

GREENLAWNS HIGH SCHOOL
SEMESTER I EXAMINATION
CHEMISTRY
X – 12/10/23

Maximum Marks: 80

Time allowed: Two hours

Answers to this Paper must be written on the paper provided separately.

The time given at the head of this Paper is the time allowed for writing the answers.

Section A is compulsory. Attempt any four questions from Section B.

The intended marks for questions or parts of questions are given in brackets [].

SECTION A
(Attempt all questions)

Question 1

Choose the correct answers to the questions from the given options.

(Do not copy the question, Write the correct answer only.)

[15]

- (i) Boron and Silicon shows similar properties as
- | | |
|--------------------------------|-------------------------------|
| (a) they belong to same period | (b) they belong to same group |
| (c) they are bridge elements | (d) they are metalloids |
- (ii) A → Statement : Ionisation potential increases across the period from left to right.
B → Reason : Atomic radii decreases across the period.
- | | |
|-----------------------------|-----------------------------|
| (a) both A and B are right | (b) A is right & B is wrong |
| (c) A is wrong & B is right | (d) both A and B are wrong |
- (iii) Electron affinity ____ i ____ as we move from left to right in the period
and ____ ii ____ as we move down the group.
- | | |
|----------------------------------|----------------------------------|
| (a) (i) increases (ii) increases | (b) (i) increases (ii) decreases |
| (c) (i) decreases (ii) decreases | (d) (i) decreases (ii) increases |

- (iv) Compare the acidity of LiOH and RbOH .
- (a) $\text{LiOH} > \text{RbOH}$ (b) $\text{LiOH} = \text{RbOH}$
(c) $\text{LiOH} \geq \text{RbOH}$ (d) $\text{LiOH} < \text{RbOH}$
- (v) Cations have
- (a) incomplete outermost shell (b) complete outermost shell
(c) overfilled outermost shell (d) under filled outermost shell
- (vi) Covalent compound is symmetrical and electrically neutral when.
- (a) non-polar covalent molecule is formed
(b) polar covalent molecule is formed
(c) polar ionic molecule is formed
(d) non-polar ionic molecule is formed
- (vii) Bond formed when one of the combining atoms contributes both the shared electrons.
- (a) covalent bond (b) ionic bond
(c) dative bond (d) metallic bond
- (viii) A compound having 1 lone pair of electrons :
- (a) water (b) methane
(c) ammonia (d) hydrogen sulphide
- (ix) Find the empirical formula of $\text{C}_2\text{H}_6\text{O}_2$.
- (a) CH_3O (b) $\text{C}_2\text{H}_3\text{O}$
(c) CH_3O_2 (d) CH_2O
- (x) Calculate the vapour density of sulphur dioxide. [S=32 , O=16]
- (a) 48 (b) 24 (c) 32 (d) 20

- (xi) A compound which liberate reddish brown gas at anode during electrolysis in the molten state.
- (a) Sodium chloride (b) Copper (II) oxide
(c) Copper (II) sulphate (d) Lead (II) bromide
- (xii) During electrorefining pure metal is obtained at
- (a) Cathode (b) Anode
(c) Electrolyte (d) None of these
- (xiii) When ethene reacts with chlorine the product formed is :
- (a) 1,1-dichloroethane (b) 1,1-dichloroethene
(c) 1,2-dichloroethane (d) 1,2-dichloroethene
- (xiv) A reagent which is used to distinguish between alkanes and alkenes.
- (a) bromine water (b) Carbon tetrachloride
(c) Alkaline KOH (d) Ammoniacal cuprous chloride
- (xv) The compound with – CHO as part of its structure :
- (a) alcohol (b) aldehyde
(c) acid (d) ester

