ST. JOSEPH'S ACADEMY, DEHRADUN

I[ST] PRELIMINARY EXAMINATION 2022-23

SUBJECT: CHEMISTRY **CLASS: X** **M.M.: 80 TIME: 2 HOURS**

NAME OF THE STUDENT.....CLASS/SECTION.....ROLL NO.....

QUESTION 1. [15]

Choose the correct answer from the options given.

a) The trend in metallic nature of metals as we go from top to bottom in a group:
   (i) Increases
   (ii) Decreases
   (iii) Neither increases nor decreases
   (iv) None of the above.

b) The compound which is a non electrolyte:
   (i) KCl (aq)
   (ii) H_2SO_4 (dil)
   (iii) CCl_4 (l)
   (iv) CH_3COOH(aq)

c) The molecular formula of an organic compound is $C_6H_{12}O_6$ and the empirical formula is CH_2O, the value of n is: (C=12, H=1 & O=16)
   (i) 6
   (ii) 1
   (iii) 12
   (iv) 2

d) The bond in carbon tetrachloride is :
   (i) Single covalent bond
   (ii) Double covalent bond
   (iii) Ionic bond
   (iv) Triple covalent bond

e) Identify one statement that does not hold true for electrorefining of copper:
   (i) Electrolyte is acidified copper sulphate solution
   (ii) Cathode is a thin strip of pure copper
   (iii) Anode is impure block of copper
   (iv) Anode gets thicker

f) During ionization metal lose electrons this change can be called:
   (i) Oxidation
   (ii) Reduction
   (iii) Redox
   (iv) Displacement

g) Which statement is not true for electrolysis?
   (i) Cations migrate towards cathode
   (ii) Anions discharge at anode
   (iii) Anions get reduced during electrolysis
   (iv) Cations get reduced during electrolysis

h) Cathode is a reducing electrode because:
   (i) It has less number of electrons
   (ii) It has deficiency of electrons
   (iii) Cations gain electrons from cathode
   (iv) Anions lose electrons to cathode

i) The IUPAC name of ethylene is :
   (i) Propane
   (ii) Propyne
   (iii) Ethene
   (iv) Ethyne

j) The chemical name of the principal ore of aluminium:
   (i) Sodium aluminium fluoride
   (ii) Aluminium oxide
   (iii) Hydrated aluminium fluoride
   (iv) Hydrated aluminium oxide

k) Carbon to carbon double bond is found in :
   (i) 2- butylene
   (ii) Acetaldehyde
   (iii) Acetic acid
   (iv) Ethyl alcohol

l) The number of electrons that do not take part in bonding during the formation of the oxygen molecule is :
   (i) 2
   (ii) 6
   (iii) 8
   (iv) 4

m) An example of complex salt is:
   (i) Zinc sulphate
   (ii) Sodium hydrogen sulphate
   (iii) Iron (II) ammonium sulphate
   (iv) Tetraammine copper (II) sulphate

n) Metal oxide which react with acid as well as alkalis is:
   (i) Silver oxide
   (ii) Copper [II] oxide
   (iii) Aluminium oxide
   (iv) Calcium oxide.

(o) The unsaturated hydrocarbons undergo :
   (i) Oxidation reaction
   (ii) Substitution reaction
   (iii) Addition reaction
   (iv) Both substitution and oxidation reaction.

QUESTION 2.

a) Give the structural formula of the following compounds. [5]
   (i) 1,2 Dichloropropane
   (ii) 2 –Methyl pentanoic acid
   (iii) 4 –Methyl Pentan-2-ol
   (iv) 3- Methyl but-2-ene
   (v) 2- Butyne

b) Identify the following. [5]

(i) A white powder P when strongly heated gives a yellow residue which changes to white solid on cooling. The gas evolved produce a brown black colour in freshly prepared acidified solution of iron (II) sulphate. What is P?

(ii) A white solid Q when heated with sulphuric acid gives a gas which forms a white precipitate when passed through silver nitrate solution. When Q is heated with sodium hydroxide solution a gas is liberated which turns Nessler's reagent paper brown. Name the cation and anion in Q.

(iii) A white solid R gives a colourless and odourless gas when heated with dilute sulphuric acid. The gas turns limewater milky. The substance R imparts a brick red colour to the non luminous flame of the Bunsen burner. Identify the cation and anion in R.

c) Name the gas in each case to which the following descriptions could apply. [5]

(i) Reacts with hydrogen chloride to give a white solid.
(ii) Reacts with an amphoteric oxide on heating liberating nitrogen.
(iii) Reacts with iron to give iron(II) chloride and a neutral gas.
(iv) Reacts with ammonia in presence of a catalyst to give nitric oxide and steam.
(v) Reacts with chlorine in presence of ultraviolet light to give methyl chloride as one of the products.

d) What do you see: [5]

(i) The gas formed on heating rock salt and concentrated sulphuric acid is passed through lead nitrate solution.
(ii) The gas formed on reacting sodium propanoate and sodalime is bubbled through a solution of bromine in an inert solvent.
(iii) Concentrated sulphuric acid is added to sugar solution.
(iv) Copper (II) sulphate is electrolysed using platinum electrodes.
(v) Excess ammonium hydroxide is added to the solution formed on reaction between lead carbonate and dilute nitric acid.

e) Give balanced molecular equations for the following. [5]

(i) Excess ammonia reacts with chlorine.
(ii) Carbon reacts with concentrated nitric acid.
(iii) Sulphur reacts with concentrated sulphuric acid
(iv) Ferric hydroxide reacts with dilute nitric acid.
(v) Magnesium sulphite reacts with dilute sulphuric aid.

