GREENLAWNS SCHOOL, WORLI

TERMINAL EXAMINATION: 2024-25

CHEMISTRY

Std: X | Marks: 80

Date: 01/10/2024 | Time: 2 hrs

Answers to this paper must be written on the paper provided separately. You will **not** be allowed to write during the first **10** minutes. This time is to be spent in reading the Question paper.

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

SECTION A

*(Attempt **all** questions from this Section)*

Question 1

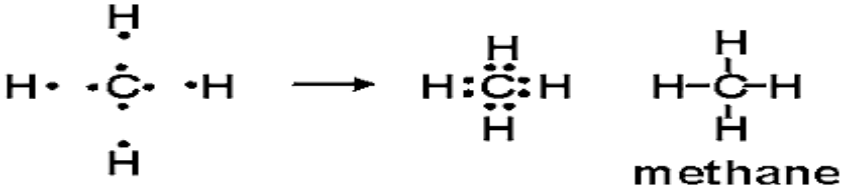
Choose the correct answers to the questions from the given options. **[15]**

(Do not copy the question, write the correct answers only.)

(i) Electron affinity is maximum in:

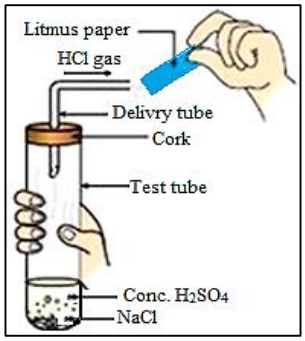
(a) Alkali metals
(b) Alkaline earth metals
(c) Halogens
(d) Inert gases

(ii) How many pairs of bond and lone pair are present in the given Methane figure?



(a) 4 bond pair and zero lone pair
(b) 8 bond pair and zero lone pair
(c) 6 bond pair and zero lone pair
(d) 4 bond pair and 4 lone pair

(iii) The figure given below represents the experiment carried out between conc. sulphuric acid and sodium chloride, which react with each other to form HCl gas:



Blue litmus paper is brought near the mouth of the delivery tube to check the presence of HCl acid, but no change is observed in the colour of litmus paper because:

(a) The litmus paper used is dry.
(b) The litmus paper used is moist.
(c) Blue litmus paper does not change its colour with an acid.
(d) The litmus paper is kept very close to the mouth of the delivery tube.

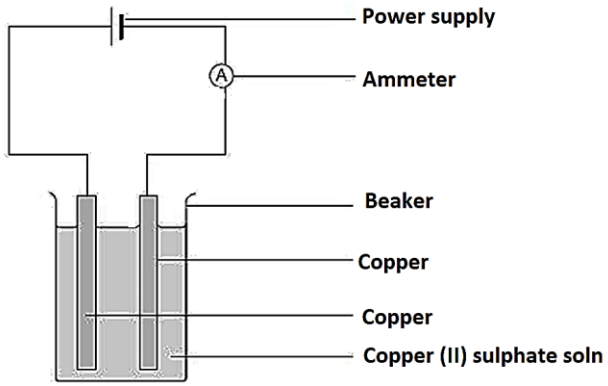
(iv) Rohan was asked to identify the cation present in the salt solution. He added one of the reagents given below and got a reddish-brown precipitate. The reagent that he used is:

(a) Barium chloride solution
(b) Calcium chloride solution
(c) Silver nitrate solution
(d) Ammonium hydroxide

(v) The gas law which relates the volume of a gas to the number of molecules:

(a) Avogadro's law
(b) Gay Lussac's law
(c) Boyle's law
(D) Charles' law

(vi) The below diagram represents the electrolysis of Copper (II) sulphate solution. The reaction occurring at the anode is:



(a) $Cu^{2+} + 2e^- \rightarrow Cu$
(b) $Cu + 2e^- \rightarrow Cu^{2+}$
(c) $Cu - 2e^- \rightarrow Cu^{2+}$
(d) $Cu^{2+} - 2e^- \rightarrow Cu$

(vii) **Assertion (A)**: Dry HCl gas is collected by the upward displacement of air.
Reason (R): HCl gas is slightly soluble in water.

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

(viii) The alkaline behaviour of liquor ammonia is due to the presence of:

(a) Ammonium ion
(b) Hydronium ion
(c) Hydroxyl ion
(d) Hydrogen ion

(ix) A student reacts copper turnings with cold dilute nitric acid in a test tube. He tests the gas given off with moist red and blue litmus paper. What is the name of the gas that evolved and what is the final colour of the litmus paper?

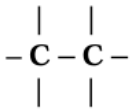
	Gas	Final colour of the litmus paper
(a)	NO	No change in blue and red litmus paper
(b)	NO_2	Blue litmus turns red and no change in red litmus
(c)	N_2	No change in blue and red litmus paper
(d)	N_2O	No change in blue and red litmus paper

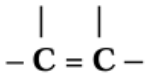
(x) The catalyst used for the manufacture of Sulphuric acid by Contact process is:

(a) MnO_2 (c) Pt

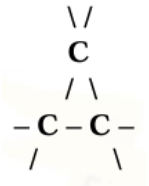
(b) V_2O_5 (d) Bi_2O_3

(xi) Which of the following chains of hydrocarbons undergoes two steps of reactions to become saturated?

