

## STRUCTURE OF ATOM DPP 1

### A. Long Answer Type Questions

(More than 60–70 words)

- Q.1** What is Thomson's model of atom ? Why was it rejected ?
- Q.2** Why is the atom neutral whereas it contains charged particles ?
- Q.3** Explain why atomic masses of most of the elements are fractional
- Q.4** Elemental boron is 20.0% B-10 and 80% B-11. Calculate the atomic mass of boron.
- Q.5** Hydrogen has three isotopes written as  ${}^1_1\text{H}$ ,  ${}^2_1\text{H}$  and  ${}^3_1\text{H}$ . Explain why :
- (i) These isotopes have almost identical chemical properties
- (ii) They are electrically neutral.
- Q.6** Who discovered the presence of electrons in an atom ? Discuss detailed experiment connected with it, How is its mass and charge determined ?
- Q.7** What observations in scattering experiment led Rutherford to make the following conclusions :
- (i) The most of the space in an atom is empty
- (ii) The whole mass of an atom is present in the centre of atom.
- (iii) Nucleus has positive charge.
- Q.8** Give important differences between :
- (i) Canal rays and cathode rays
- (ii) Atomic number and mass number
- (iii) Isotopes and isobars.
- Q.9** The following table lists mass number and atomic number of five elements A, B, C, D and E.

| Element | Mass number | Atomic number |
|---------|-------------|---------------|
| A       | 3           | 1             |
| B       | 7           | 3             |
| C       | 35          | 17            |
| D       | 40          | 18            |
| E       | 37          | 17            |

- (i) How many protons are there in an atom of B ?

- (ii) How many neutrons are there in an atom of A ?
- (iii) How many electrons are there in an atom of E ?
- (iv) How many nucleons are there in an atom of D ?
- (v) Which atoms are isotopes of the same element ?

- Q.10** Compare an electron and a proton in respect of mass and charge.

### B. Fill in the Blanks

- Q.11** The subatomic particle not present in a hydrogen atom is .....
- Q.12** The number of protons in the nucleus of an atom is called its .....
- Q.13** The total number of protons and neutrons in the nucleus of an atom is called its .....
- Q.14** An atom has atomic mass number 23 and atomic number 11. The atom has ..... electrons.
- Q.15** An atom of an element has 11 protons, 11 electrons and 12 neutrons. The atomic mass of the atom is .....

### C. True /False Type Questions

- Q.16** Electrons are present in all matter and carry negative charge.
- Q.17** In  $\text{Na}^+$  number of electrons are more than the number of protons.
- Q.18** The number of neutrons in the atoms of an element is equal to its atomic number.
- Q.19** Isotopes of an element differ in the number of neutrons.
- Q.20** Element having electronic arrangement 2, 7 is fluorine.
- Q.21** Matter is electrical and negative in nature.
- Q.22** Mass of electron is about 1840 times that of proton.
- Q.23** Neutrons were discovered by Henry Becquerel.

## STRUCTURE OF ATOM DPP 2

### A. Very Short Answer Type Questions

- Q.1 How many times a proton is heavier than an electron ?
- Q.2 Who was the first to discover neutrons ?
- Q.3 The atomic number of oxygen and sulphur are 8 and 16 respectively. What will be the number of electrons in these ?
- Q.4 An element may be represented as  ${}^{40}_{18}X$ . Find the number of electrons, protons and neutrons in this atom. Give its electronic configuration.
- Q.5 Out of O-16 and O-18 isotopes, which has more number of neutrons ?
- Q.6 The mass number and atomic number of an element is 23 and 11 respectively. What is the number of nucleons present in it ?
- Q.7 An element has atomic number 19 and mass number 39. How many electrons and protons are present in its unipositive ion ?
- Q.8 Give the nuclear composition of  ${}^{18}_8O$ .
- Q.9 Who determined the charge of the electron for the first time ?
- Q.10 What is the nature of charge on cathode rays ?
- Q.11 Which of the two has larger mass : electron or proton ?
- Q.12 What is the approximate ratio of mass of proton and electron ?
- Q.13 Give one property in which cathode rays and anode rays differ.
- Q.14 Are electrons present in all matter ?
- Q.15 The nucleus of an element contains 17 protons and 18 neutrons. What is its mass number and atomic number ?

