4. Structure of the Atom

Q 1 Write the electronic configuration of chlorine.

Mark (1)

Q 2 What determines the chemical nature of an element?

Mark (1)

Q 3 What do you mean by atomic number of an element?

Mark (1)

Q 4 Define cathode rays.

Mark (1)

Q 5 Which elements have tendency to gain electrons?

Mark (1)

Q 6 What is the relation between mass number and atomic number?

Mark (1)

Q 7 Name the radioisotopes used to –
(a) determine the activity of thyroid gland.

(b) detect blood cells.

Mark (1)

Q 8 What do you understand by isobars?

Mark (1)

Q 9 What is the general name of the elements having 2 or 8 electrons in the valence shell of their atoms?

Mark (1)

Q 10 Explain the two types of valency.

Mark (1)

Q 11 Name three subatomic particles present in an atom.

Mark (1)

Q 12 Who discovered neutron?

Mark (1)

Q 13 Name the scientist who proposed that the atoms are indivisible?

Mark (1)

Q 14 Name the scientist who presented the model of the structure of an atom for the first time.

Mark (1)

Q 15 How can you consider an atom to be electrically neutral when it has both negatively charged electron and positively charged proton?

Mark (1)

Q 16 Name the subatomic particle/s present in the nucleus of an atom.

Mark (1)

Q 17 Write the electronic configuration of chlorine.

Mark (1)

Q 18 Helium atom has a mass number of 4 and 2 protons in its nucleus. How many neutrons does it have?

Marks (2)

Q 19 What are isotopes? Give examples.

Marks (2)

Q 20 How the mass number of an element is defined?

Marks (2)

Q 21 What is the mass and charge of an electron ?

Marks (2)

Q 22 Calculate the maximum number of electrons which can be present in M shell of an atom.

Marks (2)

Q 23 Name the particles which are present in the nucleus. What type of charge is carried by each of them?

Marks (2)

Q 24 Name the scientists who discovered
(a) nucleus
(b) proton

Marks (2)

Q 25 How many neutrons are present in $^{24}_{12}Mg$?

Marks (2)

Q 26 Write the isotopes of carbon and oxygen.

Marks (2)

Q 27 Why are the atomic masses of some elements are in fractions and not in whole numbers?

Marks (2)

Q 28 List two observations, which show that an atom is not indivisible.

Marks (2)

Q 29 What are isotopes? Explain with an example.

Marks (2)

Q 30 Calculate the number of electrons and neutrons present in $_{13}Al^{27}$.

Marks (2)

Q 31 (i) An atom of an element has two electrons in the M-shell. Calculate the atomic number of this element.
(ii) What will be the valency of an element having atomic number 16?

Marks (2)

Q 32 Draw a sketch of Bohr's model of an atom with four shells ?

Marks (3)

Q 33 What weight in grams is represented by
(a) 2 moles of CO_2
(b) 5 moles of NH_3.

Marks (3)

Q 34 The composition of two atomic particles is given below:

	A	B
Protons	6	6
Electrons	6	6
Neutrons	6	8

(a) What is the mass number of A and B?
(b) Which element/elements do they represent?
(c) What is the relation between A and B?

Marks (3)

Q 35 What information about the nucleus was provided by the alpha particle scattering experiment of Rutherford?

Marks (3)

Q 36 What observations were noticed by Rutherford during alpha particle scattering experiment?

Marks (3)

Q 37 An element X has 11 protons. What is the valency of the element? What will be the name of element?

Marks (3)

Q 38 How did Neils Bohr explain the stability of atom?

Marks (3)

Q 39 How did Bohr explain the stability of atom when Rutherford's model was rejected.

Marks (3)

Q 40 How are cathode rays formed from the gas taken in the discharge tube? Explain.

Marks (3)

Q 41 A sample of an element Z contains two isotopes Z-35 and Z-37. If the average atomic mass of this sample is 35.5u, calculate the percentage of the two isotopes in this sample.

Marks (3)

Q 42 Atomic mass of element (A) is 24 and its atomic number is 12.
(i) Calculate the number of neutrons present in an atom of element (A).
(ii)How many electrons will be present in K, L and M energy shell of an atom of element (A)?

Marks (3)

Q 43 Composition of nuclei of two atomic species X and Y are as follows:

X	Y
Protons = 6	Protons = 6
Neutrons = 8	Neutrons = 6

(i) Calculate the mass numbers of X and Y.
(ii) How are (X) and (Y) related to each other?

Marks (3)

Q 44 Elements X, Y, A, D and E have electrons, neutrons and protons as follows:

Element	Electrons	Neutrons	Protons
X	4	4	3
Y	8	9	9
A	18	22	18
D	17	20	17
E	17	18	17

From this data, name

(i) a cation.