(a) 

(b) 

(c) 

(d) 

(xii) Choose the element which possesses the largest atomic radius:

(a) Be (c) Li

(b) B (d) C

(xiii) Pure water consists of:

(a) Ions (c) Atoms and molecules

(b) Atoms (d) Molecules

(xiv) An explosive formed when ammonia and chlorine react together is:

(a) NOCl (c) HCl

(b) NH_4Cl (d) NCl_3

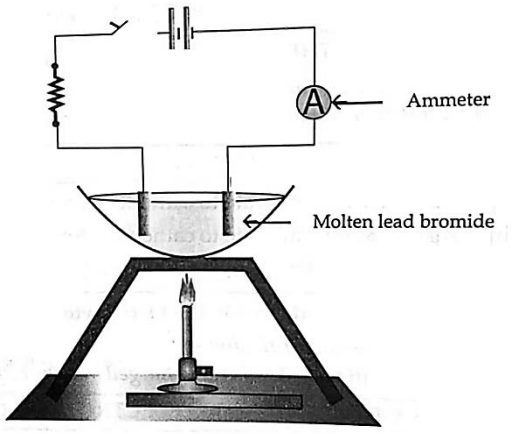
(xv) Electrovalent compounds show some characteristic properties. Identify an electrovalent compound from the given substances:

Compound	Final colour of the litmus paper
W	Easily insoluble in polar solvents
X	High melting point and strong electrolyte
Y	High melting point and weak electrolyte
Z	Soluble in water but a bad conductor of electricity

(a) Only W
(b) Only X
(c) Both X and Y
(d) Both Y and Z

Question 2

(i) The setup shown below is that of the electrolysis of molten lead bromide. [5]



(a) Name the electrodes used and justify its preference.
(b) Why is the crucible made of silica?
(c) Give the reaction taking place at anode.
(d) What is observed at the cathode?
(e) Why is solid lead bromide not used in electrolysis?

(ii) Match the following Column A with Column B: [5]

Column A	Column B
(a) Non – polar	1. Helium
(b) Polar	2. Fluorine
(c) Highest Ionisation Potential	3. Methane
(d) Most electronegative element	4. Ammonium hydroxide
(e) Caustic alkali	5. Ammonia
	6. Chlorine
	7. Potassium hydroxide

(iii) Complete the following by choosing the correct answers from the bracket: [5]

(a) Ammonia can convert heated copper oxide to copper. This shows that ammonia is a _____ (reducing agent/oxidising agent).
(b) The number of chain isomers possible for an alkane with 5 carbon atoms are _____ (3 / 4).

(c) The _____ (higher/ lower) is the position of the cation in the electrochemical series, the greater the difficulty of it being discharged at the cathode.
(d) _____ (Sulphuric acid / hydrochloric acid) does not form an acid salt.
(e) The reaction of methane gas with excess chlorine in the presence of U.V. light to form CCl_4 is considered as a/an _____ (/ addition) reaction.

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

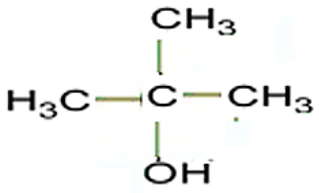
(a) The formula of a compound which shows the simplest whole number ratio between the atoms of the elements in the compound.
(b) An ionic compound which dissociates in aqueous solution to yield a positive ion other than H^+ ion and a negative ion other than OH^- ion.
(c) A bond formed between two atoms by sharing of a pair of electrons, with both electrons being provided by the same atom.
(d) The amount of energy released when an atom in the gaseous state accepts an electron to form an anion.
(e) The property of certain elements whereby its atoms can form long straight chain, branched chain or cyclic chain by self-linking with other atoms of the same element.

(v) (a) Draw the structural diagram for the following compounds: **[5]**

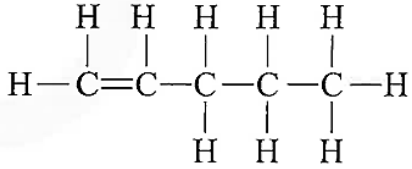
1. Propanoic acid
2. Pentan-2-ol
3. 2,2 dibromo butane

(b) Give the IUPAC name of the following organic compounds:

1.



2.



SECTION B

*(Attempt **any four** questions)*

Question 3

(i) Draw electron dot structure of the following: **[2]**

(a) Ammonium ion
(b) Magnesium chloride

(ii) Atomic number of an element is 20. Answer the questions given below: **[3]**

(a) How many valence electrons does this element have?
(b) To which period does it belong?
(c) Will this element behave as an oxidising or a reducing agent?

(iii) An article is electroplated with silver using Aqueous Sodium Argentocyanide solution as an electrolyte. Answer the following questions: **[4]**

(a) Write the electrode reaction taking place at cathode.
(b) Describe the changes that occur at anode.
(c) Silver nitrate solution is not preferred as an electrolyte. Give a reason.
(d) Give one reason for electroplating.

