

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

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Structure of the Atom

INTEXT QUESTIONS PAGE NO. 53

Q1. For the symbol H, D and T tabulate three sub-atomic particles found in each of them.

Answer:

Symbol	Proton	Neutron	Electron
H	1	0	1
D	1	1	1
T	1	2	1

Q2. Write the electronic configuration of any one pair of isotopes and isobars.

Answer: $^{12}\text{C}_6$ and $^{14}\text{C}_6$ are isotopes, have the same electronic configuration as (2, 4). $^{40}\text{Ar}_{18}$ and $^{40}\text{Ca}_{20}$ are isobars. They have different electronic configuration as given below:: $^{40}\text{Ar}_{18} - 2, 8, 8$ $^{40}\text{Ca}_{20} - 2, 8, 2$

Q2. What are the limitations of J.J. Thomson's model of the atom?

Answer: The limitations of J.J. Thomson's model of the atom are:

→ It could not explain the result of scattering experiment performed by Rutherford.

→ It did not have any experiment support.

EXERCISE QUESTIONS PAGE NO. 55, 56

Q1. Compare the properties of electrons, protons and neutrons.

Answer:

Particle	Nature of Charge	Mass	Location
Electron	Electrons are negatively charged.	9×10^{-31} kg	Extra nuclear part distributed in different shell or orbits.
Proton	Protons are positively charged.	1.672×10^{-27} kg (1 μ) (approx. 2000 times that of the electron)	Nucleus
Neutron	Neutrons are neutral.	Equal to mass of proton	Nucleus

Q3. What are the limitations of Rutherford's model of the atom?

Answer: The limitations of Rutherford's model of the atom are

- It failed to explain the stability of an atom.
- It doesn't explain the spectrum of hydrogen and other atoms.

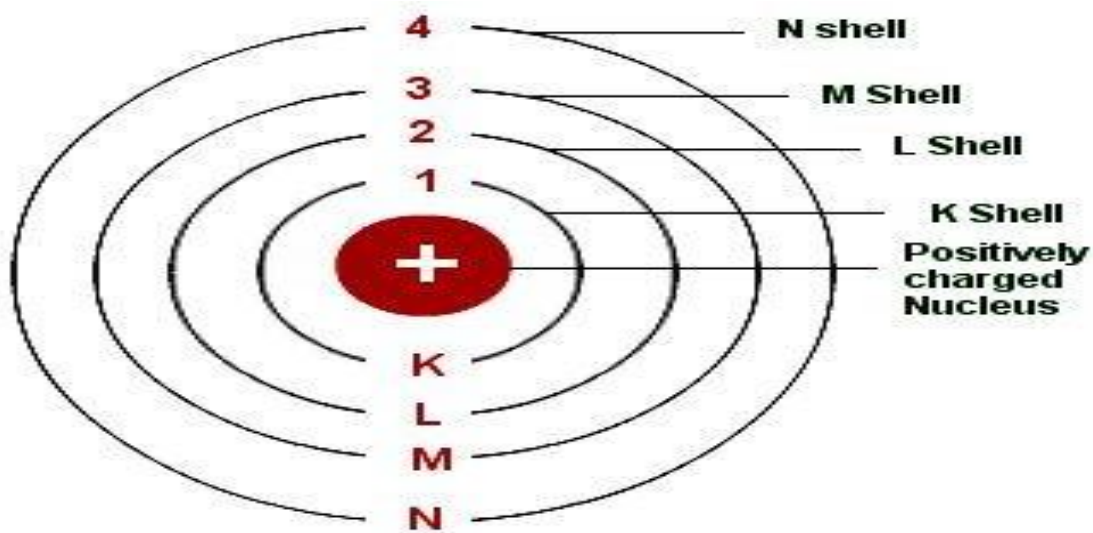
Q4. Describe Bohr's model of the atom.

Answer: →The atom consists of a small positively charged nucleus at its center.

- The whole mass of the atom is concentrated at the nucleus and the volume of the nucleus is much smaller than the volume of the atom.
- All the protons and neutrons of the atom are contained in the nucleus.
- Only certain orbits known as discrete orbits of electrons are allowed inside the atom.
- While revolving in these discrete orbits electrons do not radiate energy.

These orbits or cells are represented by the letters K, L, M, N etc.

or the numbers, $n = 1, 2, 3, 4,$ as shown in below figure.



Q5. Compare all the proposed models of an atom given in this chapter.

Answer:

Thomson's model	Rutherford's model	Bohr's model
<p>→ An atom consists of a positively charged sphere and the electrons are embedded in it.</p> <p>→ The negative and positive charges are equal in magnitude. As a result the atom is electrically neutral.</p>	<p>→ An atom consists of a positively charged center in the atom called the nucleus. The mass of the atom is contributed mainly by the nucleus.</p> <p>→ The size of the nucleus is very small as compared to the size of the atom.</p> <p>→ The electrons revolve around the nucleus in well- defined orbits.</p>	<p>→ Bohr agreed with almost all points as said by Rutherford except regarding the revolution of electrons for which he added that there are only certain orbits known as discrete orbits inside the atom in which electrons revolve around the nucleus.</p> <p>→ While revolving in its discrete orbits the electrons do not radiate energy.</p>
