

Class 9 CBSE Test paper Solved Chapter 3: Structure of atoms -2

Q.1) Write two characteristics of the canal rays.

Ans: a) Canal rays are positively charged.

(b) Canal rays have charge equal in magnitude but opposite in sign to that of electron.

(c) Canal rays have mass approximately 2000 times that of electrons.

Q.2) Write electronic distribution in an atom of potassium (atomic number = 19)

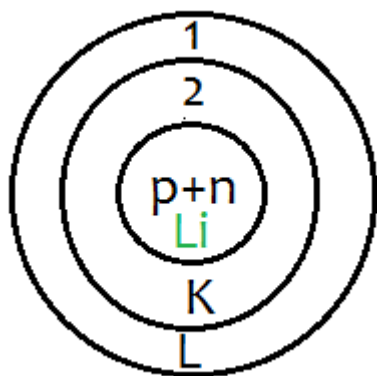
Ans: 2,8,8,1

Q.3) The atomic number of lithium is 3. Its mass number is 7.

a) How many protons and neutrons are present in a lithium atom?

b) Draw the diagram of a lithium atom.

Ans: Protons and neutrons are present in a lithium atom are 3 and 4



Q.4) Write the electronic configuration of a positively charged sodium ion (Na^+). Atomic number of sodium is 11.

Ans: 2,8

Q.5) The atomic number of Al and Cl are 13 and 17 respectively. What will be the number of electrons in Al^{3+} and Cl^- ?

Ans: the number of electrons in Al^{3+} and Cl^- are $(13-3) = 10$ and $(17+1) = 18$

Q.6) In the atom of an element 'Z', 5 electrons are present in the outermost shell. It requires noble gas configuration by accepting requisite number of electrons, then what would be the charge on the ion so formed? Write the formula of the compound which will be formed when 'Z' reacts with Na atom.

Ans: Z^{-3} Negative , $\text{Na}^+ \text{Z}^{-3} = \text{Na}_3\text{Z}$

Q.7) The electronic configuration of phosphorous atom is 2,8,5. Give the electronic configuration of P^{3-} ion.

Ans: 2,8,8

Q.8) ${}_{86}^{222}\text{Rn}$ is an isotope of noble gas, radon. How many protons, neutrons and electrons are there in one atom of this radon isotope?

Ans: protons = 86 neutrons = $222 - 86 = 136$ electrons = 86

Long Answer Questions

Q.9) Why do isotopes show similar chemical properties?

Ans: This is because isotopes have same no of electrons

Q.10) What is the gold foil experiment? Name the scientist who performed this experiment. Write the conclusions and shortcomings of Rutherford's model of atom.

Ans: Rutherford experiment in which fast moving alpha (α)-particles were made to fall on a thin gold foil to discover the nucleus of an atom is called gold foil experiment.

Rutherford concluded from the α -particle scattering experiment that-

(i) Most of the space inside the atom is empty because most of the α -particles passed through the gold foil without getting deflected.

(ii) Very few particles were deflected from their path, indicating that the positive charge of the atom occupies very little space.

(iii) A very small fraction of α -particles were deflected by 180°, indicating that all the positive charge and mass of the gold atom were concentrated in a very small volume within the atom.

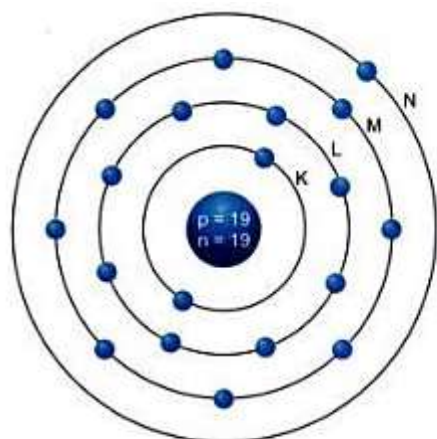
Shortcomings of Rutherford's model of atom : Instability of atom: According to Rutherford's model of atom the revolving electron would lose energy and finally fall into the nucleus.

Q.11) Show diagrammatically the electron distribution in a potassium atom and a potassium ion and also give their atomic number

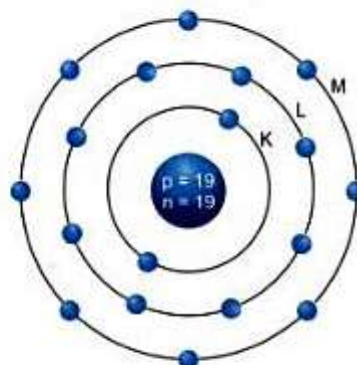
Ans:

An atom of potassium has 19 protons and electrons = 19. [2,8,8,1]

A potassium ion has 19 protons and electrons = 18 [2,8,8]



(K = 2, L = 8, M = 8, N = 1)
Structure of K atom



(K=2, L= 8, M= 8)
Structure of K⁺ ion

Q.12) Why do helium, neon and argon have zero valency?

Ans: Helium has 2 electrons in valance shell and both neon and argon have 8 electrons in valance shell. Therefore they do not have tendency to combine with other element .hence they have valancy zero.

Q.13) An element 'X' has mass number 4 and atomic number 2, write the valency of this element. Will it react with other atoms of different elements?

Ans: 'X' has mass number 4 and atomic number 2, So No of electron is $4 - 2 = 2$
Its valency = 0 as k shell is filled. Thus it will not react with other atoms of different elements of this element

Q.14) How do you know that nucleus is very small as compared to the size of atom?

Ans: Rutherford observed that when α - particles were bombarded on a very thin foil they bounce back . But the number of α - particle bouncing back got double when he double the thickness of gold foil. . Then he concluded that area of nucleus is very small as compared to the size of atom.

Q.15) some radioactive isotopes are playing increasingly important roles in medicines. Write down the name of one such isotope and briefly describe its use in medicine.

Ans: Cpbalt-60 gives off intense gamma radiation which can be used to destroy cancerous growths.