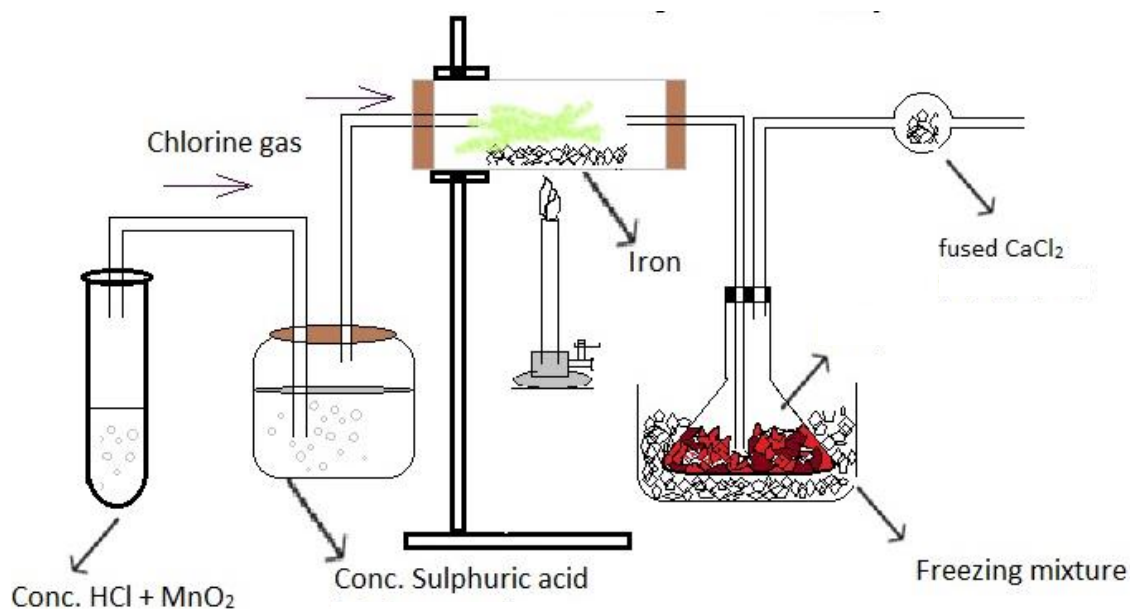
Question 2

- (i) Select the correct answer from the brackets to complete the following statements. [5]
- (a) Alkenes mainly undergoes _____ reactions.
[addition / substitution]
- (b) The metal plate through which current leaves from an electrolyte is called as _____. [cathode / anode]
- (c) _____ atoms are present in one mole of sodium element.
[6.022×10^{23} / 6.023×10^{22}]

- (d) _____ is a tribasic acid. [HCl / H₃PO₄ / H₂SO₄]
- (e) Barium is an _____. [alkaline earth metal / alkali metal]

(ii) Analyse the salt preparation process and answer the questions.

[5]



- (a) Name the volatile salt produced by above shown method using iron and Cl₂ gas.
- (b) Write the chemical equation for above method of salt preparation.
- (c) Purpose of using freezing mixture and fused CaCl₂.
- (d) Why is heating discontinued once Iron has becomes red hot?

(iii) Match the following

[5]

- | | |
|--|---------------------|
| (a) CH ₃ COOH | 1. Strong acid |
| (b) Cu strip dipped in CuSO ₄ Soln. | 2. inert electrode |
| (c) Pt strip dipped in CuSO ₄ | 3. light metal |
| (d) HCl | 4. active electrode |
| (e) n/p ratio around 1 | 5. weak acid |

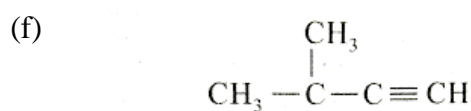
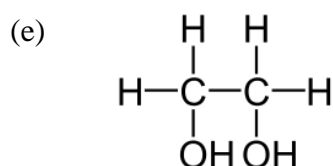
(iv) Identify the following [5]

- (a) An element which has four valence electron and possesses the ability of catenation.
- (b) Force that exist between molecules in covalent compounds.
- (c) Base which is used as an antacid.
- (d) The electrode that does not take part in a reaction.
- (e) An acid used as ink-stain remover.

(v) Draw the structural diagram of the following compounds [5]

- (a) 2,2 – ethyl methyl butan–1–ol
- (b) 4 – bromo – 3,3 – dichloro pent–1–ene
- (c) 4 – ethyl pentanoic acid

Give the IUPAC name of the following organic compounds



SECTION B

Question 3

(i) The position of three elements A,B and C in the periodic table is as shown [2]

Group VIA	Group VIIA
	A
B	C

- (a) State whether C is a metal or non-metal.
- (b) Size of C will be larger or smaller than B.

