GREENLAWNS SCHOOL, WORLI

PRELIMINARY EXAMINATION: 2024-25

CHEMISTRY

Std: X | Marks: 80

Date: /01/2025 | 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 **15** 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) The number of molecules in 3.6 g of H_2O (H=1, O=16) is:

(a) 1.2×10^{23} (c) 0.2×10^{23}

(b) 6×10^{23} (d) 12×10^{23}

(ii) Which of the following pairs of metals are reduced only by electrolysis?

(a) Na and Pb (c) Na and Ca

(b) Ca and Cu (d) Ag and K

(iii) In the manufacture of Sulphuric acid, SO_3 is absorbed in:

(a) H_2O (c) Oleum

(b) Conc. H_2SO_4 (d) Vanadium pentoxide

(iv) The functional group present in Methanal is:

(a) Ester (c) Halide

(b) Carboxylic acid (d) Aldehyde

(v) The correct order of electron affinity is:

(a) Cl > Na > Si > Ar (c) Si > Cl > Na > Ar

(b) Cl > Si > Ar > Na (d) Cl > Si > Na > Ar

(vi) Which pair of elements listed below will not undergo covalent bond formation?

(a) H and O (c) C and Cl

(b) Na and Cl (d) C and H

(vii) Two bases which are not alkali are:

(a) $Ca(OH)_2$ and NH_4OH (c) $Al(OH)_3$ and ZnO

(b) Na_2O and K_2O (d) NaOH and KOH

(viii) **Assertion (A)**: Acidity of Acetic acid is 1.
Reason (R): Acetic acid ionizes in an aqueous solution to produce one hydrogen ion per molecule of the acid.

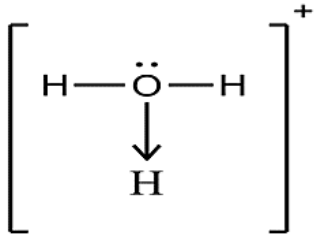
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

(ix) Sodium atoms and Sodium ions:
(a) Are chemically same
(b) Have the same number of electrons
(c) Have the same number of protons
(d) Form covalent bonds

(x) An organic compound X of molecular formula $C_2H_4O_2$, gives a brisk effervescence with sodium bicarbonate. X is:
(a) Acetic acid
(b) Formic acid
(c) Benzoic acid
(d) Oxalic acid

(xi) On heating strongly, pure nitric acid decomposes to:
(a) H_2O and NO_2
(b) H_2O, NO_2 and O_2
(c) H_2O, NO and O_2
(d) NO_2 and O_2

(xii) What type of bond is/are present in the structure below?



(a) Covalent and coordinate bond
(b) Only covalent bond
(c) Only ionic bond
(d) Covalent and ionic bond

(xiii) The appropriate method to prepare lead sulphate from lead carbonate:
i. $PbCO_3 + H_2SO_4$
ii. $PbCO_3 + HNO_3$
iii. $PbCO_3 + NaNO_3$
iv. $PbCO_3 + HCl$

(a) Only i
(b) Only iv
(c) ii & iii
(d) i & iv

(xiv) Zinc blende is concentrated by the method of:

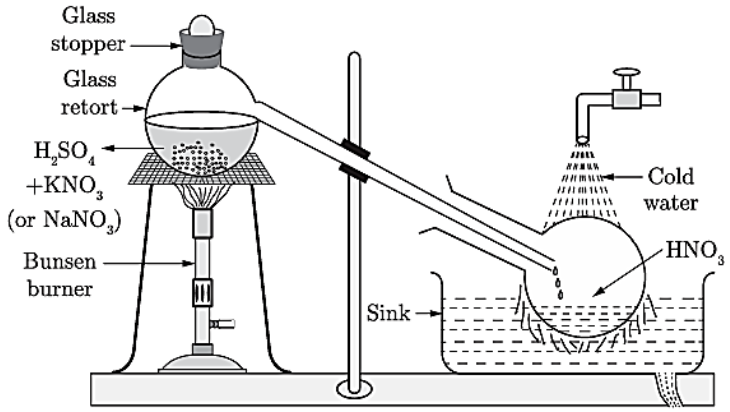
(a) Leaching
(b) Magnetic separation
(c) Froth floatation
(d) Gravity separation

