GREENLAWNS HIGH SCHOOL

SEMESTER I EXAMINATION

CHEMISTRY

X – 1/10/25

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) An element in period 2 whose electron affinity is zero.

(a) Neon (b) Argon

(c) Lithium (d) Nitrogen

(ii) Non-metal oxides which produce acid with water

(1) carbon dioxide (2) nitric oxide

(3) carbon monoxide (4) nitrogen dioxide

(a) all of the above (b) 1 and 4 only

(c) 1, 2 and 4 (d) 1, 2 and 3

(iii) Assertion (A) : Ionic compounds can't conducts electricity in solid state.

Reason (R) : Ionic compound in solid state has no free ions.

(a) Both A and R are true and R is a correct explanation for A

(b) Both A and R are true and R is not a correct explanation for A

(c) A is true but R is false

(d) A is false but R is true

(iv) Identify the salt which does not form precipitate with NH_4OH

(a) $Pb(NO_3)_2$ (b) $Zn(NO_3)_2$

(c) $Ca(NO_3)_2$ (d) $Cu(NO_3)_2$

(v) When NaCl reacts with H_2SO_4 and temperature is maintained < 200˚c.

(a) mixed salt is formed (b) acid salt is formed

(c) normal salt is formed (d) double salt is formed

(vi) NH_3 is used in

(a) Haber's process (b) Contact process

(c) Bayer's process (d) Ostwald process

(vii) Gas released when copper reacts with cold dilute nitric acid.

(a) NO only (b) NO_2 only

(c) NO_2 and O_2 (d) NO and O_2

(viii) In contact process SO_3 is absorbed using

(a) Dil. H_2SO_4 (b) HCl

(c) NH_3 (d) Conc. H_2SO_4

(ix) Cation which gives lilac colour during flame test.

(a) Calcium ion (b) potassium ion

(c) Copper ion (d) Sodium ion

(x) Anion which gives insoluble white ppt with $BaCl_2$ solution.

(a) CO_3^{2-} (b) SO_4^{2-}

(c) NO_3^- (d) SO_3^{2-}

(xi) Functional group of in ethyl acetate is

(a) – CHO (b) – COOH

(c) – OH (d.) – COO

(xii) Select the acid which contains four hydrogen atoms in it.

(a) Formic acid (b) Phosphoric acid

(c) acetic acid (d) Sulphurous aci

(xiii) Acidity of aluminium hydroxide is

(a) 3 (b) 2

(c) 1 (d) 4

(xiv) Element X with atomic number 14 behaves as

(a) metal (b) metalloid

(c) non-metal (d) Inert

(xv) In group 7 of the periodic table as we go down the group

(a) ionic radius will increase (b) I.P. will increase

(c) electronegativity will increase (d) reactivity will increase

Question 2

(i) Identify the following : **[5]**

(a) Energy required to remove an electron from a neutral isolated gaseous atom to convert it into positive ion.

(b) Bond formed between oxygen atom of water and H^+ ion.

(c) The gas released when an acid reacts with a sulphide.

(d) Aluminium hydroxide reacts with sodium hydroxide to give.

(e) Promoter used in Haber's process.

(ii) Complete the following by choosing the correct answers from the bracket. **[5]**

(a) Sticky mass of _____ is formed during the laboratory preparation of HCl. (Na_2SO_4 / Na_2SO_3)

(b) Nitric acid is a strong _____agent. (oxidising/ reducing)

(c) Formula of oleum is _____. (H_2SO_7. / $H_2S_2O_7$.)

