



St. Mary's Convent Inter College, Prayagraj

Preliminary Examination 2024 - 25

Time : 2hr.

Class- 10^E
CHEMISTRY

M.M. : 80

Name : Roll No. Date :

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

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

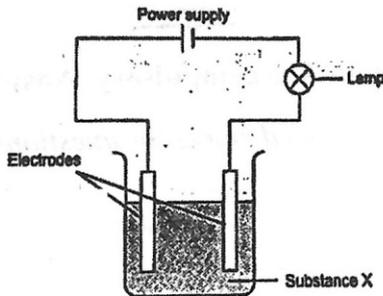
SECTION - A (40 marks)

Question -1

[15]

Choose one correct answer to the questions from the given options:

- i) Which one of the following statements is true for the electrolysis of molten lead bromide?
- Silver grey metal deposits at the anode
 - Temperature is not maintained during electrolysis
 - Brown vapours of bromine is obtained at the anode
 - Electrolyte contains H^+ ions along with Pb^{2+} ions
- ii) Atomic number of element X is 12 and it forms an ionic compound with element Y. which of the following atomic numbers will be appropriate for Y?
- 8
 - 10
 - 14
 - 18
- iii) Which one of the following will possess number of molecules equal to Avogadro's number?
- P. 22.4 litres of CO_2 at STP
Q. One mole of Na
R. One gram-molecule of NaOH
- P and Q
 - P and R
 - Q and R
 - P, Q and R
- iv) The equation below shows the reaction between element 'M' and dilute sulphuric acid.
 $M(s) + H_2SO_4(aq) \rightarrow MSO_4(aq) + H_2(g)$
Which particles are responsible for conducting electricity in dilute sulphuric acid and compound MSO_4 ?
- Electrons
 - Only positive ions
 - Only negative ions
 - Both positive and negative ions
- v) **Assertion:** Ammonia gas is collected by the downward displacement of air .
Reason: Ammonia gas is heavier than air.
- Both A and R are true and R is the correct explanation of A
 - Both A and R are true and R is not the correct explanation of A
 - A is true but R is false
 - A is false but R is true
- vi) Which one of the following statements is incorrect regarding the following compounds A and B?
- A. $CH_3-CH=CH-CH_3$ B. $CH_3-CH_2-CH=CH_2$
- A and B are unsaturated hydrocarbons
 - A and B are position isomers
 - A and B belong to the same homologous series
 - A and B have different general formula

- vii) Ravi 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
- Silver nitrate solution
 - Barium chloride solution
 - Ammonium hydroxide
 - Calcium chloride solution
- viii) In the circuit below, the lamp lights up. What could X be?
- A solution of alcohol in water
 - A solution of sodium chloride in water
 - Sugar solution
 - Solid potassium chloride
- 
- ix) Elements A and B have atomic numbers 8 and 13 respectively. The chemical formula of the compound formed between A and B is
- AB
 - A₂B₃
 - B₂A₃
 - B₃A₃
- x) Choose the correct set of electrodes used in Hall-Heroult's process ?
- Cathode-carbon lining; anode-thick carbon rods
 - Cathode-nickel lining; anode-thick carbon rods
 - Cathode-carbon lining; anode-nickel rods
 - Cathode-nickel lining; anode-nickel rods
- xi) Assertion: The process of heating the concentrated ore in the absence of air is roasting.
Reason: Froth floatation is suitable for sulphide ores.
- Both A and R are true and R is the correct explanation of A
 - Both A and R are true and R is not the correct explanation of A
 - A is true but R is false
 - A is false but R is true
- xii) The ratio between the volumes occupied by 64 g of SO₂ gas and 4g of H₂ gas at STP [H=1, S=32, O=16] is
- 1:1
 - 1:2
 - 1:4
 - 1:1
- xiii) Glucose reacts with concentrated sulphuric acid to give a very pure form of carbon called sugar charcoal. The reaction taking place is:
- Oxidation
 - Combustion
 - Dehydration
 - Combination
- xiv) The aim of the fountain experiment is to prove that HCl
- Turns blue litmus red
 - Is denser than air
 - Is highly soluble in water
 - Fumes in moist air
- xv) ----- is the functional group in ethanal:
- C₂H₅
 - OH
 - CHO
 - COOH

Question – 2

[5]

A) Give the scientific term/word used for the following:

- 1) The pair of electrons in an atom that does not take part in chemical bond formation.
- 2) An ionic compound which dissociates in aqueous solution to yield a positive ion other than H^+ and a negative ion other than OH^- .
- 3) The process involved in crushing and grinding of ore into fine particles.
- 4) The method by which bauxite ore is concentrated using caustic soda solution.
- 5) The tendency of an element to form chains of identical atoms.

