CLASS IX – SCIENCE PRACTICE PAPER (2026-27)

Chapter 9: Atomic Foundations of Matter

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. Use these atomic masses where needed: H = 1 u, C = 12 u, N = 14 u, O = 16 u, F = 19 u, Mg = 24 u, S = 32 u, Cl = 35.5 u, Ca = 40 u.

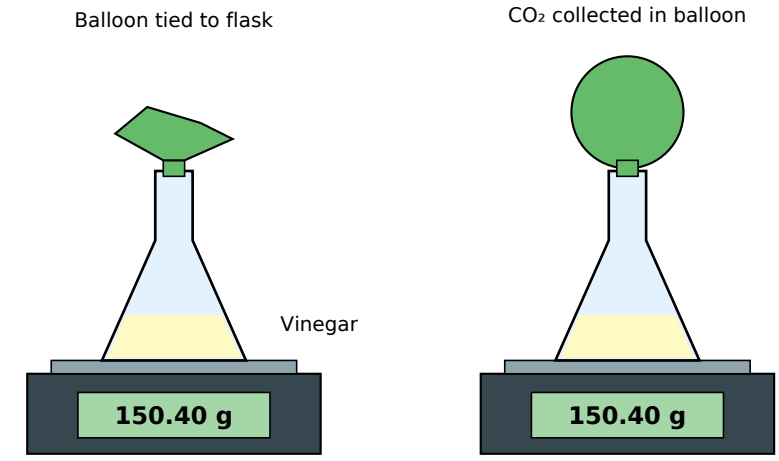
(viii) **Questions 2, 6, 12, 16, 19 and 20 are figure-based** and refer to Fig. 1 to Fig. 6.

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

1 The Law of Conservation of Mass was proposed by: **1**

(A) John Dalton
(B) Joseph Proust
(C) Antoine Lavoisier
(D) James Chadwick

2 **[Figure-based]** A flask containing vinegar, with a balloon of baking soda tied to its mouth, is weighed before and after the baking soda is tipped in (Fig. 1). The reading is the same, even though the balloon inflates. This is because: **1**



(a) Before: baking soda in balloon (b) After: balloon inflated

Fig. 1: Mass before and after a reaction in a closed flask

(A) carbon dioxide has no mass
(B) the gas formed stays inside the closed system, so total mass is conserved
(C) no chemical reaction takes place in the flask
(D) mass of the baking soda is destroyed

3 In pure water, the ratio of the mass of hydrogen to the mass of oxygen is always: **1**

(A) 1 : 8
(B) 8 : 1
(C) 1 : 16
(D) 2 : 1

4 Which of the following is a covalent compound? **1**

(A) NaCl
(B) MgO
(C) $CaCl_2$
(D) CCl_4

5 The correct chemical formula of aluminium sulfate is: **1**

(A) $Al_3(SO_4)_2$
(B) $AlSO_4$
(C) $Al_2(SO_4)_3$
(D) Al_2SO_4

6 **[Figure-based]** Fig. 2 shows the electron arrangement of a species whose nucleus has a charge of 17+. The species is: **1**

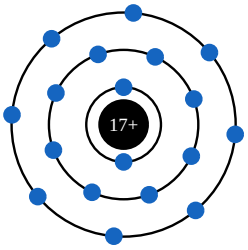


Fig. 2: Electron arrangement of a species

(A) argon atom
(B) chlorine atom
(C) potassium ion
(D) chloride ion

7 The formula unit mass of calcium chloride, $CaCl_2$ (Ca = 40 u, Cl = 35.5 u), is: **1**

(A) 75.5 u
(B) 111 u
(C) 146.5 u
(D) 151 u

8 The correct name of the compound N_2O_5 is: **1**

(A) nitrogen pentoxide
(B) dinitrogen pentaoxide
(C) dinitrogen pentoxide
(D) nitrogen dioxide

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):** Solid sodium chloride does not conduct electricity, but molten sodium chloride does. **1**

Reason (R): In the molten state the ions are free to move, whereas in the solid state they are held in fixed positions.

