CLASS IX – SCIENCE PRACTICE PAPER (2026-27)

Chapter 8: Journey Inside the Atom

Max. Marks: 40 **Time Allowed: 1 hour 30 minutes**

General Instructions:

(i) This question paper consists of **20 questions** in **5 sections (A to E)**. All questions are compulsory. Internal choice is given in some questions.

(ii) **Section A** has 10 questions of 1 mark each: Q1–8 are Multiple Choice Questions and Q9–10 are Assertion–Reason questions.

(iii) **Section B** has 4 Very Short Answer questions of 2 marks each (about 30–40 words).

(iv) **Section C** has 3 Short Answer questions of 3 marks each (about 50–60 words).

(v) **Section D** has 2 Case-Based questions of 4 marks each.

(vi) **Section E** has 1 Long Answer question of 5 marks with an internal choice.

(vii) Questions are competency-based and application-oriented. Show all steps in numerical questions. Electrons in diagrams are shown as small dots on the shells.

(viii) **Questions 2, 6, 12, 16, 19 and 20 are figure-based** and refer to Fig. 1 to Fig. 6.

SECTION A – Objective Questions (10 × 1 = 10 marks)

1 According to Thomson's model of the atom, the positive charge is: **1**

(A) concentrated at the centre in a tiny nucleus

(B) present only on the surface of the atom

(C) spread uniformly through a sphere with electrons embedded in it

(D) carried by the electrons that orbit the centre

2 **[Figure-based]** Fig. 1 shows the paths of three α-particles P, Q and R fired at a thin gold foil. A very small number of α-particles, like R, bounced straight back. This observation shows that: **1**

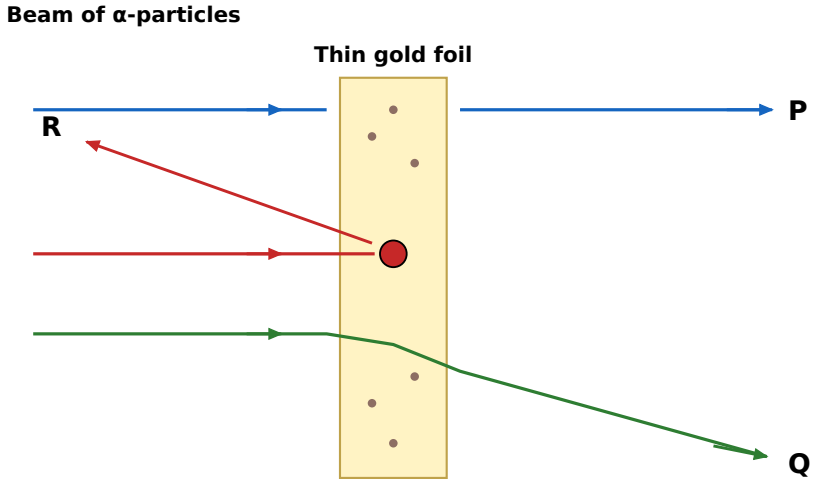


Fig. 1: Paths of alpha-particles near a gold nucleus

(A) the atom is mostly empty space

(B) the positive charge and most of the mass are packed in a tiny, dense nucleus

(C) electrons are spread evenly through the atom

(D) α-particles carry no charge

3 The maximum number of electrons that the M-shell (n = 3) of an atom can hold is: **1**

(A) 8

(B) 2

(C) 32

(D) 18

4 Calcium (atomic number 20, mass number 40) and argon (atomic number 18, mass number 40) are examples of: **1**

(A) isobars
(B) isotopes
(C) isotones
(D) allotropes

5 An atom has atomic number 17 and mass number 35. The number of neutrons in its nucleus is: **1**

(A) 17
(B) 35
(C) 18
(D) 52

6 **[Figure-based]** Fig. 2 shows the arrangement of electrons in a neutral atom. The atomic number of this atom and its valency are respectively: **1**

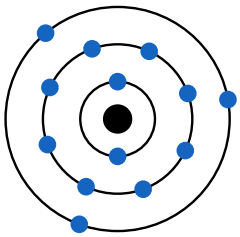


Fig. 2: Electron arrangement in a neutral atom

(A) 3 and 3
(B) 13 and 5
(C) 10 and 3
(D) 13 and 3

7 Which of the following pairs of an element and its symbol is correct? **1**

(A) Potassium – P
(B) Iron – Fe
(C) Sodium – S
(D) Gold – Go

8 Which of the following could Rutherford's nuclear model **not** explain? **1**

(A) Most α-particles pass through gold foil undeflected
(B) The existence of a positively charged centre
(C) Why electrons do not spiral into the nucleus
(D) The large-angle deflection of a few α-particles

Questions 9 and 10 consist of two statements: Assertion (A) and Reason (R). Choose the correct option:
(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, and R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

9 **Assertion (A):** Isotopes of an element show similar chemical properties. **1**

Reason (R): Isotopes have the same number of electrons and the same electronic configuration.

