



## ST. JOSEPH'S COLLEGE, PRAYAGRAJ

PRE-BOARD EXAMINATION 2024

CHEMISTRY

CLASS - X

TIME: 3 Hours

MM: 80

### SECTION - A

(Attempt all questions from this Section)

Q 1) Choose the correct answers to the questions from the given options.

[15]

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

1) Organic compounds have relatively-

- a) low melting but high boiling point
- b) low melting and low boiling point
- c) high melting point but low boiling point
- d) high melting and high boiling point

2) Which of the following is dibasic in nature-

- a) HCl
- b) HNO<sub>3</sub>
- c) H<sub>3</sub>PO<sub>3</sub>
- d) H<sub>3</sub>PO<sub>4</sub>

3) The ions present in the electrolyte are Cu<sup>2+</sup> and Ag<sup>+</sup>. The ion which discharges at the cathode is-

- a) Ag<sup>+</sup>
- b) Cu<sup>2+</sup>
- c) Both Ag<sup>+</sup> and Cu<sup>+</sup>
- d) None of the above

4) The organic compound mixed with ethanol to make it spurious is

- a) Methanol
- b) Methanoic acid
- c) Methanal
- d) Ethanoic acid

5) **Assertion (A):** Lead hydroxide is chalky white precipitate which is soluble in excess of ammonium hydroxide.

**Reason (R):** Reaction of lead nitrate with ammonium hydroxide form lead(II) hydroxide which is insoluble in excess of ammonium hydroxide.

- a) Both Assertion and Reason are true.
- b) Both Assertion and Reason are false
- c) Assertion is true and Reason is false.
- d) Assertion is false but Reason is true.

6) **Assertion (A):** HCl gas is highly soluble in water.

**Reason (R):** HCl gas is collected over water.

- a) Both Assertion and Reason are true, R is the correct explanation of A.
- b) Both Assertion and Reason are true, R is not the correct explanation of A.
- c) Assertion is false but reason is true.
- d) Assertion is true but Reason is false.

7) The atomic masses of sulphur(S), Oxygen(O) and helium(He) are approximately 32, 16 and 4 respectively. Which of the following statements regarding the number of atoms in 32g of sulphur, 16g of oxygen and 4g of helium is correct?

P : 16g of oxygen contains four times the number of atoms as 4g of helium.

Q : 16g of oxygen contains half the number of atoms as 32g of sulphur.

- a) Only P
- b) Only Q
- c) Both P and Q
- d) Neither P nor Q

8) A compound with empirical formula XY<sub>2</sub> has the vapour density equal to its empirical formula weight its molecular formula is-

- a) X<sub>2</sub>Y<sub>4</sub>
- b) X<sub>2</sub>Y<sub>2</sub>
- c) XY
- d) X<sub>4</sub>Y<sub>2</sub>

9) Silver nitrate is a \_\_\_\_\_ electrolyte.

- a) Non
- b) Strong
- c) Weak
- d) Very weak

10) A metal from period 2 and group 1

- a) Potassium
- b) Sodium
- c) Lithium
- d) Beryllium

11) **Assertion (A):** Potassium, sodium, calcium cannot be reduced by coke, carbon monoxide.

**Reason (R):** Oxides of highly active metals have greater affinity towards oxygen and so cannot be reduced by common reducing agent.

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

12) Brass is an alloy of -

- a) Copper and Tin
- b) Copper and Zinc
- c) Zinc and lead
- d) Lead and Tin

13) The metal oxide which can react with acid as well as alkali is-

- a) Silver oxide
- b) Copper (II) oxide
- c) Aluminium oxide
- d) Calcium oxide

14) Assertion(A):  $\text{NH}_3$  is a polar covalent compound.

Reason(R): The shared pair of electrons is unequally distributed between the nitrogen and hydrogen atom in ammonia.

- Both Assertion and Reason are true, R is the correct explanation of A.
- Both Assertion and Reason are true, R is not the correct explanation of A.
- Assertion is true and Reason is false.
- Assertion is false but Reason is true.