B) Complete the sentences by choosing the correct answer from the brackets :

[5]

- 1) Alkynes undergo _____ (addition / substitution) reactions.
- 2) The atomic size of Boron is 0.88A and that of Nitrogen is 0.70A. Nitrogen lies to the _____ (left / right) of Boron in the periodic table.
- 3) The _____ (higher / lower) is the position of the cation in the electrochemical series the greater is the difficulty of it being discharged at the cathode.
- 4) The number of chain isomers possible for an alkane with five carbon atoms are _____ (three / four).
- 5) Ammonia can convert heated copper oxide to copper metal .This shows that ammonia is a _____ (oxidising / reducing) agent.

C) Match the following:

[5]

Column A

- 1) White, soluble in excess NaOH
- 2) White, insoluble in excess NaOH
- 3) Acid salt
- 4) Liberates NH_3 on addition of NaOH
- 5) Basic salt

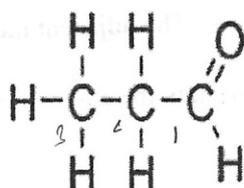
Column B

- A. $Pb(OH)Cl$
- B. $(NH_4)_2SO_4$
- C. $Ca(OH)_2$
- D. $Zn(OH)_2$
- E. $NaHSO_4$

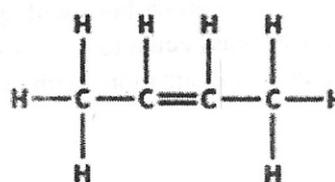
D) a. Write the IUPAC name of the following organic compounds:

[5]

1)



2)



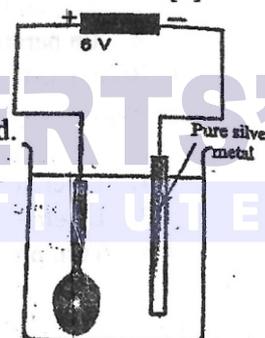
b. Draw structural formula for the following:

- 1) 2- methyl pentane
- 2) butanoic acid
- 3) 2,2 dichloropropane

E) An apparatus was set up by a student as shown below to electroplate a spoon with silver, using an appropriate electrolyte. However, the procedure was not successful.

[5]

- 1) Mention the error in the experiment.
- 2) Redraw the set-up after rectifying the error.
- 3) Name the electrolyte you would choose for the process to be successfully completed.
- 4) What would you observe at the anode?
- 5) Write the reaction taking place at the anode.





SECTION- B (40 MARKS)

Question – 3

- a) What property of Sulphuric acid is exhibited in each of the following cases: [2]
- In the preparation of HCl gas when it reacts with Sodium chloride.
 - When conc. Sulphuric acid reacts with Copper to produce sulphur dioxide gas.
- b) Give a reason why: [2]
- Concentrated nitric acid appears yellow when it is left standing in a glass bottle.
 - Concentrated alkali is used for the concentration of bauxite ore.
- c) Given below are a few elements belonging to the same period of the periodic table along with their atomic radii. Answer the questions that follow: [3]
- P(0.110nm), Q(0.130nm), R(0.157nm), S(0.099nm)
- Arrange the elements in the order in which they appear in the particular period of the periodic table.
 - Which one of these is most electronegative?
 - Identify the strongest reducing agent among these.
- d) The following questions relate to the industrial preparation of nitric acid by Ostwald's process. [3]
- Write the temperature and the catalyst required during the catalytic oxidation of ammonia.
 - Give a balanced chemical equation for the reaction occurring during the conversion of nitrogen dioxide to nitric acid.

Question – 4

- a) Differentiate between the following pairs using the chemical given in brackets: [2]
- Ammonium hydroxide and sodium hydroxide solution (excess of copper sulphate solution)
 - Dilute hydrochloric acid and dilute sulphuric acid (barium chloride solution)
- b) Give a reason why: [2]
- Alumina is reduced electrolytically rather than by using a reducing agent like carbon.
 - Dry ammonia gas is a covalent compound and does not conduct electricity but its aqueous solution ammonium hydroxide is a weak electrolyte.
- c) Alkanes are ----- hydrocarbons with general formula ----- . The adjacent members of this series differ by molecular mass equal to -----a.m.u. [3]
- d) Give balanced chemical equations with necessary conditions to show the conversion of the following: [3]
- Ethene to ethane
 - Sodium chloride to Sodium sulphate
 - Aluminium hydroxide to alumina