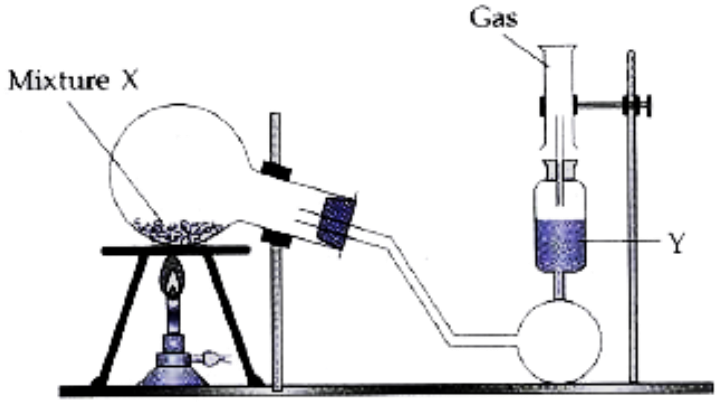
(d) _____ is a cyclic organic compound with 6 carbon atoms. (benzene / hexzene).

(e) When KCl solution is added to $AgNO_3$ _____ precipitate of AgCl is obtained (White / Silvery)

(iii) Match the following **[5]**

(1)	Sodium nitrate	a.	simple displacement
(2)	Ferric chloride	b.	Neutralisation
(3)	Lead chloride	c.	decomposition by acid
(4)	zinc sulphate	d.	double decomposition
(5)	Sodium bisulphate	e.	direct synthesis

(iv) The diagram below shows the set up for the laboratory preparation of pungent alkaline gas **[5]**



(a) Identify the gas collected in the jar?

(b) Write the balanced chemical equation for the above preparation.

(c) Name the drying agent used.

(d) Why the gas is not collected over water?

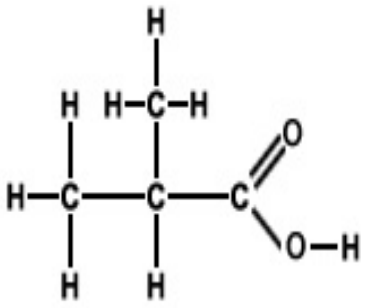
(e) Why P_2O_5 can not be used as drying agent for the above preparation.

(v) (a) Draw the branched structural formula for each of the following : **[5]**

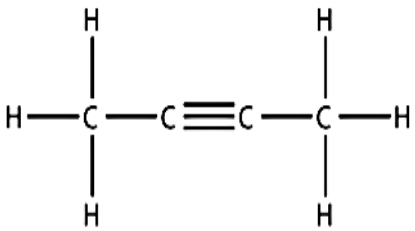
1. 1,2 dibromopropane
2. 2 – propanol
3. Iso – butane

(b) Write the IUPAC name for the following compounds :

1.



2.



SECTION B

(Attempt any four questions)

Question 3

(i) Draw the dot and cross structure of ammonia molecule. **[2]**

(ii) Why oxidizing power of elements increases from left to right in period? **[2]**

(iii) Identify the type of salt and define the type , (a) KNO_3 (b) $KHSO_4$ **[3]**

(iv) $CuSO_4$ when treated with limited amount of NH_4OH forms insoluble $Cu(OH)_2$ on further addition of NH_4OH it gives soluble complex $[Cu(NH_3)_4]SO_4$. Write the balance equations for both the conversions giving the colour of both soluble and insoluble products. **[3]**

Question 4

(i) Define (a) Electron affinity (b) Co-ordinate bond **[2]**

(ii) Differentiate between the following pairs of compounds using the reagents given in the bracket. **[2]**

(a) Heated $CaCO_3$ and $CaSO_4$ (using acidified $K_2Cr_2O_7$)

(b) $ZnSO_4$ and $Al_2(SO_4)_3$ (using excess of NH_4OH solution.)

(iii) You are provided with some compounds in the box. **[3]**

CO_2	CH_4	HCl	SO_3
H_2SO_4	CH_3OH	H_2O	

Choose the most appropriate compound which fits the descriptions (a) to (c) given below:-

(a) Gas formed in the contact process.

(b) Acidic compound which can react to form an acid salt.

(c) Neutral compound which turns $CoCl_2$ pink.

