

**GREENLAWNS HIGH SCHOOL**  
**SEMESTER I EXAMINATION**  
**CHEMISTRY**  
**X – 20/01/25**

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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.

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

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

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**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.)

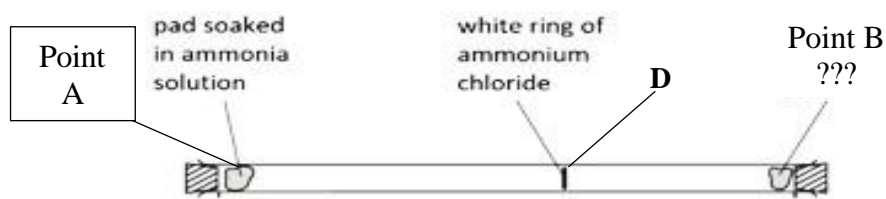
[15]

- (i) A copper electrode is dipped in the following colourless solutions.  
Which of the solutions will finally turn blue?

P. HgCl<sub>2</sub>                      Q. AlCl<sub>3</sub>  
R. ZnCl<sub>2</sub>                      S. AgNO<sub>3</sub>

- (a) P and R      (b) Q and S      (c) P and S      (d) R and Q

- (ii) Reaction is carried out in the tube; white fumes are observed at point D after reactant vapours have reacted. The reactant at point A is liquor ammonia, identify the reactant at point B



- (a) HCl                      (b) HNO<sub>3</sub>  
(c) H<sub>2</sub>SO<sub>4</sub>                      (d) H<sub>2</sub>SO<sub>3</sub>

- (iii) Molecular formula of a compound is  $(C_2H_6O)_3$ . Find its empirical formula
- (a) CHO                      (b)  $C_2H_6O$                       (c)  $CH_3O$                       (d)  $CH_2O$
- (iv) During the electroplating of an article, low current used for a longer period of time is not a cause for \_\_\_\_\_ of the coating.
- (a) smoothness                      (b) firmness
- (c) uniformness                      (d) unevenness
- (v) Assertion (A) Iron is rendered passive when it reacts with fuming nitric acid.
- Reason (R) A reddish brown layer of soluble iron nitrate is formed which prevent further reaction
- (a) Both A and R are true and R is the correct explanation for A
- (b) Both A and R are true but R is not the correct explanation for A
- (c) A is true but R is false
- (d) A is false but R is true
- (vi) During \_\_\_\_\_ reaction carboxylic acids lose a  $CO_2$  molecule.
- (a) Decarbonation                      (b) Decarboxylation
- (c) Saponification                      (d) Esterification
- (vii) Electronic configuration of element X is (2, 8, 3) . Find the number of atoms of element X present in the oxide of element X.
- (a) one                      (b) two
- (c) three                      (d) four
- (viii) Which of the following is correct increasing order of electron affinity?
- (a)  $Cl < F < Br < I$                       (b)  $F < Cl < Br < I$
- (c)  $I < Br < F < Cl$                       (d)  $Cl < Br < I < F$

(ix) A substance which is used to increase the efficiency of Iron during Haber's process

- (a) Mg (b) Md  
(c) Mn (d) Mo

(x)  $2\text{FeCl}_2 + \text{Cl}_2 \rightarrow 2\text{FeCl}_3$

In the above reaction iron \_\_\_\_\_

- (a) gain an electron and is oxidised  
(b) loses an electron and is oxidised  
(c) loses an electron and is reduced  
(d) gain an electron and is reduced

(xi) Which of the following is monobasic acid?

- (a)  $\text{H}_2\text{SO}_4$  (b)  $\text{H}_2\text{SO}_3$   
(c)  $\text{HCOOH}$  (d)  $(\text{COOH})_2$

(xii) An element belongs to period 2 and group IVA. It has \_\_\_\_ electrons in outer most shell and forms \_\_\_\_\_ bond

- (a) 4, covalent (b) 4, ionic  
(c) 2, ionic (d) 2, covalent

(xiii) Lead [II] hydroxide precipitates out as a.....ppt. with NaOH.

