IN-TEXT QUESTIONS SOLVED

Ncert Textbook Page 47
Question 1. What are canal rays?
Answer: Canal rays are positively charged radiations which led to the discovery of positively charged sub-atomic particle called proton.

Question 2. If an atom contains one electron and one proton, will it carry any charge or not?
Answer: The atom will be electrically neutral as one - ve charge balances one + ve charge.

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Question 1. On the basis of Thomson's model of an atom, explain how the atom is neutral as a whole.
Answer: According to Thomson's model of an atom
(i) An atom consists of a positively charged sphere and the electrons are embedded in it,
(ii) The negative and positive charges are equal in magnitude. So the atom is electrically neutral.

Question 2. On the basis of Rutherford's model of an atom, which sub-atomic particle is present in the nucleus of an atom?
Answer: As per Rutherford's model of an atom, the protons which are positively charged are present in the nucleus of an atom.

Question 3. Draw a sketch of Bohr's model of an atom with three shells.
Answer:
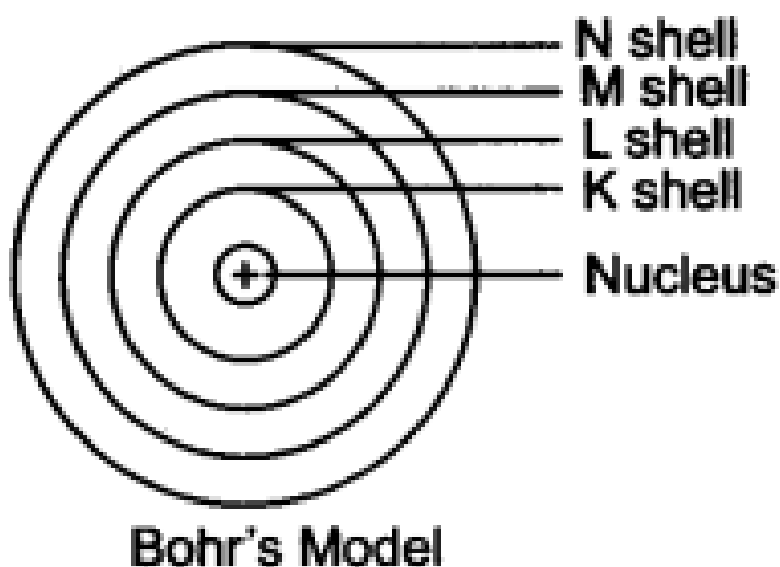
Question 4. What do you think would be the observation if the a-particle scattering experiment is carried out using a foil of a metal other than gold?

Answer: On using any metal foil, the observations of the a-particle scattering experiment would remain the same as all atoms would have same structure.

Ncert Textbook Page 49
Question 1. Name the three sub-atomic particles of an atom.
Answer: The sub-atomic particles of an atom are

Protons → Positively charged

Electrons → Negatively charged

Neutrons → No charge

Question 2. Helium atom has an atomic mass of 4 u and two protons in its nucleus. How many neutrons does it have?
Answer:

Atomic mass of He = 4u.

Atomic mass = No. of protons + No. of neutrons

$\therefore$ 4 = 2 + no. of neutrons.

$\therefore$ No. of neutrons = 4 – 2 = 2

Helium atom has 2 neutrons.

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Question 1. Write the distribution of electrons in carbon and sodium atoms.
Answer:

Write the distribution of electrons in carbon and sodium atoms.

Carbon   Atomic number = 6

$\therefore$ No. of protons = 6

and Number of protons = Number of electrons

$\therefore$ Distribution of electrons = KL

2 4

Sodium   Atomic number = 11

$\therefore$ No. of protons = 11 = No. of electrons

$\therefore$ Distribution of electrons = K L M

2 8 1

Question 2. If K and L shells of an atom are full, then what would be the total number of electrons in the atom?
Answer: K shell can hold 2 electrons and L shell can hold 8 electrons.When both the shells are full, there will be (8 + 2) 10 electrons in the atom.

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Question 1. How will you find the valency of chlorine, sulphur and magnesium?
Answer:

Valency is the combining capacity of an atom of an element.

Chlorine,   Atomic Number = 17

$\therefore$ Protons = 17, Electrons = 17

$\therefore$ Distribution of electrons = K L M

2 8 7

Chlorine needs 1 electron to complete its outermost orbit/shell.

$\therefore$ Its valency is – 1 (gains 1 electron).

