

**ICSE Board**  
**Class IX Chemistry**  
**Paper - 4**

**Time: 2 hrs**

**Total Marks: 80**

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**General Instructions:**

1. Answers to this paper must be written on the paper provided separately.
  2. You will **not** be allowed to write during the first **15** minutes.  
*This time is to be spent in reading the question paper.*
  3. The time given at the head of the paper is the time allotted for writing the answers.
  4. Attempt **all** questions from **Section I** and **any four** questions from **Section II**.
  5. The intended marks of questions or parts of questions are given in brackets [ ].
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**SECTION I (40 Marks)**

*Attempt **all** questions from this section.*

**Question 1**

**(a)** State whether the following statements are True or False:

- i.  $\text{Cl}_2 + \text{NaOH} \rightarrow \text{NaCl} + \text{NaOCl} + \text{H}_2\text{O}$  is a balanced reaction.
- ii. A balanced chemical equation tells us which substance is a reactant and which is a product.
- iii. Hydrogen monoxide is a trivial name for water.
- iv.  $\text{Na}_2\text{SO}_4$  is named potassium sulphate.
- v. Carbonate is a divalent electronegative acid radical. [5]

**(b)**

- i. What is the difference between precipitation and neutralisation reactions?
- ii. What types of salts are prepared by neutralisation and precipitation? [5]

**(c)** Give the names of the following compounds:

- i.  $\text{Na}_2\text{O}_2$
- ii.  $\text{Zn}(\text{OH})_2$
- iii.  $\text{KHCO}_3$
- iv.  $\text{K}_4[\text{Fe}(\text{CN})_6]$
- v.  $\text{NaClO}$  [5]

**(d)** Write the formula and balance the following chemical equations:

- i. Magnesium + Nitrogen  $\longrightarrow$  Magnesium nitride
- ii. Magnesium nitride + Water  $\longrightarrow$  Magnesium hydroxide + Ammonia
- iii. Copper hydroxide  $\xrightarrow{\Delta}$  Copper oxide + Water
- iv. Potassium chlorate  $\xrightarrow{\Delta}$  Potassium chloride + Oxygen
- v. Zinc sulphide + Oxygen  $\longrightarrow$  Zinc oxide + Sulphur dioxide [5]

**(e)** What is the valency of the underlined element in the following compounds?

- i. CaCl<sub>2</sub>
- ii. (NH<sub>4</sub>)<sub>3</sub>PO<sub>4</sub>
- iii. Na<sub>2</sub>SO<sub>4</sub>
- iv. FeCl<sub>3</sub>
- v. NiSO<sub>4</sub> [5]

**(f)** Give examples of substances with their chemical equations which undergo physical and chemical changes simultaneously. [5]

**(g)** Explain why:

- i. Water is an excellent liquid to use in cooling systems.
- ii. A solution is always clear and transparent.
- iii. Lakes and rivers do not suddenly freeze in the winters.
- iv. A solute cannot be separated from a solution by filtration.
- v. Fused CaCl<sub>2</sub> or conc. H<sub>2</sub>SO<sub>4</sub> is used in a desiccator.
- vi. Effervescence is seen on opening a bottle of soda water. [5]

**(h)**

- i. Hydrogen is not prepared by the reaction of a metal such as aluminium with dilute acids. Give reason.
- ii. Explain the different types of combination reactions. Give an example of each. [5]

## SECTION II (40 Marks)

Attempt any **four** questions from this section.

### Question 2

(a) Fill in the blanks:

- i. Pollutants such as  $\text{NO}_2$ ,  $\text{SO}_2$  and  $\text{SO}_3$  dissolved in the moisture of air are the cause of \_\_\_\_\_.
- ii. Excessive release of carbon dioxide in the atmosphere is the cause of \_\_\_\_\_ effect which produces global warming.
- iii. The ozone layer prevents the harmful \_\_\_\_\_ radiation of the sun from reaching the earth.
- iv. Decrease of the concentration of ozone in the stratosphere is the cause of formation of \_\_\_\_\_ holes.
- v. Ozone depletion is mainly caused by the active \_\_\_\_\_ atoms generated from CFC in the presence of UV radiation. [5]

(b) Name:

- i. An oxidising agent which does not contain oxygen
- ii. A substance which oxidises concentrated HCl to chlorine
- iii. A substance which will reduce aqueous iron(III) ions to iron(II) ions
- iv. A liquid which is an oxidising agent as well as a reducing agent
- v. A solid which is an oxidising agent [5]

### Question 3

(a) Give balanced chemical equations for the action of heat on the following:

- i. Red lead
- ii. Lead dioxide
- iii. Potassium dichromate
- iv. Silver oxide
- v. Mercuric oxide [5]

(b)

A given amount of gas A is confined in a chamber of constant volume. When the chamber is immersed in a bath of melting ice, the pressure of the gas is 100 cmHg.

- i. What is the temperature when the pressure is 10 cmHg?
- ii. What will be the pressure when the chamber is brought to  $100^\circ\text{C}$ ? [5]

#### Question 4

(a) Write the balanced chemical equations for the following metals with water:

- i. Sodium
- ii. Potassium
- iii. Calcium
- iv. Magnesium
- v. Iron

[5]

(b) Gas 'A' is a colourless gas which is produced by the reaction of active metals with dilute HCl. Gas 'B' is produced by the action of heat on potassium chlorate. Gas 'A' undergoes reaction with gas 'B' and forms a colourless liquid 'C'.

- i. Identify A, B and C.
- ii. Give the balanced chemical equation for the formation of liquid 'C' from 'A' and 'B'.
- iii. Give two tests to identify liquid 'C'.
- iv. Give the balanced chemical equation for the reaction of 'C' with
  - a. Sulphur dioxide
  - b. Sodium oxide
  - c. Ammonia
  - d. Carbon dioxide

[5]

#### Question 5

(a) Name the element present in

- i. Group 1 and Period 2
- ii. Group 2 and Period 3
- iii. Group 14 and Period 2

[3]

(b) Why is the atomic number more appropriately equal to the number of protons?

[1]

(c) Give a balanced chemical equation for the action of heat on the following:

- i. Silver oxide
- ii. Red lead
- iii. Mercuric oxide

[3]

(d) What are drying agents? Name the drying agent for the following gases:

- i. Chlorine
- ii. Ammonia

[3]

**Question 6****(a)**

i. Complete the following table:

Element	Mass No.	Atomic No.	p	N	e
A	1	1	1	—	—
B	14	—	7	—	7
C	—	12	12	12	—
D	35	—	17	—	17

ii. Give the electronic configuration of A, B, C and D.

iii. Identify A, B, C and D.

iv. How many valence electrons are present in A, B, C and D?

v. What is the valency of A, B C and D?

[5]

**(b)** Explain the manufacture of hydrogen gas by electrolysis of water.

[5]

**Question 7****(a)** A gas occupies an initial volume of  $400 \text{ cm}^3$  at a pressure 'Z'. If the pressure is changed to 5 atmospheres, the volume of the gas is  $200 \text{ cm}^3$ . Calculate the value of Z'. [3]**(b)** State Charles' law and give the relation between volume and temperature. [3]**(c)** What are isotopes? Write the isotopes of hydrogen, carbon and oxygen. Why do isotopes show similar chemical properties? [4]