

Class 9 CBSE Test paper Solved Chapter 3: Structure of atoms - 4

1. Q. Will Cl-35 and Cl-37 have different valences?

Ans: No, It is because these are isotopes of chlorine that have same atomic number but different mass number

2. Q. Calculate the number of neutrons present in the nucleus of an element X which is represented as $^{31}_{15}X$. Ans: $^{31}_{15}X$.indicate that No. of proton=15 and mass number =31

$$\text{Mass number} = \text{No. of protons} + \text{No. of neutrons} = 31$$

$$\text{Number of neutrons} = 31 - \text{number of protons} = 31 - 15 = 16$$

3. Q. The atomic number of calcium and argon are 20 and 18 respectively, but the mass number of both these elements is 40. What is the name given to such a pair of elements?

Ans: Isobars

4. Q. Why do Helium, Neon and Argon have a zero valency?

Ans: Helium, Neon and Argon have 2, 8 and 8 electron in outermost cell so they are having no need to gain or loss electrons. Hence they have zero valency.

5. Q. In what way the Rutherford proposed atomic model?

Ans: Rutherford proposed a model in which electrons revolve around the nucleus in well-defined orbits. There is a positively charged centre in an atom called the nucleus. He also proposed that the size of the nucleus is very small as compared to the size of the atom and nearly all the mass of an atom is centered in the nucleus.

6. Q. In what way the Thomson proposed atomic model?

Ans: Thomson proposed the model of an atom to be similar to a Christmas pudding. The electrons are studded like currants in a positively charged sphere like Christmas pudding and the mass of the atom was supposed to be uniformly distributed.

7. Q. What were the drawbacks of Rutherford's model of an atom?

Ans: The orbital revolution of the electron is not expected to be stable. Any particle in a circular orbit would undergo acceleration and the charged particles would radiate energy. Thus, the revolving electron would lose energy and finally fall into the nucleus. If this were so, the atom should be highly unstable and hence matter would not exist in the form that we know.

8. Q. What are the limitations of J.J. Thomson's model of an atom?

Ans. The major limitation of J.J. Thomson's model is that it does not explain how positively charged particles are shielded from negatively charged particles, without getting neutralized.

9. Q. Write two differences between isobars and isotopes.

Ans:

Isobars	Isotopes
(i) Isobars have the same mass number but different atomic numbers	Isotopes have the same atomic number but different mass numbers.
(ii) Isobars have different chemical properties	Isotopes have similar chemical properties.

10. Q. Why do isotopes shows similar chemical properties.

Ans: Isotopes of an element have similar chemical properties because they have same atomic number and valence electrons.

11. Q. How Rutherford concluded that the centre part of any atom not empty?

Ans: When Rutherford experimented with alpha particles, then he realized that few particles bounced back directly. Rutherford's result lead him to believe that most of the foil was made of empty space, but had extremely small, dense lumps of matter inside, which is present only at the center because from center, few particles bounced back. All other particles deflected at different angles. So Rutherford concluded that the center part of any atom is nucleus not empty.

12. Q. Why an atom of an element is very stable even electrons are in continuous motion?

Ans: The electron could revolve around the nucleus in certain orbits called energy shells and each orbit have different radius. The electrons which are close to nucleus have low energy and the electrons which are farther from the nucleus have high energy .Due to this the electrons do not loose energy and remain stable.

13.Q. What was the limitation of J .J. Thomson's model of an atomic?

Ans: When an electron moves around a nucleus, it must continuously radiate out energy and hence, gradually move towards the nucleus in a spiral path, till it collides with the nucleus. Hence atoms are unstable.

14.Q. When a gold sheet is bombarded by a beam of Alpha particles, only a few of them get deflected whereas most go straight undeflected. Why?

Ans: This is because the nucleus has much smaller volume than that of an atom. The size of atom is 10^{-10} m and size of nucleus is 10^{-15} m.

15.Q. Why did Goldstein give the name canal rays to the rays that travel from anode to that cathode?

Ans: This is because these rays cross the canals of the cathode and reach the other side