(iv) P, Q, R and S are the compounds used in the preparation of acids **[3]**

P – NaCl Q – $NaNO_3$ R – SO_2Cl_2 S – PCl_3

Choose the most appropriate compound to prepare the following acids:

(a) HCl (b) H_2SO_4 (c) HNO_3

Question 5

(i) Draw the electron dot structural diagram of CaO. (Ca=20, O= 8) **[2]**

(ii) Give two advantages of using funnel arrangement in preparation of HCl. **[2]**

(iii) Define homologous series. Give two significance of the homologous series. **[3]**

(iv) Complete and rewrite the balanced equation, write the name of the main product formed : **[3]**

(a) $C_2H_5OH + Na \longrightarrow$ _____ + _____

(b) $CH_3COOH + NaHCO_3 \longrightarrow$ _____ + _____ + _____

Question 6

(i) What are isomers. Differentiate between chain and position isomerism. **[2]**

(ii) Give reason **[2]**

(a) Ionic compounds are soluble in water.

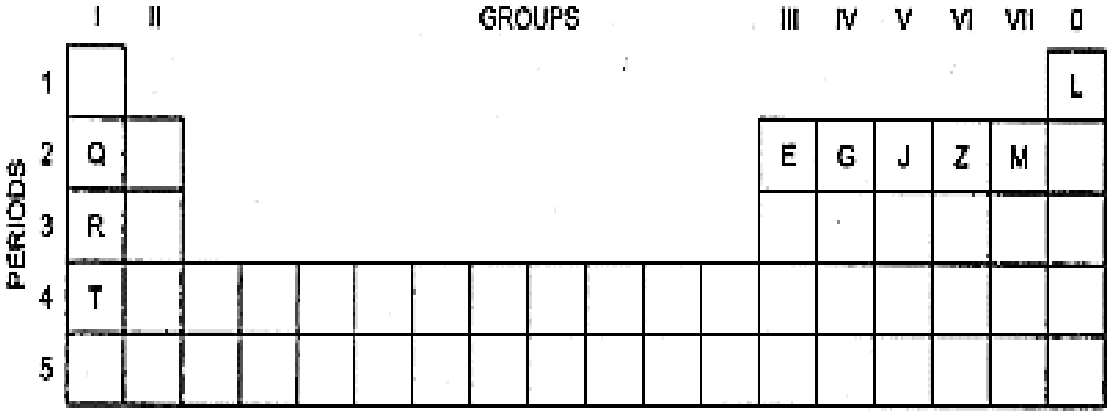
(b) Non-polar covalent compounds are non-conductor of electricity.

(iii) $CaCO_3$ is prepared by precipitation method using soluble salts calcium chloride and sodium carbonate. **[3]**

(a) Write the balanced chemical reaction for the above preparation.

(b) Explain how will you obtain both the product in solid state.

(iv) Use the letters only written in the periodic table below to answer the questions:- **[3]**



(a) State the valency of atom Z

(b) Which elements are univalent?

(c) Write the formula of the compound formed between R and J.

Question 7

(i) Draw dot and cross structure representing formation of hydroxide ion **[2]**

(ii) Salt A gives no precipitate when treated with dilute NH_4OH and NO_2 gas is evolved when salt is treated with conc.H_2SO_4 in presence of Cu. **[2]**

(a) Identify the cation and anion in salt A.

(b) Write the molecular formula of salt A.

(iii) Write the reactions taking place in steps I to III of Ostwald's process. **[3]**

(iv) Give suitable chemical term for:- A reaction in which hydrogen of an alkane is replaced by a halogen. **.[3]**

Write chemical reaction representing above reaction using 2nd member of homologous series of alkane to form corresponding dichloroalkane

Question 8

(i) Electron affinity increases across a period from left to right **[2]**
Name the elements in period 2 which are exception to this trend.

(ii) Name two methods used by combining atoms to achieve **[2]**
stable electronic configuration.

(iii) Name a metal rendered passive by HNO_3. **[3]**
Why the named metal is rendered passive by HNO_3?
Suggest a method to overcome the passivity of the metal.

(iv) Write the balanced equation for following conversions. **[3]**

(a) ethanol to carbon dioxide – by burning

(b) ethane to ethanal – by oxidation using MoO as a catalyst.

(c) ethene to ethane – by hydrogenation