(xv) The hydroxide which is soluble in excess of ammonium hydroxide is:

(a) Lead hydroxide
(b) Copper hydroxide
(c) Ferrous hydroxide
(d) Calcium hydroxide

Question 2

(i) The setup shown below is that of the laboratory preparation of nitric acid. [5]



(a) What is the ratio of the reactants used?
(b) Give the reaction which takes place in the retort.
(c) Why the product obtained is yellow in colour?
(d) Why is the temperature maintained below 200^0C?
(e) Why is an all glass apparatus used in the lab preparation of nitric acid?

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

Column A	Column B
(a) Ferric chloride	1. Precipitation
(b) Sodium chloride	2. Simple displacement
(c) Magnesium sulphate	3. Metal oxide and dilute acid
(d) Lead chloride	4. Synthesis
(e) Copper sulphate	5. Neutralisation (Titration)

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

(a) The acid anhydride of sulphuric acid is _____ (Sulphur dioxide / Sulphur trioxide).
(b) In a period or a group, the larger the atomic size of an element, the _____ (more / less) metallic is the element.

(c) Aluminium is an important constituent metal in duralumin since it is_____ (a good conductor of heat / unaffected by food acids / light).
(d) On reaction with manganese (IV) oxide, conc. hydrochloric acid produces a _____ (reddish brown / greenish yellow) coloured gas.
(e) The compound that does not have a lone pair of electrons is _____. (Ammonia / Carbon tetrachloride)

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

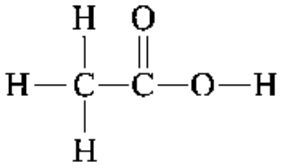
(a) A non-metal which has three electrons in the outermost shell.
(b) The gas evolved on reaction of aluminium with boiling concentrated caustic alkali solution.
(c) Ethyl alcohol containing pyridine or copper sulphate.
(d) Separation of ore and gangue due to difference in density of particles.
(e) The ratio of the mass of a certain volume of gas to the same volume of hydrogen measured under the same conditions of temperature and pressure.

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

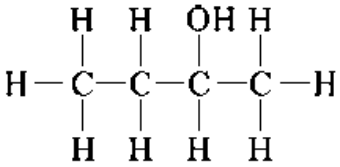
1. Ethanal
2. 2,2-dimethyl propane
3. But-2-yne

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

1.



2.

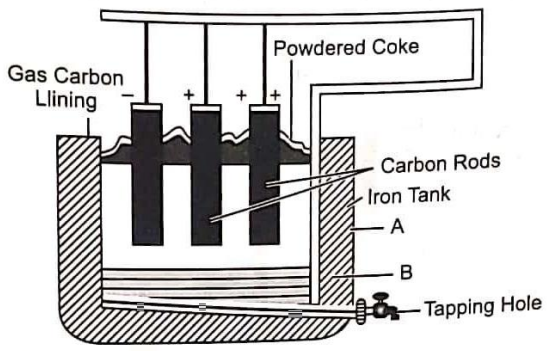


SECTION B

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

Question 3

(i) The following questions relate to the extraction of aluminium: **[4]**



(a) Name the process shown in the figure.
(b) Why is the electrolyte covered with coke?
(c) Write the reaction taking place at cathode.
(d) Why are there a number of carbon rods, instead of a single carbon rod?