(ii) a pair of isotopes.

(iii) an atom of noble gas.

Marks (3)

Q 45 (i) Nucleus of an atom has 6 protons and 6 neutrons. What would be the atomic number, mass number, number of electrons and the number of valency electrons per atom of this element?
(ii) What will be the valency of an element having atomic number 15?

Marks (3)

Q 46 (i) An element has atomic number 14. How many electrons will be present in K, L and M energy shells of its atom?
(ii) If an element N has mass number 24 and atomic number 12, how many neutrons does its atom contain?

Marks (3)

Q 47 Give a brief account of the observations made by Rutherford in his alpha particle scattering experiment.

Marks (5)

Q 48 Describe how electrons in an atom are arranged in different shells.

Marks (5)

Q 49 An atom of phosphorous can be representes as $^{31}_{15}P$,

(i) What does the figure 31 indicates?

(ii) What does the figure 15 indicates?

(iii) What is the number of protons in an atom of phosphorous?

(iv) What is the number of electrons in an atom of phosphorous?

(v) What is the number of neutrons in an atom of phosphorous?

Marks (5)

Q 50 Describe the structure of atom as suggested by Bohr.

Marks (5)

Q 51 State five applications of radioactive isotopes.

Marks (5)

Q 52 Write electronic configuration of the elements whose atomic numbers are 6, 8, 15, 18 and 20 respectively. Also give the name of elements.

Marks (5)

Q 53 Explain the structures of the following atoms giving diagram also.

$^{24}_{12}Mg$, $^{32}_{16}S$, $^{39}_{19}K$, $^{40}_{20}Ca$, $^{35}_{17}Cl$

Marks (5)

Q 54 (a) Atomic masses of two isotopes of chlorine are 35u and 37u. They occur in the ratio of 3:1 in nature. Calculate the average atomic mass of chlorine atom on the basis of this data.
(b)Write three uses of isotopes.

Marks (5)

Q 55 (a)Write the electronic configuration of the following elements:

(i) $^{40}_{20}Ca$

(ii) $^{32}_{16}S$

(iii) $^{12}_{6}C$

(b) Atom is electrically neutral. Why?
(c) Identify a pair of isotopes and isobars from the following:

$^{40}_{20}A$ $^{36}_{16}B$ $^{40}_{18}C$ $^{37}_{16}D$

Marks (5)

Q 56 The numbers of the subatomic particles for some elements are given below. Write their atomic numbers and the symbols of the elements they are representing.
(a) $8P^+$, 8n, $8e^-$
(b) $17P^+$, 20n, $17e^-$
(c) $13P^+$, 14n, $13e^-$
(d) $12p^+$, 12n, $12e^-$
(e) $7p^+$, 7n, $7e^-$

Marks (5)

Most Important Questions

Q 1 What are canal rays?

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

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

Q 4 What do you think would be the observation if the alpha-particle scattering experiment is carried out using a foil of a metal other than gold?

Q 5 Helium atom has an atomic mass of 4 unit and 2 protons in its nucleus. How many neutronsare present in its nucleus?

Q 6 Find the valency of chlorine, magnesium, and sulphur.

Q 7 What is the mass and charge of an electron ?

Q 8 Describe the structure of atom as explained by J.J Thomson.

Q 9 Define the term atomic number.

Q 10 Define the mass number of an element.

Q 11
Name the scientists who discovered

(a) Nucleus of atom

(b) Proton

Q 12 Name the particles which are present in the nucleus and what type of charge is there on them?

Q 13 Define cathode rays.

Q 14 Write the relation between mass number and atomic number.

Q 15 Name the radio – isotopes used to –

(a) Determine the activity of thyroid gland

(b) Detect blood cells

Q 16 What were the limitations of J.J. Thomson's model of the atom?

Q 17 What are the limitations of Rutherford's model of the atom?

Q 18 If Z = 3, what would be the valency of the element? Also name the element.

Q 19 Na^+ has completely filled K shell and L shells. Explain.

Q 20 What are isotopes? Give example?

Q 21 What weight in grams is represented by (a) 2 mole of CO_2 (b) 5 mole of NH_3.

Q 22 Draw a sketch of Bohr's model of an atom with four shells?

Q 23 Helium atom has an atomic mass of 4u and two protons in its nucleus. How many neutrons does it have?

Q 24 Describe how electrons in an atom are arranged in different shells.

Q 25 Describe Rutherford's model of atom.

Q 26 Write the observations in Rutherford's gold foil experiment.

Q 27 Write the electronic configuration of chlorine.

Q 28 What is the general name given to the elements having 2 or 8 electrons in the valence shell of their atoms?

Q 29 What type of elements have tendency to gain electrons?