### B. Short Answer Type Questions

(About 16–25 words)

- Q.16 What are the characteristic features of Thomson's model of atom ?

- Q.17 Give four properties of cathode rays.
- Q.18 Write the Bohr-Bury scheme to fill the electrons in various energy levels of an atom. Using these rules, write the electronic arrangement of the elements having atomic numbers 6, 11, 15 and 18.
- Q.19 What are the main postulates of Bohr's atomic theory ?
- Q.20 What are the maximum number of electrons that can be present in the K, L and M shells ?
- Q.21 What do you understand by atomic number and mass number ?
- Q.22 Write electronic configuration for the following elements:  
 ${}^{16}_8O, {}^{28}_{14}Si, {}^{35}_{17}Cl, {}^{40}_{18}Ar$
- Q.23 What are isotopes ? Write three isotopes of hydrogen.
- Q.24 Isotopes have the same chemical properties but different physical properties. Explain.
- Q.25 Name the elements which have the following electronic configuration :  
(i) 2, 6    (ii) 2, 7    (iii) 2, 8, 1  
(iv) 2, 8, 7    (v) 2, 8  
Which of these is chemically inert ?

## Structure of atom DPP 3

1. Canal rays were named positive rays by -

- (A) Dalton (C) Thomson  
(B) Goldstein (D) Chadwick

2. Dalton's atomic theory is based on -

- (A) Law of conservation of mass (C) Both (A) and (B)  
(B) Law of definite proportion (D) None of these

3. The name atom belongs to which language ?

- (A) Latin (C) French  
(B) English (D) Greek

4. What happens when an electron jumps from a higher orbit to a lower orbit ?

- (A) Energy is released (C) A & B both  
(B) Energy is absorbed (D) None of these

5. Cathode rays are deflected towards

- (A) positive electrode (C) both electrodes  
(B) negative electrode (D) none of the electrodes

6. The nucleus of the atom consists of -

- (A) Proton and neutron (C) Neutron and electron  
(B) Proton and electron (D) Proton, neutron and electron

7. An electron is -

- (A) alpha-ray particle (C) Hydrogen ion  
(B) beta-rays particle (D) Positron

8. Who discovered neutron ?

- (A) James Chadwick (C) J.J. Thomson  
(B) William Crooks (D) Rutherford

9. Complete the following statements: (i) The sum of number of protons and neutrons in the nucleus of an atom is known as ----- of the atom.

(ii) Isotopes have same .....number but different ..... number.

(iii) Isobars have same ..... number but different ..... number.

(iv) ..... contain same number of neutrons in their atoms.

(v) An atom of an element having 11 protons, 11 electrons and 12 neutrons, the atomic mass of the atom would be .....

10. The ratio of  $e/m$  for a cathode ray – (A) varies with the gas in a discharge tube (B) is fixed (C) varies with different electrodes (D) is maximum if hydrogen is taken

11. Write the isotopic symbols of the following nuclei

- (i) Helium with one neutron.
- (ii) Nitrogen with same number of protons and neutrons.
- (iii) Argon with two more neutrons than protons.
- (iv) An atom having 9 protons, 9 electrons and 10 neutrons.

12. Match the following

Column I    Column-II

- (i) Cathode rays    (a) Helium nuclei
- (ii) Dumb-bell    (b) Uncertainty principle    (iii) Alpha particles    (c) Electromagnetic radiation
- (iv) Moseley    (d) p-orbital
- (v) Heisenberg    (e) Atomic number
- (vi) X-rays    (f) Electrons

13. What are isotopes? Give one example.

14. Four elements A, B, C and D are given A shows the presence of 20 neutrons, 17 protons and 17 electrons. B shows the presence of 18 neutrons, 17 protons and 17 electrons. C shows the presence of 10 neutrons, 9 protons and 10 electrons. D shows the presence of 4 neutrons, 3 protons and 2 electrons. State which of the above is (a) an anion (b) a cation (c) a pair of isotopes Also write the formula of the compound formed between D and C.

15. Explain the reason for chemical reactivity of an atom with reference to its electronic configuration.