- (a) white gelatinous insoluble (b) white chalky insoluble  
(c) white gelatinous soluble (d) white chalky soluble

(xiv)  $112 \text{ dm}^3$  of diatomic chlorine gas contains how many moles of chlorine molecules.

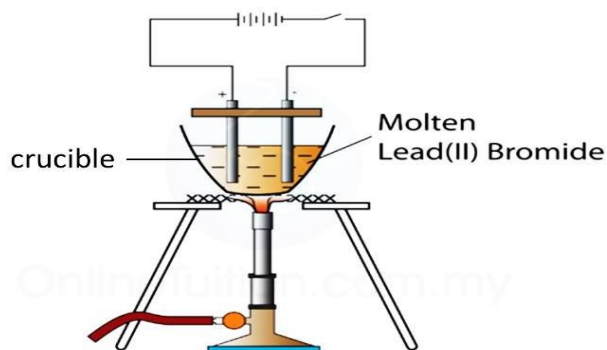
- (a) 2 moles (b) 4 moles  
(c) 5 moles (d) 3 moles

(xv) Type of reaction which takes place during formation of insoluble salt by precipitation method

- (a) combination (b) displacement  
(c) neutralisation (d) double decomposition

## Question 2

(i) The setup shown below is that of the electrolysis of fused lead bromide. Throughout the electrolysis the electrolytic cell made of silica is heated slowly from outside. [5]



- (a) Why electrolytic cell is made from silica?  
(b) Give the minimum temperature suitable to carry out above electrolysis.  
(c) Write the observation at the cathode.  
(d) Why graphite anode is preferred over other inert electrodes?  
(e) Write chemical equation representing electrolytic dissociation of  $\text{PbBr}_2$ .
- (ii) Complete the following by choosing the correct answers from the bracket: [5]
- (a) Greater the value of E.A., more \_\_\_\_\_ is the element. (oxidising / reducing)  
(b) Acidic oxides dissolves in water to give \_\_\_\_\_. (acid / base)  
(c) Aluminum reacts with hot conc. caustic alkali to liberate \_\_\_\_\_. (hydrogen / oxygen)  
(d) Alkenes prefer to undergo \_\_\_\_\_ reaction. (addition / substitution).  
(e) Acid containing hydrogen and a non-metallic element other than oxygen is known as \_\_\_\_\_. (hydracid / oxyacid)

(iii) Match the following [5]

- |                                   |                                |
|-----------------------------------|--------------------------------|
| (a) Native state                  | 1. Strong oxidising agent      |
| (b) Conc. $\text{H}_2\text{SO}_4$ | 2. Polar covalent compound     |
| (c) Nitric acid                   | 3. Non-polar covalent compound |
| (d) $\text{CCl}_4$                | 4. Gold/platinum               |
| (e) $\text{NH}_3$                 | 5. Ostwald's process           |

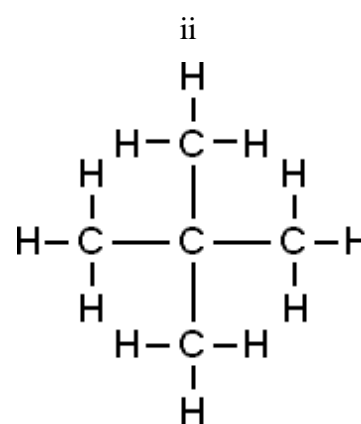
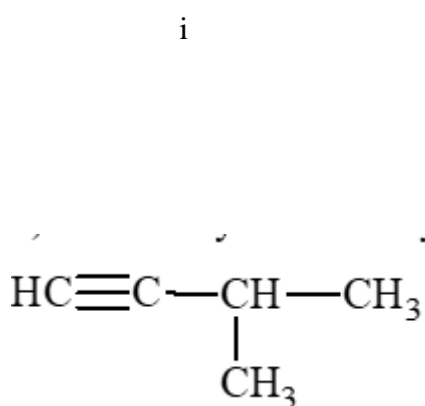
(iv) Identify the following [5]

- (a) Cation formed when ammonia is dissolved in water.
- (b) Aqueous solution of an acid, having relatively low percentage of an acid in it.
- (c) Undistilled alcohol containing large amount of methanol.
- (d) Element having largest atomic radius in period 2.
- (e) Compound which is reacted with nitric acid to produce T.N.T.