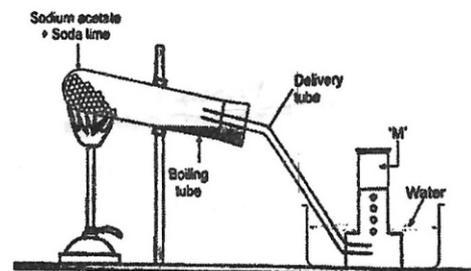
Question – 5

- a) Ammonia is prepared by Haber's process on a large scale. If it was required to prepare 500ml of ammonia gas using nitrogen and hydrogen, calculate the volume of each gas required in the above process. [2]
- b) Give balanced chemical equations to show the following. Give conditions wherever necessary. [2]
- Preparation of ammonia from magnesium nitride
 - Preparation of ethyne from calcium carbide
- c) Rohit has three different colourless solutions X, Y and Z that has pH 2, 7 and 13 [3] respectively. Which solution will:
- Liberate sulphur dioxide gas when reacted with sodium sulphite
 - Liberate ammonia gas when heated with ammonium chloride
 - Turn pink when a few drops of phenolphthalein is added to it

- d) 1. When nitric acid is prepared by the action of concentrated sulphuric acid and potassium nitrate, what is the special feature of the apparatus used? [1]
 2. Write a balanced chemical equation for the reaction, stating the conditions. [1]
 3. Explain why conc. HCl cannot be used in place of conc. H₂SO₄ as one of the reactants in the reaction? [1]

Question – 6

- a) Draw the electron dot diagram for: [2]
 i. Ammonium radical
 ii. Carbon tetrachloride
 [Atomic no: N=7, C=6, Cl=17, H=1]
- b) Select from the options given in brackets, the method that is used for the following preparations. [2]
[Halogenation, Dehydrohalogenation, Hydrogenation]
 i) Ethyne from ethylene dibromide
 ii) 1,2-dichloro ethene from ethyne
- c) Blue Copper sulphate solution is electrolysed using copper electrodes. [3]
 i. As electrolysis progresses, it is observed that the anode diminishes in size. Explain why?
 ii. State the colour of the solution when electrolysis is almost complete.
 iii. Write the equation for the reaction occurring at the electrode which undergoes reduction.
- d) Answer the following questions based on the diagram given below. In the boiling tube, a mixture of sodium acetate and soda lime is heated to form the product 'M' (the main component of natural gas) [3]
- i. Name M and write its structural formula.
 ii. Give the balanced equation for the above process.
 iii. M undergoes halogenation in the presence of uv light or diffused sunlight. Write a balanced chemical equation to show its reaction with chlorine.



Question – 7

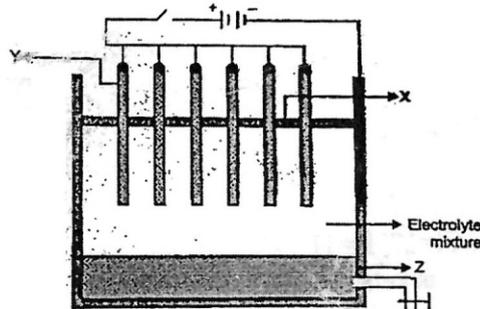
- a) Match the reactants in Column A with the methods of preparation in Column B. [4]
- | <u>Column A</u> | <u>Column B</u> |
|----------------------------|--------------------------------|
| 1. AgNO ₃ + HCl | a. Displacement |
| 2. Fe + Cl ₂ | b. Precipitation |
| 3. Mg + HCl | c. Neutralisation by titration |
| 4. KOH + HNO ₃ | d. Synthesis |
- b) Amit found that 30g of a gas occupied 1000 cc at STP. [3]
 i. What will be the gram molecular weight and the vapour density of this gas?
 ii. How many molecules of this gas will be present in 44.8 litres of it at STP?
- c) Aluminium carbide reacts with water according to the following equation: [3]

$$\text{Al}_4\text{C}_3 + 12\text{H}_2\text{O} \rightarrow 4\text{Al}(\text{OH})_3 + 3\text{CH}_4$$
 Molecular mass of Al₄C₃ = 144, Al(OH)₃ = 78
 i. What mass of Al(OH)₃ is formed from 12g of Al₄C₃?
 ii. What volume of methane at STP is obtained from 12g of Al₄C₃?

Question – 8.

- a) Study the given figure, which relates to the electrolytic reduction of alumina, and answer the questions that follow:

[4]



- i. Along with cryolite and alumina, one more substance is added to the electrolytic mixture. Name the substance.
- ii. A powdered substance X is sprinkled on the surface. State its purpose.
- iii. State the change observed in electrode Y during the process.
- iv. Write the reaction taking place at the electrode Z.

- b) Name the:

[3]

- i. Common metal present in brass and duralumin
- ii. Common metal present in bronze and solder
- iii. **Principal** metal in stainless steel

- c) Write balanced chemical equation in each case:

[3]

- i. Reaction of ethyl alcohol with acetic acid
- ii. Reaction of ammonia with excess chlorine
- iii. Action of potassium hydroxide on aluminium hydroxide

.....X.....X.....