(ii) Give balanced equations for the below conversions with appropriate conditions: **[4]**

(a) Ethanol $\xrightarrow{A}$ Ethene $\xleftarrow{B}$ Ethyl bromide

(b) Sodium acetate $\xleftarrow{C}$ Acetic acid $\xrightarrow{D}$ Ethyl acetate

(iii) Draw an electron dot diagram of: **[2]**

(a) A non-polar hydrocarbon
(b) A polar covalent compound

Question 4

(i) If the vapour density of a gaseous hydrocarbon 'X' is 35, determine its molecular formula if 0.60 g of carbon is present in 0.70 g of the hydrocarbon 'X'. **[3]**
(C = 12, H = 1)

(ii) Give one chemical test to distinguish between the following pairs: **[3]**

(a) Calcium nitrate and calcium chloride solution
(b) Iron [II] chloride and Iron [III] chloride solution
(c) Ethane and Ethene

(iii) Give balanced chemical equations for the following: **[4]**

(a) Burning of ammonia in oxygen.
(b) Laboratory preparation of hydrogen chloride.
(c) Reaction of excess ammonia with chlorine.
(d) Action of cold and dilute nitric acid on copper.

Question 5

(i) $\mathbf{3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2}$ **[2]**

If 40g of iron reacts completely, calculate:

(a) The weight of Fe_3O_4 formed
(b) The volume of hydrogen evolved at S.T.P. (Fe=56, H=1, O=16)

(ii) Arrange the following as per the instruction given in the brackets: **[2]**

(a) Mg, Cl, Na, S, Si (decreasing order of atomic size)
(b) Li, K, Na, H (decreasing order of ionisation potential)

(iii) Write one use of the following alloys: **[2]**

(a) Brass
(b) Fuse metal

(iv) The following questions are pertaining to the laboratory preparation of Ammonia gas from Magnesium nitride: **[4]**

(a) Write a balanced chemical equation for its preparation.
(b) Why is this method seldom used?
(c) How do you identify the gas formed?
(d) How is the gas collected in the laboratory?

Question 6

(i) Study the following observations and name the anions present: **[3]**

(a) When a crystalline solid **'P'** is warmed with conc. Sulphuric acid and copper turnings, a reddish brown gas is released.
(b) When a few drops of dilute Sulphuric acid is added to salt **'Q'** and heated, a colourless gas is released which turns moist lead acetate paper silvery black.
(c) When few drops of barium nitrate solution is added to the salt solution **'R'**, a white precipitate is formed which is insoluble in HCl.

(ii) What will you observe when: **[3]**

(a) Excess ammonium hydroxide solution is added to lead nitrate solution.
(b) Sugar crystals are added to Conc. Sulphuric acid.
(c) Ammonia gas is passed over heated Copper [II] oxide.

(iii) Give reasons for the following: **[3]**

(a) Concentrated Sulphuric acid is not used for drying ammonia gas.
(b) Ionic compounds have a high melting point.
(c) Conductivity of dilute hydrochloric acid is greater than that of acetic acid.

(iv) Define – Ionisation potential. **[1]**

Question 7

(i) Write the equation for the preparation of the following salts: **[3]**

(a) Magnesium chloride from Magnesium.
(b) Lead sulphate from lead nitrate.
(c) Sodium sulphate from sodium carbonate.

(ii) Complete the table given below: **[4]**

Electrolyte	Cathode	Anode	Reaction at anode	Product at cathode
Acidified water	Platinum	Platinum	(a) ----------	(b) ----------
Copper sulphate	Copper	Copper	(c) ----------	(d) ----------

(iii) Ethane is exploded with oxygen. If the volume of ethane used is 200 cm^3 & oxygen is 3000cc. Calculate the volume of unused oxygen. **[2]**

(iv) Give one point of difference between roasting and calcination. **[1]**

Question 8

(i) Give an equation to show the following properties of sulphuric acid: **[3]**

(a) Oxidising agent
(b) Dehydrating agent
(c) Non-volatile acid

(ii) The following questions pertain to the laboratory preparation of HCl gas: **[3]**

(a) Why is Conc. Nitric acid not used in the preparation?
(b) Name the drying agent used and give a reason for your choice.
(c) Mention one precaution that needs to be followed during the preparation.

(iii) Choose the correct word from the brackets to complete the following sentence: **[2]**

Anions are discharged at the anode during electrolysis. The tendency of the anions to get _____ (reduced / oxidised) at the anode increases on _____ (ascending / descending) the electrochemical series.

(iv) Give balanced equation for the conversion of: **[2]**

(a) Ethanol to sodium ethoxide.
(b) Methane to carbon tetrachloride.

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