10 **Assertion (A):** The formula of calcium chloride is $CaCl_2$. **1**

Reason (R): A calcium atom forms a Ca^+ ion and a chlorine atom forms a Cl^+ ion.

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

11 (a) State the Law of Constant Proportions. (1) **2**

(b) If 36 g of water is decomposed, how much hydrogen and oxygen will be obtained? (1)

12 **[Figure-based]** Fig. 3 shows the outer shells of two atoms of an element Y sharing electrons to form a molecule (shared electrons are shown in red). **2**

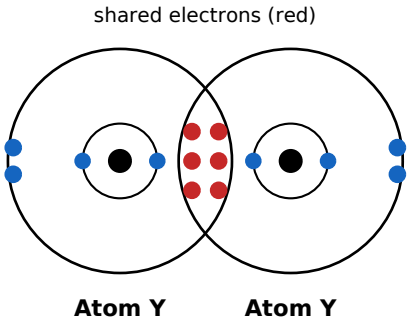


Fig. 3: Bonding between two atoms of Y

(a) How many electron pairs are shared? Name this type of covalent bond. (1)

(b) Write the molecular formula of the molecule and show its structure using lines between the atoms. (1)

13 Write the chemical formula of (i) sodium carbonate and (ii) ammonium sulfate, showing the criss-cross of charges. (1 + 1) **2**

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

A. Name the covalent compounds (i) CS_2 and (ii) N_2O_4. (1 + 1)

OR

B. Calculate the molecular mass of sulfuric acid, H_2SO_4. (2)

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

15 10.6 g of sodium carbonate reacts with 7.3 g of hydrochloric acid in a closed container to form 11.7 g of sodium chloride, 4.4 g of carbon dioxide and 1.8 g of water. Find the total mass of reactants and of products and state whether the Law of Conservation of Mass is obeyed. (1 + 1 + 1) **3**

16 **[Figure-based]** A student uses the set-up in Fig. 4 to test two samples. Solid X does not light the bulb. When X is dissolved in water, the bulb glows. A sugar solution does not light the bulb. **3**

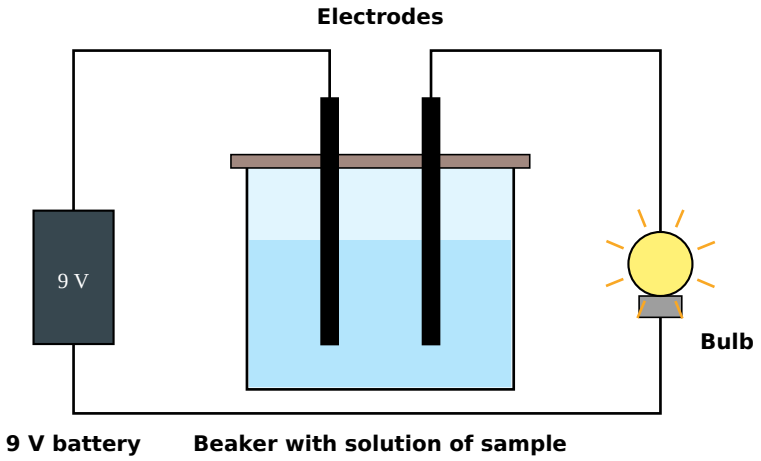


Fig. 4: Testing electrical conductivity of a solution

(i) What type of bond does X contain? Why does solid X not conduct but its solution does? (1)

(ii) Sugar dissolves in water, yet its solution does not light the bulb. Give a reason. (1)

(iii) Predict whether molten X would conduct electricity. Give a reason. (1)

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

A. Using electronic configurations, explain the formation of sodium chloride (Na: 11, Cl: 17) by transfer of electrons. (3)

OR

B. Give any three differences between ionic and covalent compounds. (3)

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

18 **Case Study: Burning Magnesium Ribbon** **4**

Asha burns 2.4 g of magnesium ribbon in an open dish. The ribbon burns with a dazzling white flame and leaves a white ash of magnesium oxide weighing 4.0 g. She is puzzled, because the ash is heavier than the ribbon she started with.