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

1. Butanoic acid
2. 2-chloro-2-methyl propane
3. pent-2-yne

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



## SECTION B

### Question 3

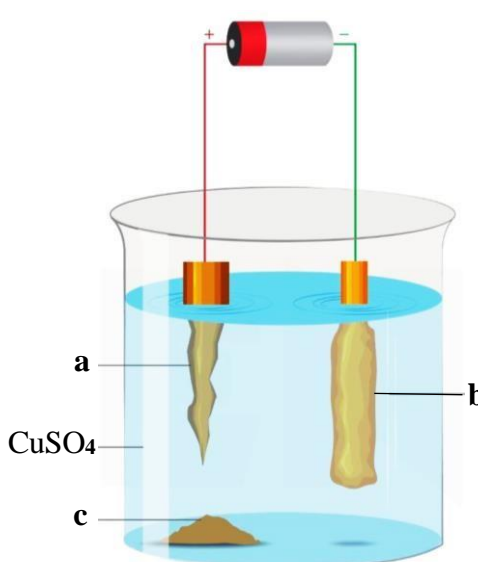
- (i) Write the balanced equation for conversion of  $\text{SO}_2$  to  $\text{SO}_3$ . Why the catalyst used in this conversion is preferred over platinised asbestos as a catalyst? [2]
- (ii) State 2 effects of  $\text{NH}_3$  on human sense organs. [2]
- (iii) Define ionization potential. Discuss in brief 1<sup>st</sup> and 2<sup>nd</sup> ionization potential energy giving general equation for the same. [3]
- (iv) Write chemical equations for the preparation of following salts as per given instructions [3]
- (a) Lead sulphate by precipitation method using soluble salts containing nitrate as anion in salt-I and potassium as cation in salt-II respectively.
- (b) Iron [II] sulphate from metal ion and dilute acid.
- (c) Lead sulphide by direct combination of metal and non-metal.

### Question 4

- (i) Write 2 difficulties faced during electrolytic reduction of alumina. [2]
- (ii) Determine the empirical formula of organic compound if its molecule contains 12 atoms of carbon. The percentage of hydrogen and oxygen are 6.48 and 51.42 respectively. [2]
- [C = 12, H=1 and O=16]**
- (iii) Give the balanced equations for the following reactions. [3]
- (a) Conversion of aluminum hydroxide to pure alumina..
- (b) Oxidation of HCl using  $\text{HNO}_3$  as an oxidising agent.
- (c) Combustion of ammonia.
- (iv) Why quicklime is not used as a drying agent in the laboratory preparation of hydrogen chloride gas?  
Give 2 reasons why temperature is kept less than or around  $200^\circ\text{C}$  during laboratory preparation of HCl gas? [3]

### Question 5

- (i) Combination reaction of  $N_2$  and  $H_2$  is exothermic and reversible in nature, as per Le Chatelier's principle forward reaction is favoured by decrease in temperature then why [2]
- (a) High temperature of around  $450^\circ C$  is used in the above process.
- (b) What happens when temperature exceeds  $500^\circ C$ .
- (ii) Stainless steel contains Fe 75% , Ni 10%, Cr 15% and C 0.5% whereas nickel steel contains Fe 97% , Ni 2%, and C 1%. Write the property imparted by metal nickel to stainless steel and non-metal carbon to stainless steel respectively. [2]
- (iii) Rajani carried out a titration of NaOH with dil.  $H_2SO_4$ . After complete neutralisation salt was obtained. [3]
- (a) Name the salt produced by Rajani.
- (b) Write balanced equation for the above titration.
- (c) Ratio of NaOH and dil.  $H_2SO_4$  required for complete neutralisation such that neither acid nor base is in excess.
- (iv) Given below is a schematic diagram of the electrorefining of impure copper. Identify the parts labelled as a,b and c from the column B. [3]

