# THE FIRST COMPARATIVE EXAMINATION 2019-20
## Class X (ICSE)
## SCIENCE Paper-2
## CHEMISTRY

**Time: Two hours** **Maximum marks: 80**

- *Answers to this paper must be written on the answer script provided separately.*
- *You will **NOT** be allowed to write during the first 15 minutes.*
- *This time is to be spent in reading the question paper.*
- *The time given at the head of this paper is the time allowed for writing the answers.*
- *The intended marks for questions or parts of questions are given in brackets [ ].*
- *All subsections of each question or parts of question must be answered in the correct order.*
- *Please do **not** write anything on your question paper except your name and roll number.*
- *This paper is divided into **two** sections. **Section I** [40 marks] and **Section II** [40 marks]. Section I is **compulsory**. Attempt any **four** questions from Section II.*
- *Give balanced equations wherever required.*

### SECTION I [40 marks]
*Attempt **all** questions from this Section.*

**Question 1**

(a) Choose the most appropriate answer from the options given below: [5]

(i) Properties of elements are periodic function of their:

(A) Mass number (B) Atomic numbers

(C) Molecular mass (D) Relative atomic number.

(ii) The compound which has all the three kinds of bonds is:

(A) Sodium chloride (B) Ammonia

(C) Ammonium chloride (D) Carbon tetrachloride.

(iii) Lead sulphate is prepared by:

(A) Synthesis reaction (B) Neutralisation reaction

(C) Displacement reaction (D) Precipitation reaction.

(iv) If an element A belongs to period 2 and group III A then it will have:

(A) 2 shells and 3 valence electrons

(B) 2 shells and 2 valence electrons

(C) 3 shells and 2 valence electrons

(D) 3 shells and 3 valence electrons.

(v) The gas which will **NOT** produce an acid when dissolved in water is:

(A) CO (B) $CO_2$

(C) $NO_2$ (D) $SO_3$.

(b) Fill in the blanks with the choices given in brackets: [5]

(i) Metals lose electrons during ionization. This process is called _____ (Oxidation / Reduction / Redox).

(ii) A salt which is soluble in hot water but insoluble in cold water is _____ (Lead nitrate / Lead sulphate / Lead chloride).

(iii) The most electronegative element in the periodic table is _____ (Fluorine / Chlorine / Caesium).

(iv) The chemical bond formed between two atoms by transfer of electrons is _____ (Electrovalent / Covalent / Polar covalent) bond.

(v) The hydroxide of _____ is soluble in Sodium hydroxide solution. (Copper / Lead / Magnesium).

(c) State one relevant observation for each of the following: [5]

(i) Copper [II] sulphide is treated with dilute Hydrochloric acid.

(ii) Excess Ammonium hydroxide is added to Copper sulphate solution.

(iii) Dilute Hydrochloric acid is reacted with Lead nitrate solution.

(iv) Concentrated Hydrochloric acid is added to Manganese dioxide.

(v) Barium chloride solution is added to Sodium sulphate solution.

(d) Give a suitable chemical term for each of the following: [5]

(i) A bond formed by a shared pair of electrons with both electrons coming from the same atom

(ii) A compound which when dissolved in water yields hydroxyl ions as the only negatively charged ions

(iii) A salt which is formed by incomplete neutralization of an acid by a base.

(iv) The amount of energy released when an atom in gaseous state accepts an electron to form an anion

(v) Tendency of an atom to attract electrons towards itself when combined in a compound.

(e) Give a chemical test to distinguish between each of the following pair of compounds: [3]

(i) Sodium chloride and Sodium nitrate solution

(ii) Iron (II) chloride and Iron (III) chloride

(iii) Copper sulphate and Iron (II) sulphate.

(f) Draw the electron dot structure of: [2]

(i) Nitrogen molecule [N = 7]

(ii) Sodium chloride [Na = 11, Cl = 17]

(g) Give reasons for each of the following statements: [5]

(i) Hydrogen chloride is a polar covalent compound.

(ii) A molecule of ammonia has one lone pair of electrons.

(iii) The oxidizing power of elements increases from left to right along a period in the periodic table.

(iv) The temperature should not be above 200°C in the laboratory preparation of Hydrogen chloride gas.

(v) Hydrogen chloride gas cannot be dried over quicklime.

(h) Write a balanced chemical equation for each of the following reactions: [5]

(i) Calcium bicarbonate reacts with dilute Hydrochloric acid

(ii) Sodium sulphide reacts with dilute Hydrochloric acid

(iii) Iron reacts with dilute Hydrochloric acid

(iv) Sodium carbonate reacts with dilute Hydrochloric acid.

(v) Sodium sulphite reacts with dilute Hydrochloric acid.

(i) (i) State Gay Lussac's Law. [1]

(ii) Oxygen oxidizes Ethyne to Carbon dioxide and Water as shown by the equation:

$$2C_2H_2 + 5O_2 \rightarrow 4CO_2 + 2H_2O$$ [H = 1, C = 12, O = 16] [2]

What volume of Ethyne gas at S.T.P. is required to produce 8.4 $dm^3$ of Carbon dioxide at S.T.P.?

