

**ICSE Board**  
**Class X Chemistry**

**Time: 2 hrs**

**Total Marks: 80**

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**General Instructions:**

- Answers to this paper must be written on the paper 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.
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**Section I** is compulsory.

Attempt any four questions from **Section II**.

The intended marks for 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.** Name the following: [5]

- i. An organic compound having –OH as the functional group.
- ii. The flame used for welding and cutting of metals.
- iii. A gas having rotten egg smell.
- iv. The gas dissolved in nitric acid which gives a pale yellow colour.
- v. An organic acid which is the major constituent of vinegar.

**b.** Write balanced chemical equations for the following: [5]

- i. Calcium carbide is hydrolysed.
- ii. Ferric oxide is reduced by aluminium.
- iii. Sulphur dioxide is passed through acidified potassium dichromate solution.
- iv. Dissolution of platinum in *aqua regia*.
- v. Ethyl bromide reacts with alcoholic KOH.

**c.** [5]

- i. How does the metallic character vary in group and period?
- ii. Elements of Group 1 are called (1) \_\_\_\_\_ metals. These are good (2) \_\_\_\_\_ agents, whereas the elements of Group 17 are called (3) \_\_\_\_\_. These are good (4) \_\_\_\_\_ agents.
- iii. The vertical columns are called (1) \_\_\_\_\_. The horizontal rows are called (2) \_\_\_\_\_.

- d.** Copy and complete the table. The table summarises the observation following the addition of barium chloride solution and lead nitrate solution to the solution of sodium salts. [5]

	Barium chloride solution	Lead nitrate solution
Sodium chloride solution		
Sodium nitrate solution		No reaction
Sodium sulphate solution		

- e.** Fill in the blanks. [5]

- Concentrated sulphuric acid converts ethanol to \_\_\_\_\_ as it is a \_\_\_\_\_ agent.
- Sulphuric acid is commonly called \_\_\_\_\_.
- The salts of sulphuric acid are \_\_\_\_\_ and \_\_\_\_\_.
- Sulphuric acid is a \_\_\_\_\_ acid.
- The catalyst used during the contact process is \_\_\_\_\_.

- f.** What is the expected pH of the following solutions? [5]

- One which turns blue litmus red
- One which liberates ammonia from ammonium salts
- Pure water
- One which liberates carbon dioxide from metallic carbonate
- Ferric chloride solution

- g.** Give the balanced chemical equations for the reaction of iron with [5]

- Dil. HCl
- Dil.  $\text{H}_2\text{SO}_4$
- Chlorine
- Copper sulphate
- Sulphur

- h.** [5]

- Name the most common ore of aluminium.
- Define mineral.
- Give the formula of bauxite.
- Which two chemical compounds are added to pure bauxite at the time of electrolytic reduction and why?

## SECTION II (40 Marks)

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

### Question 2

- a.** [5]
- What changes will you observe at the cathode, anode and in the electrolyte during the electrolysis of copper sulphate solution with copper electrodes?
  - Give the equations taking place at the cathode and at the anode.

- b.** [5]
- A to F below relate to the source and extraction of either zinc or aluminium.
- A: Bauxite  
B: Coke  
C: Cryolite  
D: Froth floatation  
E: Sodium hydroxide solution  
F: Zinc blende

- Write the three letters each from the above list which are relevant to
  - Zinc
  - Aluminium
- Fill in the blanks using the most appropriate words from A to F:
  - The ore from which aluminium is extracted must first be treated with \_\_\_\_\_ so that pure aluminium oxide can be obtained.
  - Pure aluminium oxide is dissolved in \_\_\_\_\_ to make a conducting solution.
- Write the formula of cryolite.

### Question 3

- a.** What is the major purpose of subjecting concentrated ore to either roasting or calcination? [2]
- b.** Name the most common ore of aluminium, zinc and iron. Name the processes by which the named ores are concentrated. [3]
- c.** Give balanced chemical equations for the following: [3]
- Aluminium hydroxide is heated.
  - Zinc oxide is reduced.
  - Formation of sodium aluminate on dissolving the most common ore of aluminium in a suitable alkali.
- d.** Name a metal which reacts with both acids and alkalis to liberate hydrogen. Give the balanced chemical equation also. [2]

**Question 4**

- a.** Draw different isomers having the following molecular formula: [3]
- $C_5H_{12}$  (chain)
  - $C_4H_8$  (position)
- b.** What is denatured alcohol? [2]
- c.** Give two important uses of ethanol. [2]
- d.** Write equations for [3]
- Preparation of ethanol by hydration of  $C_2H_4$
  - Preparation of acetic acid from ethanol

**Question 5**

- a.** Starting from lead nitrate, how will you prepare the following named salts in the laboratory? Write only the balanced chemical equations in support of your answer. [4]
- Lead chloride
  - Lead sulphide
- b.** The following table shows the tests a student performed on two aqueous solutions A and B. Write the observations (i) and (ii) which were made. [2]

Test	Observation	Conclusion
i. To Solution A, sodium hydroxide solution was added.	(i)	A contains $Fe^{3+}$ ions
ii. To Solution B, ammonium hydroxide solution was added slowly till in excess.	(ii)	B contains $Cu^{2+}$ ions

- c.** Answer the following: [4]
- What do you observe when excess of ammonia is passed through an aqueous solution of lead nitrate?
  - Name the substance used for drying ammonia.
  - Write an equation to illustrate the reducing nature of ammonia.
  - With reference to Haber's process for the preparation of ammonia, write the equation and the conditions required.

### Question 6

- a. Write equations for each of the following reactions: [2]
- Chlorine is passed over heated iron.
  - Copper sulphate solution is added to sodium hydroxide solution.

- b. [3]

Element	Group numbers
B	I A or 1
H	VI A or 16
F	IV A or 14
J	VII A or 17
C	II A or 2
K	VII A or 17

- Write the formula of the compound formed between B and H.
  - In a compound between F and J, what type of bond will be formed?
  - Draw the electron dot structure of the compound formed between C and K.
- c. The elements of one short period of the periodic table are given below in the order from left to right. [5]
- Li   Be   B   C   O   F   Ne
- To which period do these elements belong?
  - One element of this period is missing. Where should it be placed?
  - Which element in this period shows the property of catenation?
  - Place the three elements Fluorine, Beryllium and Nitrogen in the order of increasing electronegativity.
  - Which element belongs to the halogen series?

### Question 7

**a.**

i. Who proposed the following law?

'Under the similar conditions of temperature and pressure, equal volumes of all gases contain equal number of molecules'. [1]

ii. An inorganic compound has the following percentage composition:

P = 22.45%, Cl = 77.45%. Deduce the empirical formula of the compound.

(P = 31, Cl = 35.5) [2]

iii. Calculate the percentage of iron in iron (III) oxide ( $\text{Fe}_2\text{O}_3$ ).

(O = 16, Fe = 56) [2]

**b.** Write the equation for the following reactions: [5]

i. Aluminium nitride and water

ii. Calcium carbide and water

iii. Ethene and steam

iv. Sulphur dioxide and water

v. Bromoethane and an aqueous solution of sodium hydroxide