15) Solid lead bromide is a:

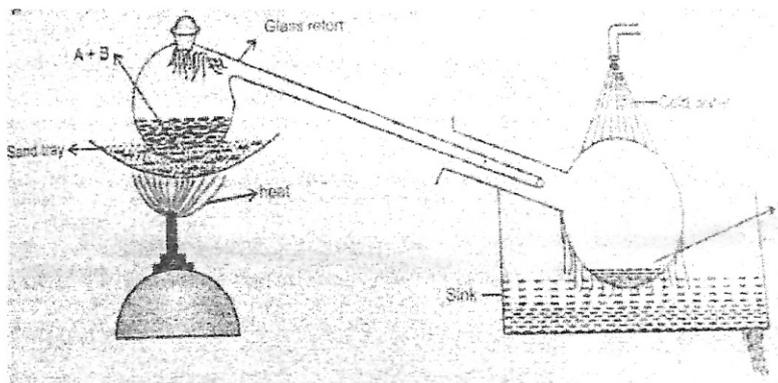
- Conductor of electricity
- Non-conductor of electricity
- Best conductor of electricity
- Semi-conductor of electricity

Q 2)

1) Identify the term/ gas/ substance/ element in the following-

- Ice like crystals formed on cooling an organic acid sufficiently. [5]
- Unique property of a carbon atom to link with each other so as to form long chains or ring structures.
- A method used to concentrate Iron ore.
- The bond formed by the mutual sharing of electron(s).
- The scale used for determining the acidic or alkaline or neutral character of a solution.

2) The figure given below illustrates the apparatus used in the laboratory preparation of nitric acid. [5]



- Name A (a liquid) and B (a solid) [do not give the formula].
- Write an equation to show how nitric acid undergoes decomposition.
- Why is the flask fitted in slanting position in the above figure?
- Why is cold water poured in the collection flask.

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

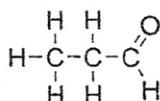
- Dehydro halogenation reaction takes place when an alkyl halide is treated with \_\_\_\_\_ (alc.KOH/ aqueous KOH).
- The process of formation of ions by HCl in aqueous solution is called \_\_\_\_\_ (Ionisation/ Dissociation).
- The value of electron affinity of chlorine is \_\_\_\_\_ (more/ less) than fluorine.
- Heating an ore in a limited supply of air or in the absence of air at a temperature just below its melting point is \_\_\_\_\_ (calcination/ roasting).
- The ion which readily discharge at the anode during the electrolysis of acidified water is \_\_\_\_\_ (Cl<sup>-</sup>/ OH<sup>-</sup>)

4) State your observations: [5]

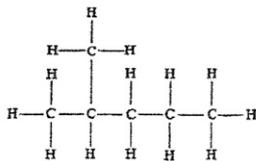
- When concentrated sulphuric acid is added drop wise to a crystal of hydrated copper sulphate.
- At anode, during the electrolysis of copper(II) sulphate solution with copper electrodes.
- When nitrogen dioxide is passed through acidified freshly prepared ferrous sulphate solution.
- When ammonium hydroxide solution is added drop by drop and then in excess to copper sulphate solution
- Sodium hydroxide solution is added to Iron(II) chloride solution

5) Write the IUPAC name of the following organic compounds- [5]

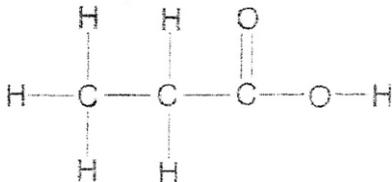
a)



b)



c)



d) Write the structure of the following organic compounds:

a) 3-methyl pentan-2-ol

b) 2-Bromo propane

### SECTION – B

(Attempt any four questions)

Q 3)

1) Complete the following table:

[2]

Process	Product at Cathode	Product at Anode
Electrolysis of molten Lead Bromide		

2) State your observation for the following case:

[2]

- a) Ammonia gas is burnt in an atmosphere of oxygen in the absence of catalyst.  
 b) Bromine vapours are passed into a solution of ethyne in carbon tetrachloride.

3) Complete the table given below which refers to the important industrial processes.

[3]

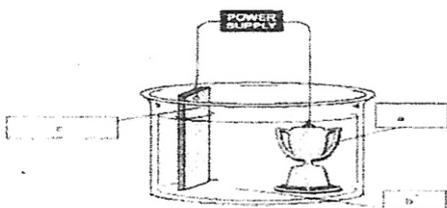
Output refers to the product of the process not the intermediate steps.