(iv) Give a balanced equation for laboratory preparation of Ethanol by the process of dehydration. **[1]**

Question 4

(i) Write complete and balanced equations for the reactions occurring in the following cases: **[3]**

(a) Passing dry ammonia gas over heated Copper [II] oxide placed in a combustion tube to produce a brown metal.
(b) When concentrated nitric acid is reacted with sulphur to produce a reddish-brown gas.
(c) When concentrated sulphuric acid oxidises sulphur to produce a gas which turns acidified potassium dichromate paper green.

(ii) A hydrocarbon on analysis was found to contain 2.2% hydrogen, 26.6% carbon and 71.2% oxygen. Calculate the following: **[4]**

(a) The Empirical formula of the compound.
(b) The molecular formula of the compound if its relative molecular mass is 90.
[Atomic mass: C=12, H=1, O=16]

(iii) Anita's father bought a basket of ripe bananas. While opening it she found a small sachet containing a white crystalline powder along with the bananas. She was told that it is a chemical that releases a gas when it comes in contact with moisture that induces ripening of fruits. **[3]**

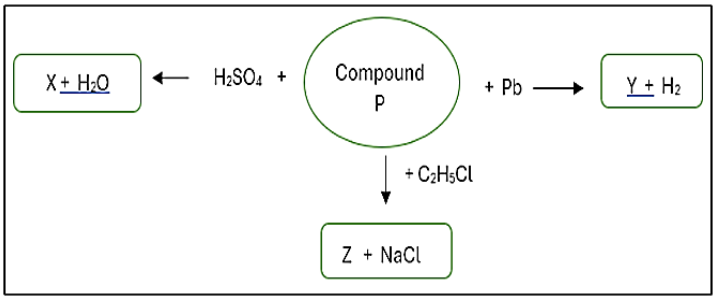
(a) Name the chemical powder in the sachet.
(b) Name the gas.
(c) Give a balanced chemical equation for the reaction that results in the evolution of this gas.

Question 5

(i) Ram has solution X, Y and Z that has pH 2, 7 and 13 respectively. Which solution: **[3]**

(a) Will liberate ammonia gas when reacted with ammonium chloride.
(b) Will liberate Sulphur dioxide gas when heated with Sodium sulphite.
(c) Will not have any effect on litmus paper?

(ii) Observe the reactions given below and answer the following questions: [4]



(a) Identify compound P.
(b) Give the chemical formula of Z.
(c) Write the reaction taking place between the identified compound P and Sulphuric acid.
(d) Name compound Y.

(iii) One variety of household fuel is a mixture of propane (60%) and butane (40%). If 20 litres of this mixture is burnt, find the total volume of carbon dioxide added to the atmosphere. The combination reactions can be represented as: [3]

$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$

Question 6

(i) Write a balanced equation for the preparation of each of the following salts: [2]
(a) Copper sulphate from Copper carbonate.
(b) Zinc carbonate from Zinc sulphate.

(ii) Ravi heated 367.5 g of $KClO_3$ in a test tube. The decomposition of potassium chlorate took place according to the equation: [2]

$2KClO_3 \rightarrow 2KCl + 3O_2$

Find:
(a) The volume of the colourless and odourless gas liberated during the experiment.
(b) The weight of the residue left behind in the test tube.

(iii) Give balanced chemical equation for the following: [3]
(a) Laboratory preparation of Nitric acid.
(b) Catalytic oxidation of ammonia.
(c) Laboratory preparation of Ethane.

(iv) Study the following observations and name the anions present in each of the reactions: [2]
(a) When a crystalline solid '**P**' is warmed with concentrated H_2SO_4 and copper turnings a reddish brown gas is released.

(b) When few drops of barium nitrate solution is added to the salt solution '**Q**', a white precipitate is formed which is insoluble in HCl.

(v) Define – Mole. **[1]**

Question 7

(i) **Study the information given in the table below and answer the questions that follow:** (Note: The letters do not represent the actual symbols of the elements) **[3]**

Element	Electronic Configuration	Ionisation Energy $kjmol^{-1}$
X	2,2	900
Y	2,8,2	738
Z	2,8,8,2	590

(a) Explain why element X has highest ionization energy.
(b) To which period does Z belong?
(c) Draw the electron dot structure of the compound formed between Z and oxygen.

(ii) For the preparation of HCl acid: **[2]**

(a) Why is direct absorption of HCl gas in water not feasible?
(b) What arrangement is done to dissolve HCl gas in water?

(iii) **A gas cylinder can hold 1 kg of hydrogen at room temperature and pressure:** **[4]**

(a) Find the number of moles of hydrogen present.
(b) What weight of CO_2 can the cylinder hold under similar conditions of temperature and pressure? (H= 1, C = 12, O = 16)
(c) If the number of molecules of hydrogen in the cylinder is X, calculate the number of CO_2 molecules in the cylinder under the same conditions of temperature and pressure.
(d) State the law that helped you to arrive at the above result.

(iv) Write a balanced chemical equation to show how Oleum is converted to Sulphuric acid. **[1]**

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