SECTION-B
[ATTEMPT ANY FOUR QUESTIONS]

QUESTION 3.

(a) Give balanced molecular equations to explain the following properties of sulphuric acid. [5]

1. Dibasic nature.
2. Non volatile nature.
3. As oxidizing agent using copper.
4. As a typical acid.
5. As a dehydrating agent using sugar.

(b) A metal article is to be electroplated with silver. Answer the following questions. [5]

1. Name the electrolyte.
2. Why is it preferred to silver nitrate as an electrolyte?
3. State one condition to ensure that the deposit is smooth, firm and long lasting. Write the reaction taking place at cathode and anode.

QUESTION 4.

(a) Give balanced molecular equations for the following conversions. [4]

1. Ethyne from calcium carbide.
2. Ethene from ethanol.
3. Ethane from sodium propanoate
4. Ethane from ethyne

(b) Draw the branched structure of isomers of pentane. [3]

(c) State the following [3]

(i) The non metal present in fluorspar.

(ii) The metal from lithium, sodium and potassium which has the highest metallic character.

(iii) The ion from the ions Ag^{1+}, H^{1+}, Cu^{2+} which is discharged less easily at cathode.

QUESTION 5.

(a) The following questions are relevant to the extraction of aluminium. [4]

(i) State the reason for addition of caustic alkali to bauxite ore during purification of bauxite.

(ii) Give balanced chemical equations involved in the purification of bauxite.

(b) The following reactions are carried out : [4]

A: Nitrogen + Metal $\longrightarrow$ Compound X

B: X + H_2O $\longrightarrow$ Ammonia + Another compound

C: Ammonia + metal oxide $\longrightarrow$ Metal + water + nitrogen

[The metal used is divalent]

(i) State the major condition to be followed in equation B.

(ii) Write the formula of compound X

(iii) Write the balanced chemical equation for the reaction B

(iv) Which property of ammonia is demonstrated by reaction C.

(c) Distinguish between the following: [2]

(i) Dilute HCl and dilute HNO_3 using silver nitrate solution.

(ii) Dilute HCl and dilute H_2SO_4 using lead nitrate solution.

QUESTION 6.

(a)

GROUP	1	2	13	14	15	16	17	18
PERIOD-2	Li		D			O	J	Ne
PERIOD-3	A	Mg	E	Si		H	M	
PERIOD -4	R	T	I		Q	U		Y

- In this table H does not represent hydrogen.
- Some elements are given in their own symbol and position in the periodic table.
- While others are shown with a letter.

With reference to the table answer the following questions. [8]

1. Identify the most electronegative element.
2. Identify the most reactive metal in group 1
3. Identify the element from period 3 with least atomic size.
4. How many valence electrons are present in Q?
5. Which element from group 2 would have least ionization energy?
6. Identify the noble gas of the fourth period.
7. In the compound between A and H, what type of bond would be formed and give the molecular formula for the same.

(b) Compare the compounds carbon tetrachloride and sodium chloride with regard to solubility In water and electrical conductivity. [2]

QUESTION 7.

a) Name the following. [4]

(i) Two bases which are not alkalis.
(ii) A normal salt and an acid salt of the same acid.
(iii) A salt insoluble in cold water but soluble in hot water.
(iv) An alloy of copper and zinc.

b) A compound gave a following data: [4]
C= 57.82%, O=38.58% and the rest hydrogen. Its relative molecular mass is166. Find its Empirical formula and molecular formula. [C=12 O=16 H=1]

c) 67.2 litres of hydrogen combines with 44.8litres of nitrogen to form ammonia.
$N_2 + 3H_2 \longrightarrow 2NH_3$. Calculate the volume of ammonia produced. What is the substance, if any that remains in the resultant mixture. [2]

QUESTION 8.

(a) Explain the following [4]

(i) Dilute nitric acid is generally considered a typical acid but not so in its reaction with metals.
(ii) Concentrated nitric acid appears yellow when it is left standing in a glass bottle.
(iii) Concentrated nitric acid accidentally falls on the skin.
(iv) Sulphur trioxide vapours are absorbed in concentrated sulphuric acid and not in water.

(b) State the composition of the following alloys: [3]

(i) Duralumin
(ii) Magnalium
(iii) Stainless steel.

(c) Give one point of difference between the following pairs [3]

(i) Calcination and roasting.
(ii) Polar and non polar covalent compounds.
(iii) Strong electrolyte and weak electrolyte