10 **Assertion (A):** Atoms of different elements can have the same mass number. **1**

Reason (R): The mass number of an atom depends on the number of electrons in it.

SECTION B – Very Short Answer Questions (4 × 2 = 8 marks)

11 (a) Name the particle discovered by James Chadwick in 1932. State its charge and where it is found in the atom. (1) **2**

(b) Why was this particle needed to explain the mass of a helium atom? (1)

12 **[Figure-based]** Fig. 3 shows cathode rays travelling from electrode P to electrode Q inside a discharge tube at very low pressure. The rays bend towards the positively charged plate X. **2**

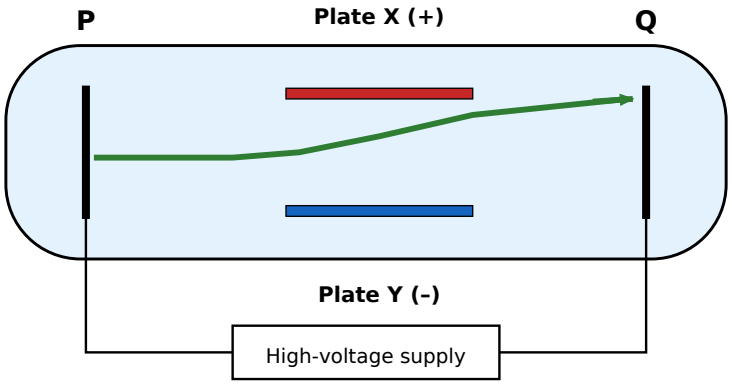


Fig. 3: A cathode ray tube

(a) Is electrode P the cathode or the anode? Give a reason. (1)

(b) What does the bending towards plate X tell you about the charge on the particles? Name these particles. (1)

13 Write the electronic configuration and the valency of (i) magnesium (atomic number 12) and (ii) sulfur (atomic number 16). (1 + 1) **2**

14 *Attempt either option A or B.* **2**

A. Why could Rutherford's model of the atom not explain the stability of the atom? (2)

OR

B. Name any **two** isotopes and state one use of each. (1 + 1)

SECTION C – Short Answer Questions (3 × 3 = 9 marks)

15 An atom X has mass number 27 and its nucleus contains 14 neutrons. Find (i) its atomic number and the number of electrons in the neutral atom, (ii) its electronic configuration, and (iii) its valency, stating whether it loses or gains electrons. (1 + 1 + 1) **3**

16 **[Figure-based]** Fig. 4 shows the nuclei of two atoms P and Q. Both atoms have the same atomic number and are neutral. **3**

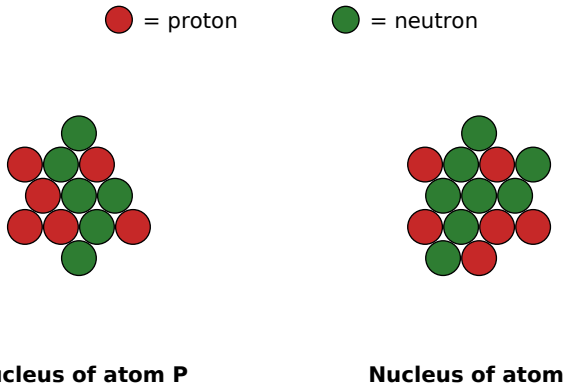


Fig. 4: Nuclei of atoms P and Q

(i) Count the particles and find the atomic number and mass number of P and of Q. (1)

(ii) What are atoms P and Q called? Why do they have the same chemical properties? (1)

(iii) Identify the element (atomic number 6 is carbon) and write the notation of Q in the form $^{A}_{Z}X$. (1)

17 *Attempt either option A or B.* **3**

A. Copper occurs naturally as two isotopes: ^{63}Cu (70%) and ^{65}Cu (30%). Calculate the average atomic mass of copper. (3)

OR

B. Give any three differences between Thomson's model and Rutherford's model of the atom. (3)

SECTION D – Case-Based Questions (2 × 4 = 8 marks)

18 **Case Study: The Atomic Prediction Board** **4**

In a school science club, students play a game called the Atomic Prediction Board. Each clue card gives only the atomic number (Z) and mass number (A) of a mystery atom. Card 1: Z = 17, A = 35. Card 2: Z = 18, A = 40. Card 3: Z = 17, A = 37.