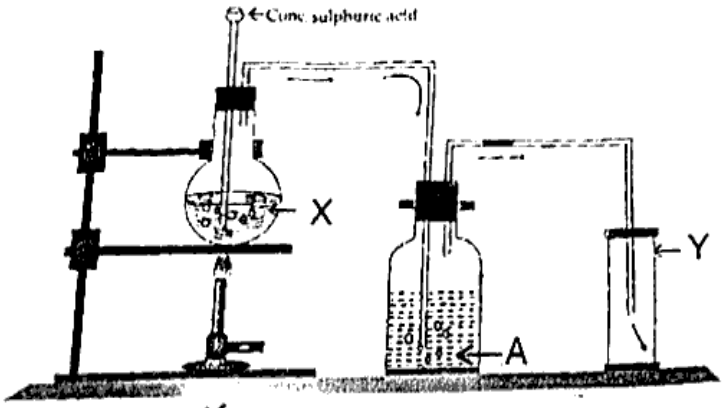
(iii) Calculate the percentage of water of crystallization in Washing soda ($Na_2CO_3 . 10H_2O$) [Na = 23, C = 12, O = 16, H = 1]. [2]

## SECTION II [40 marks]

*Attempt any four questions from this Section.*

**Question 2**

(a) The diagram given below shows the laboratory preparation of Hydrogen chloride gas. Study the same and answer the questions that follow: [4]




(i) Identify the reagents X and A.

(ii) Write a balanced chemical equation for the preparation of Hydrogen chloride gas.

(iii) What happens when a glass rod dipped in $NH_4OH$ solution is brought near the mouth of the gas jar 'Y'?

(b) Find the empirical formula of a compound containing Na = 29.11%, S = 40.51% and O = 30.38%. [Na = 23, S = 32, O = 16]. [3]

(c) Complete the following chemical equations: [3]

(i) $Fe + H_2SO_{4\,(dil)} \rightarrow$

(ii) $NaOH + H_2SO_{4\,(dil)} \rightarrow$

(iii) $Fe + Cl_2 \rightarrow$

**Question 3**

(a) Some methods (A – E) commonly used in the laboratory preparation of salts are as follows: [4]

A – Metal + acid

B – Metal carbonate + acid

C – Precipitation (Double decomposition)

D – Direct combination

E – Titration

Copy and complete the table given below by filling in the appropriate method of preparation of salts (i) – (iv):

| S.No. | Salt | Method of Preparation |
|---|---|---|
| (i) | Ammonium sulphate | |
| (ii) | Lead nitrate | |
| (iii) | Zinc sulphate | |
| (iv) | Calcium carbonate | |

(b) Consider the periodic table given below. Some elements (shaded) are given in their own symbols and position in the periodic table while others are shown with a letter. With reference to the table, answer the questions that follow: [3]

| Group → numbers | IA 1 | IIA 2 | IIIA 13 | IVA 14 | VA 15 | VIA 16 | VIIA 17 | Zero 18 |
|---|---|---|---|---|---|---|---|---|
| 2nd Period | Li | | | C | N | O | | Ne |
| 3rd Period | X | | Al | | | G | Q | |

(i) What type of bond will be formed between the elements 'X' and 'Q'?

(ii) What is the valency of the element in group V A?

(iii) A metal 'M' forms a compound with Oxygen and its formula is 'MO'. To which group does metal M belong?

(c) Name the following: [3]

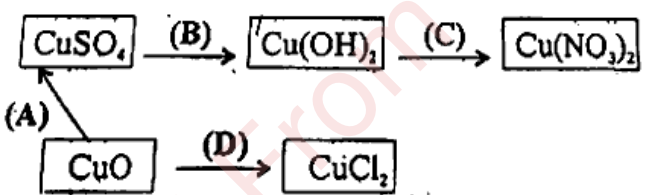
(i) The hydride of halogen in period 3

(ii) The amount of energy required to remove a loosely bound electron from the outermost shell of an isolated gaseous atom

(iii) A compound which when dissolved in water yields hydronium ions as the only positively charged ions.

**Question 4**

(a) Write balanced chemical equations for each of following conversions (A) to (D): [4]




(b) With reference to the laboratory preparation of Hydrochloric acid, answer the following questions: [3]

(i) Name the arrangement used for it.

(ii) Why is such an arrangement necessary? Give two reasons.

(c) Identify the Cation / Anion in each of the following: [3]

(i) Salt A on treatment with conc. Sulphuric acid produces a gas which gives dense white fumes with Ammonia. The anion present in Salt A is _____.

(iii) **Salt C** on reaction with dil. $H_2SO_4$ produces a gas which turns lime water milky but has no effect on acidified $K_2Cr_2O_7$. The anion present in **Salt C** is _____

**Question 5**

(a) Give reasons for each of the following statements: [4]

(i) Ionic compounds have high melting and boiling points.

(ii) Molten NaCl conducts electricity.

(iii) HCl gas cannot be collected over water.

(iv) Concentrated $H_2SO_4$ is used in the laboratory preparation of Hydrogen chloride gas.

(b) A compound gave the following data:

C = 57.82%, O = 38.58% and rest hydrogen. If the vapour density of compound is 83, find its molecular formula. [C = 12, O = 16, H = 1] [3]

(c) Show the formation of Hydronium ion and Hydroxyl ion in water with the help of electron dot diagrams. Also state the type of bonding. [3]

**Question 6**

(a) Arrange the following elements as per the instructions given in the brackets: [4]

(i) Na, S, P, Al **(decreasing order of electron affinity)**

(ii) F, C, N, Li **(increasing order of ionization potential)**

(iii) Mg, Cl, Na, S **(decreasing order of atomic size)**

(iv) Ar, He, Kr, Ne **(increasing order of number of electron shells).**

(b) The solutions **A**, **B** and **C** have pH values 5, 7 and 13 respectively: [3]

(i) Which solution has no effect on litmus solution?

(ii) Which solution will liberate $CO_2$ from Sodium carbonate?

(iii) What are universal indicators?

(c) Define each of the following terms: [3]

(i) Basic salt

(ii) Atomic radii

(iii) Lone pair effect.