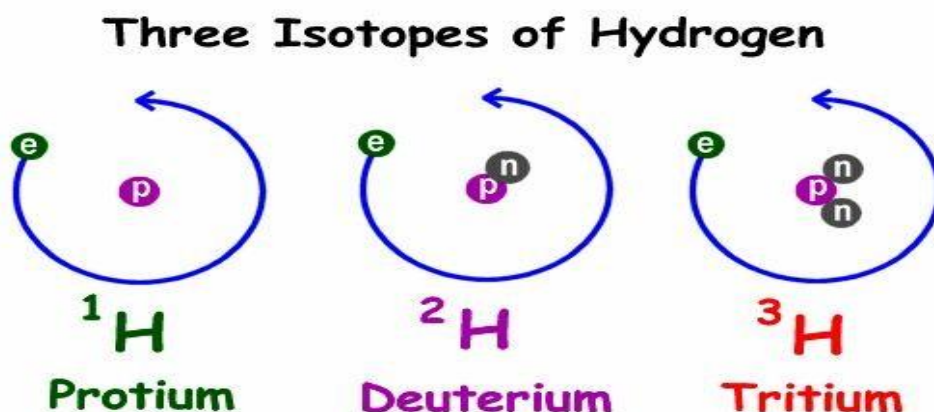
ISOTOPES Elements having same atomic number but different atomic masses are known as Isotopes.

Example – Carbon-12, Carbon-13, Carbon-14 are three isotopes of carbon atom. Here 12, 13 and 14 are the atomic masses of isotopes of carbon respectively. Since, atomic number is the unique property of an atom, thus the atomic number of carbon is 6 even in the case of three types of carbon (isotopes)



Hydrogen -1 , Deuterium – 2, Tritium -3 are three isotopes of hydrogen.

The isotopes of hydrogen are written as:



Use of Isotopes:

Carbon – 14 is used in carbon dating.

An isotope of uranium is used as fuel in nuclear reactor. An isotope of cobalt is used in treatment of cancer.

An isotope of iodine is used in treatment of goitre.

ISOBARS Atoms having same atomic mass and different atomic numbers are known as Isobars.

Example – ${}^{40}_{18}\text{Ar}$ (argon) and ${}^{40}_{20}\text{Ca}$ (calcium)

Both the elements have same atomic mass equal to 40 but different atomic numbers, i.e. argon has atomic number equal to 18 and calcium has atomic number equal to 20.