(i) Why is the ash heavier than the ribbon? (1)

(ii) Find the mass of oxygen that combined with the magnesium. (1)

(iii) Does this result go against the Law of Conservation of Mass? Explain. (1)

(iv) Find the ratio of masses of magnesium and oxygen in magnesium oxide, and the mass of magnesium that would combine with 4.0 g of oxygen. (1)

19 Case Study: Water from Different Sources **4**

[Figure-based] A student collects water from a river, a borewell and the sea. She purifies each sample and decomposes it. Fig. 5 shows the masses of hydrogen and oxygen obtained.

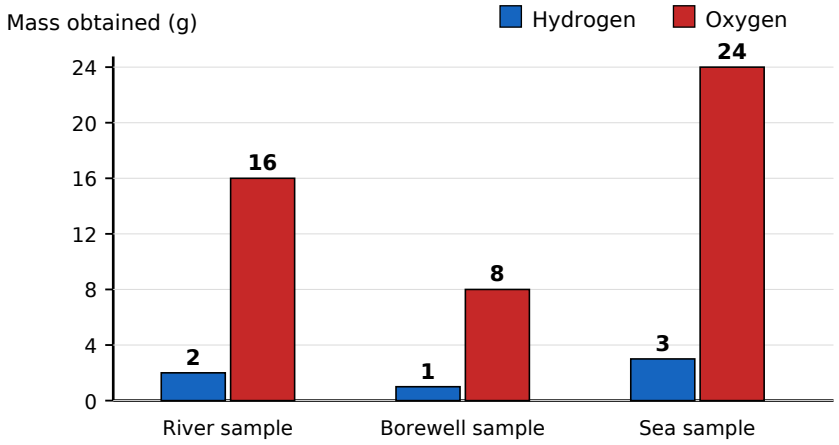


Fig. 5: Hydrogen and oxygen obtained from water samples

(i) Find the ratio of the mass of hydrogen to the mass of oxygen for each sample. (1)

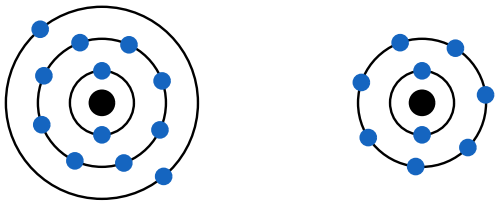
(ii) Name and state the law illustrated by these results. (1)

(iii) What mass of hydrogen and what mass of oxygen are present in 45 g of water? (1)

(iv) A student sparks a mixture of 1 g hydrogen and 12 g oxygen. How much water forms and which gas is left over? (1)

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

20 **[Figure-based]** Fig. 6 shows the electron arrangement of two neutral atoms X and Y. **5**
(Atomic masses: X = 24 u, Y = 19 u.)
Attempt either option A or B.



Atom X **Atom Y**

Fig. 6: Electron arrangement of atoms X and Y

A.

(i) Find the atomic number and the valency of X and of Y. (1)

(ii) Write the ions formed by X and Y, with their charges, and state how many electrons are transferred. (1)

(iii) Write the formula of the compound formed by X and Y, using criss-cross of charges. (1)

(iv) Name the type of bond in this compound and give one property that results from it. (1)

(v) Calculate the formula unit mass of the compound. (1)

OR

B. 4.8 g of magnesium burns completely in 3.2 g of oxygen to form magnesium oxide (Mg = 24 u, O = 16 u).

(i) Find the mass of magnesium oxide formed and name the law you used. (1)

(ii) Find the ratio by mass of magnesium to oxygen in magnesium oxide. (1)

(iii) What mass of oxygen is needed to burn 12 g of magnesium completely? (1)

(iv) A sample of magnesium oxide from another source contains 10 g of oxygen. What mass of magnesium does it contain? Name the law used. (1)

(v) Calculate the formula unit mass of magnesium oxide. (1)

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