



## CHEMISTRY

### BOOKS - SWAN PUBLICATION

### STRUCTURE OF THE ATOM

#### Questions

1. What are canal rays?

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2. If an atom contains one electron and one proton, will it carry and charge or not?

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3. On the basis of Thomson's model of an atom explain how the atom is neutral as a whole.

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4. On the basis of Rutherford's model of an atom which sub-atomic particle is present in the molecule of an atom ?

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5. Draw a sketch of Bohr's model of an atom with three shells .

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6. What do you think what would be the observation if the  $\alpha$ -particle scattering experiment is carried out using a foil of metal other than gold ?

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7. Name the three sub-atomic particles of an atom,

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

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9. Write the distribution of electrons in carbon and sodium atoms.

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10. If K and L shell of an atom are full then what would be the total number of electrons in it ?

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

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12. If number of electrons in an atom are 8 and number of protons are also 8, then :What is the charge on the atom?

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13. find out the mass of oxygen and sulphur atom.

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14. For the symbol H,D and T tabulate three fundamental particles found in each of them.

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

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## Exercise

1. Compare the properties of electron, proton and neutron

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2. Is the size of the atom in Thomson's model is the same as the atomic size in Rutherford's model?

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

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4. Describe Bohr's model of atom.

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5. Compare all the proposed models of atom given in the chapter 3 of the text.

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6. Summarize the rules for writing of distribution of electrons in various shells for the first eighteen elements.

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7. Define valency by taking examples of silicon and oxygen.

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8. Define the terms nucleus, nucleons, atomic number, mass number, isotopes, isobars, isotones.

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9.  $Na^+$  has completely filled K and L shells. Explain.

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10. If bromine atom is in the form of say isotopes  ${}^{79}_{35}\text{Br}$  (49.7%) and  ${}^{81}_{35}\text{Br}$  (50.3%) then calculate the average mass of bromine atom.

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11. The average atomic mass of a sample of an element X is 16.2 u, what are the percentages of isotopes  ${}^{16}_8\text{X}$  and  ${}^{18}_8\text{X}$  in the sample?

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12. If  $Z = 3$ , what would be the valency of the element ? Also, name the element

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13. Composition of the nuclei of two atomic species X and Y are given as under

	=	X	Y
Proton	=	6	6
Neutrons	=	6	8

Give the mass numbers of X and Y. What is the relation between the two species ?

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14. (true/false) J.J. Thomson proposed that the nucleus of an atom contains only nucleons.

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15. (true/false) A neutron is formed by an electron and a proton combining together. Therefore, it is neutral

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16. (true/false) The mass of an electron is about  $1/2000$  times that of proton.

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17. (true/false) Isotope of iodine is used for making tincture iodine, which is used as a medicine

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18. Rutherford's alpha-particle scattering experiment was responsible for the discovery of

A. Atomic Nucleus

B. Electron

C. Proton

D. Neutron

**Answer: A**

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**19.** Isotopes of an element have

- A. the same physical properties
- B. different chemical properties
- C. different number of neutrons
- D. different atomic numbers.

**Answer: C**

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**20.** Number of valence electrons in Cl-ion are :

A. 16

B. 8

C. 17

D. 18

**Answer: B**



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**21.** Which one of the following is a correct electronic configuration of sodium ?

A. 2, 8

B. 8, 2, 1

C. 2, 1, 8

D. 2, 8, 1

Answer: D

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22. Complete the following table :

Atomic No.	Mass No.	Number of Neut.	Number of Prot.	Number of Elect.	Name of the Atomic Species
9	—	10	—	—	—
16	32	—	—	—	Sulphur
—	24	—	12	—	—
—	2	—	1	—	—
—	1	0	1	0	—

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### Important Q A

1. What is Rutherford's  $\alpha$ -ray scattering experiment ? Give its observations. How does Rutherford explain these observations ?

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2. Describe the essential properties of the atom nucleus. Compare these with the properties of the electron.

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3. A student weighs 30 kg. Suppose his entire body is made up of electrons. How many electrons are there in his body ? Compare the total number of electrons in his body with the population of india.

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4. What problem of atomic structure was solved by the discovery of neutron ?

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5. Describe the distribution of electrons in different shells of the following atoms : Lithium, nitrogen, neon, magnesium and silicon.

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6. If an element M has mass number 24 and atomic number 12, how many neutrons does its atom contain ?

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7. The mass number of an element is 18. It contains 7 electrons. What is the number of protons and neutrons in it ? What is the atomic number of the element ?

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8. Give the nuclear composition and electronic configuration of first 20 elements (with atomic number 1-20).



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