Sulphur,   Atomic number = 16

$\therefore$ Protons = 16, Electrons = 16

$$\therefore \quad \text{Distribution of electrons} = \begin{array}{ccc} K & L & M \\ 2 & 8 & 6 \end{array}$$

Sulphur needs 2 electrons to complete its outermost shell.

$\therefore$ Its valency is -2 (gains 2 electrons)

Magnesium, Atomic number $= 12$

$\therefore$ Protons $= 12$, electrons $= 12$

$\therefore$ Distribution of electrons $= \begin{array}{ccc} K & L & M \\ 2 & 8 & 2 \end{array}$

Magnesium needs to donate 2 electrons from its outermost shell to become stable.

$\therefore$ Its valency is $+2$ (donates 2 electrons).

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Question 1. If number of electrons in an atom is 8 and number of protons is also 8, then

(i) What is the atomic number of the atom? and

(ii) What is the charge on the atom?

Answer:

$$\text{No. of electrons} = 8$$
$$\text{No. of protons} = 8$$

(i) $\quad$ Atomic number $=$ no. of protons $= 8$

(ii) As $\quad$ Electrons $=$ Protons

$$\oplus = \ominus$$

$\therefore$ Atom is electrically neutral (No charge)

Question 2. With the help of given Table 4.1, find out the mass number of oxygen and sulphur atom.

Table: Composition of Atoms of the First Eighteen Elements with Electron Distribution in Various Shells

Name of Element	Symbol	Atomic Number	Number of Protons	Number of Neutrons	Number of Electrons	Distribution of Electrons K	L	M	N	Valency
Hydrogen	H	1	1	-	1	1	-	-	-	1
Helium	He	2	2	2	2	2	-	-	-	0
Lithium	Li	3	3	4	3	2	1	-	-	1
Beryllium	Be	4	4	5	4	2	2	-	-	2
Boron	B	5	5	6	5	2	3	-	-	3
Carbon	C	6	6	6	6	2	4	-	-	4
Nitrogen	N	7	7	7	7	2	5	-	-	3
Oxygen	O	8	8	8	8	2	6	-	-	2
Fluorine	F	9	9	10	9	2	7	-	-	1
Neon	Ne	10	10	10	10	2	8	-	-	0
Sodium	Na	11	11	12	11	2	8	1	-	1
Magnesium	Mg	12	12	12	12	2	8	2	-	2
Aluminium	Al	13	13	14	13	2	8	3	-	3
Silicon	Si	14	14	14	14	2	8	4	-	4
Phosphorus	P	15	15	16	15	2	8	5	-	3, 5
Sulphur	S	16	16	16	16	2	8	6	-	2
Chlorine	Cl	17	17	18	17	2	8	7	-	1
Argon	Ar	18	18	22	18	2	8	8		0

Answer:

Oxygen,   No. of protons = 8

∴   No. of neutrons = 8

∴   Atomic number = 8

∴   Atomic mass number = P + N

                = 8 + 8

                = 16

Sulphur,   No. of protons = 16

∴   Atomic number = 16

       No. of neutrons = 16

∴   Atomic mass number = P + N

                = 16 + 16

                = 32

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Question 1. For the symbol H, D and T tabulate three sub-atomic particles found in each of them

Answer:

(Protium) H → (^1_1H) Atomic number = 1, Mass number = 1

∴   No. of protons = 1

       No. of electrons = 1

       No. of neutrons = Nil

D → (^2_1H) Atomic number = 1, Mass number = 2

(Deuterium) ∴   No. of protons = 1

       No. of electrons = 1

       No. of neutrons = 1

T → (^2_1H) Atomic number = 1, Mass number = 3

(Tritium) ∴   No. of protons = 1

       No. of electrons = 1

       No. of neutrons = 2

Question 2. Write the electronic configuration of any one pair of isotopes and isobar.

Answer. Isotopes: Atoms of same element having same atomic number but different mass number.

∴ Electronic configuration of isotopes remain the same.

E.g., $^{12}_6C$ $^{14}_6C$

Electronic configuration	K	L
	2	4

Electronic configuration	K	L
	2	4

Isobars: Atoms of different elements with different atomic number but same mass number.

E.g., $^{40}_{20}Ca$ $^{40}_{18}Ar$

Electronic configuration	K	L	M	N
	2	8	8	2

Electronic configuration	K	L	M
	2	8	8

********** END *********