 <p>The diagram shows an electrorefining setup. A battery is connected to two electrodes in a beaker of <math>CuSO_4</math> solution. The positive terminal (anode) is connected to a rod labeled 'a' which is impure copper. The negative terminal (cathode) is connected to a rod labeled 'b' which is pure copper. At the bottom of the beaker, there is a deposit labeled 'c' which is anode mud.</p>	<ol style="list-style-type: none"><li>1. anode mud</li><li>2. pure copper</li><li>3. impure copper</li><li>4. electrolyte</li></ol>
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### Question 6

- (i) Give reasons why the oxidising power of elements increases on moving from left to right along a period in the periodic table. [2]
- (ii) Metal salts isolated from paint X is  $\text{FeCl}_2$  and paint Y is  $\text{FeCl}_3$  respectively. The salts are treated with limited quantity of  $\text{NaOH}$  solution in separate test tubes. Write the observation for salt X and Y respectively. [2]
- (iii) Electrolysis of copper sulphate solution is carried out using copper electrode and then using platinum electrode. [3]
- (a) Write an observation with respect to colour of electrolyte and give reason for the observation.
- (b) Name the gas produced at the anode when platinum electrode is used.
- (iv) Z [1] and Y [2, 5] are two elements. Using the information answer the questions. [3]
- (a) Type of bond formed between elements Z and Y.
- (b) Electron dot structure of the compound.
- (c) Formula of the compound formed.

### Question 7

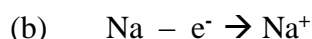
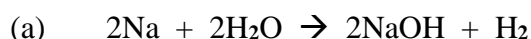
- (i) Sherly's cloth is with ink and grease. She bought the following chemicals – oxalic acid, ammonium hydroxide. [2]
- (a) Suggest which chemical is suitable for removal of which of the stain on her cloth.
- (b) Ammonium hydroxide is a \_\_\_\_\_ base.
- (ii) Give the balanced equation for the combustion of acetylene in excess of air. Write the colour of the flame produced during combustion of acetylene. [2]
- (iii)  $2 \text{C}_2\text{H}_6 + 7 \text{O}_2 \rightarrow 4 \text{CO}_2 + 6 \text{H}_2\text{O}$
- If 80ml of ethane is burned in 300ml of oxygen, find the composition of the resultant gaseous mixture when measured at room temperature [3]
- (iv) Write balanced chemical equations for: [3]



- (a) Formation of sodium ethoxide from ethanol.
- (b) Formation of acetylene ozonide from ethyne.
- (c) Formation of ethyl hydrogen sulphate from ethene.

### Question 8

- (i) Element sodium belongs to group [IA]. Observe the reactions of Na and identify the property of group [1A] illustrated by each of the given reaction. [2]

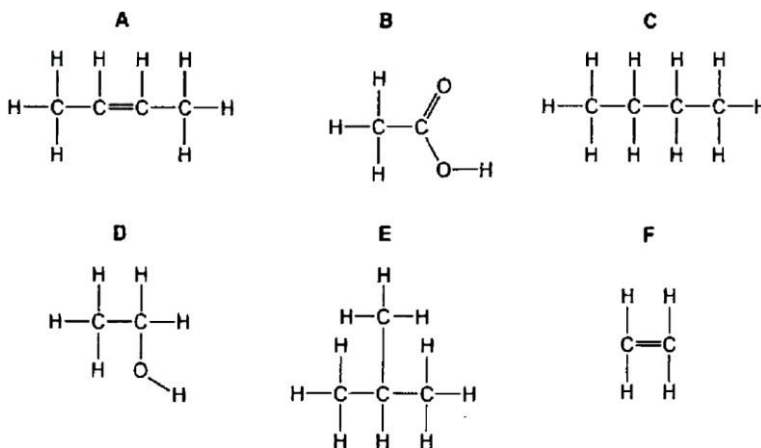


- (ii) Give balanced equation for [2]

(a) Zinc oxide dissolved in NaOH

(b) Zinc is heated with NaOH solution.

- (iii) [3]



- (a) Identify the functional group of compound F.
  - (b) An ester can be prepared using compound B and D. Give a chemical equation for the reaction and name the ester formed.
- (iv) How much calcium oxide is formed when 82g of calcium nitrate is heated? Also find the volume of nitrogen dioxide evolved [3]