(i) Find the number of neutrons in the atoms on cards 1, 2 and 3. (1)

(ii) Write the electronic configuration of the atom on card 1 and state its valency. (1)

(iii) Which card shows an atom that is chemically unreactive? Give a reason. (1)

(iv) How are the atoms on cards 1 and 3 related? Give a reason. (1)

19 Case Study: Isotopes of Boron **4**

[Figure-based] Boron (atomic number 5) occurs in nature as two isotopes. The bar chart in Fig. 5 shows how common each isotope is in a natural sample of boron.

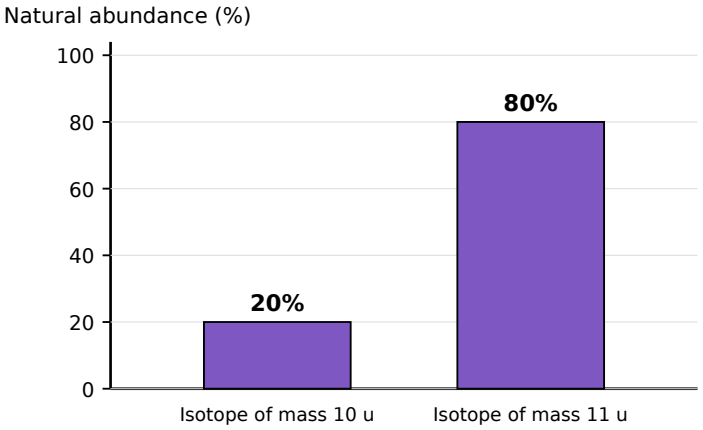


Fig. 5: Natural abundance of the isotopes of boron

(i) Find the number of neutrons in the isotope of mass 10 u and in the isotope of mass 11 u. (1)

(ii) Calculate the weighted average atomic mass of boron using Fig. 5. (1)

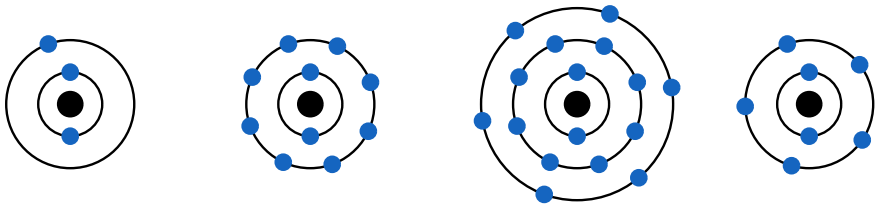
(iii) A student says the average atomic mass is (10 + 11) ÷ 2 = 10.5 u. Why is this value not accurate? (1)

(iv) Do the two isotopes have the same number of valence electrons? Explain. (1)

SECTION E – Long Answer Question (1 × 5 = 5 marks)

20 **[Figure-based]** Fig. 6 shows the electron arrangement of four neutral atoms (a), (b), (c) and (d). **5**

Attempt either option A or B.



(a) **(b)** **(c)** **(d)**

Fig. 6: Electron arrangement in four atoms

A.

(i) Find the atomic number and name of each atom (a) to (d). (1)

(ii) Which atom is chemically inert? Give a reason. (1)

(iii) Give the valency of atoms (a) and (c), stating whether each loses or gains electrons. (1)

(iv) Atom (d) has 7 neutrons. Find its mass number and write its notation $^{A}_{Z}X$. (1)

(v) Name the outermost shell of atom (c) and state how many more electrons it needs to complete its octet. (1)

OR

B. In Rutherford's α-ray scattering experiment, a narrow beam of α-particles was aimed at a very thin gold foil.

(i) What are α-particles? State their charge. (1)

(ii) State the three main observations of the experiment. (1)

(iii) What did the fact that most particles passed straight through show about the atom? (1)

(iv) What did the rebounding of a few particles show about the positive charge? (1)

(v) State one limitation of Rutherford's model that Bohr's model removed. (1)

***** END OF QUESTION PAPER *****