(ii) Element M is a metal with a valency 1, N is a non-metal with a valency 2. [2]

(a) Write an equation to show how Y forms an ion.

(b) If N is a diatomic gas, write an equation for the reaction between M and N forming a single product, a compound of M and N.

(iii) Choosing the chemicals from the list given below, write the balanced chemical equations for the reactions which would be used in the laboratory to obtain the following salts: (a) Sodium sulphate (b) Zinc carbonate (c) Iron (II) chloride. [3]

Chemicals provided :

Acids – Dilute Sulphuric acid, Hydrochloric acid

Metals – Iron

Base – Sodium hydroxide

Salts – Zinc sulphate, Sodium carbonate

(iv) Copper on reacting with conc. H_2SO_4 produce copper sulphate. If 1.28g of copper is used find : (a) Weight of copper sulphate formed (b) Weight of H_2SO_4 required. [3]
(Cu = 64 , S = 32 , O = 16)



Question 4

(i) Define electrorefining of metals
What happens at the anode and cathode during the electro refining of Copper. [2]

(ii) Define pyrolysis. Give equation for the pyrolysis of methane. [2]

(iii) Solution A is a strong acid, Solution B is a weak acid, Solution C is a strong alkali.

(a) Which solution contains acid as well as water molecule.

(b) Which solution contains highest amount of hydronium ions.

(c) Type of a salt formed when solution B reacts with solution C [3]
(acidic salt / basic salt)

(iv) 2500 cc of oxygen was used with 600 cc of ethane. Calculate the volume of unused oxygen and volume of carbon dioxide formed. [3]



Question 5

- (i) If 6 L of H_2 and 4 L of Cl_2 are mixed and exploded and if water is added to the gases formed, find the volume of residual gas. [2]
- (ii) From the following select an acid salt, insoluble sulphate, insoluble chloride, soluble sulphate. [2]

K_2SO_4 , CaSO_4 , AgCl , KCl , NaHSO_4

- (iii) Draw the electron dot structure of ammonium ion [N = 7 , H = 1] [3]
- (iv) **Group I metals** [3]

Lithium,

Sodium,

Potassium,

Rubidium,

Caesium,

Name the members of the alkali metal group which has the:

- (a) Highest ionisation potential (b) Lowest electronegativity
- (c) Metals with melting point greater than Potassium.

Question 6

- (i) How is hydronium ion formed? Write the ionization of nitric acid showing the formation of hydronium ion. [2]
- (ii) What percentage of water is found in $\text{Na}_2\text{S} \cdot 9\text{H}_2\text{O}$? [2]
[Na = 23 , S = 32 , O = 16 , H = 1]
- (iii) With respect to the electrolysis of lead bromide, answer the following questions: [3]
- (a) Why is the lead bromide maintained in a molten state?
- (b) Why is the electrolyte cell/crucible made of silica?
- (c) Write the overall reaction for electrolysis of lead bromide.

- (iv) Write chemical equations of the reactions of ethanoic acid with : [3]
- (a) Sodium metal (b) Sodium hydroxide

Identify the type of reaction taking place in both the cases

Question 7

- (i) How does the chemical reactivity vary down the alkali metals and halogens? [2]
- (ii) Why do covalent compounds exist as gases, liquids or soft solids? [2]
- (iii) With respect to the electrolysis of water, answer the following questions: [3]
- (a) Why is the sulphuric acid used in electrolysis of water?
- (b) List the positive and negative ions present in the electrolyte?
- (c) Write the anode reaction.
- (iv) In the laboratory preparation of ethyne cold water is added to calcium carbide [3]
at room temperature using a thistle funnel.
- (a) Write the reaction for the preparation of ethyne using calcium carbide.
- (b) How is calcium carbide prepared?
- (c) Name the chemical used to remove impurity – phosphine

Question 8

- (i) Define – periodic properties ? Give 2 reasons for the periodicity in properties [3]
of elements in periods and groups of periodic table.
- (ii) Explain in brief with example : [3]
- (a) Non-polar covalent bond.
- (b) Polar covalent bond.
- (iii) Explain why the blue colour of the aqueous copper sulphate solution remain [2]
unchanged when copper electrodes are used but fades away when platinum
electrodes are used.
- (iv) Give four uses of acetic acid. [2]