Name of the process	Inputs	Catalyst	Equation for catalysed reaction	Output
----- -----	Hydrogen + Nitrogen	Finely divided iron	-----	-----

4) A trophy manufacturer electroplates an iron trophy with Silver.

[3]

- a) Write the equation for the half reaction that occurs at the iron trophy.  
 b) Identify an appropriate electrolyte.  
 c) Identify the anode.





Q 4)

1) Convert:

- a) Ethyl chloride to ethyl alcohol
- b) Acetylene to Ethylene

[2]

2) Answer the following question:

- a) Name the gaseous reactants used during the Ostwald's process.
- b) Name the dissolved gas due to which the commercial sample of nitric acid is pale yellow in colour.

[2]

3) Answer the following question:

- a) Define Isomerism.
- b) State the type of isomerism present in the following pair of compounds -
  - i. Propanol and Propan-2-ol
  - ii. Butane and 2-methylpropane

[3]

4) Name the gas evolved when the following mixtures are heated-

- a) Calcium hydroxide and ammonium chloride.
- b) Ammonia reacts with heated copper oxide.
- c) On decomposition of ammonium nitrate.

[3]

Q 5)

1) Name the property of sulphuric acid shown in each case-

- a) When concentrated sulphuric acid is heated with carbon.
- b) When sugar crystals are added to a hard glass test tube containing concentrated sulphuric acid.

[2]

2) Write a balanced chemical equation for the following-

- a) Nitric oxide comes in contact with atmosphere.
- b) Magnesium nitride is warmed with water.

[2]

3) State one chemical test between each of the following pairs:

- a) Sodium carbonate and sodium sulphite.
- b) Ferrous nitrate and lead nitrate.
- c) Manganese dioxide and copper(II) oxide.

[3]

4) Answer the following questions-

- a) State Gay Lussac's law of combining volumes.
- b) What volume of oxygen is required to burn  $90\text{cm}^3$  of butane completely under similar conditions of temperature and pressure?
- c) A gas cylinder contains  $12 \times 10^{24}$  molecules of oxygen gas. If Avogadro's number is  $6 \times 10^{23}$ , calculate the mass of oxygen present in the cylinder.

[3]

Q 6)

1) Write one equation each to show the following properties of sulphuric acid:

- a) Acidic nature
- b) As a non-volatile acid

[2]

2) Write the balanced chemical equation for the following reactions involved in Bayer's process.

- a) Formation of aluminium hydroxide.
- b) Formation of pure alumina.

[2]

3) Answer the following-

- a) What are the two steps necessary to change lead carbonate into lead chloride.
- b) Give the name of a soluble lead salt and write the equation for the action of heat on this salt.

[3]

4) For each of the substance listed below, describe the role played in the extraction of Aluminium:

- a) Cryolite
- b) Sodium hydroxide
- c) Graphite

[3]



## Q 7)

1) A student dropped few pieces of marble in dil. hydrochloric acid contained in a test tube. The evolved gas then passed through lime water. [2]

Answer the following questions on the basis of the above statement.

- Write a balanced chemical equation for the formation of gas.
- What change would be observed in lime water?

2) Mr. Sinha has performed an experiment in the lab, confirming the presence of pungent alkaline gas, ammonia. Answer the following questions based on the above information [2]

- Number of lone pair of electron(s) in ammonium ion.
- Draw an electron dot structure of ammonium ion.

3) Element X is a metal with a valency of 2, Y is a non-metal with a valency of 3. [3]

- Write an equation to show how Y forms an ion.
- If Y is a diatomic gas, write an equation for the direct combination of X and Y to form a compound.
- To which group does this metal X belongs to?

4) During the electrolysis of copper(II) sulphate solution using platinum as cathode and carbon as anode. [3]

- What do you observe at the cathode?
- What change is noticed in the electrolyte?
- Write the reactions at the anode.

## Q 8)

1) Answer the following: [2]

- Name a distinctive reaction that takes place when ethanol is treated with acetic acid.
- Write a balanced chemical equation of the above mentioned reaction.

2) What will be the particles present in: [2]

- Kerosene
- Sodium chloride

3) Find the empirical formula and the molecular formula of an organic compound from the data given below: [3]

C=75.92% , H=6.32% and N=17.76%

The vapour density of the compound is 39.5 [ C=12, H=1, N=14]

4) Write a balanced chemical equation for each of the following: [3]

- Burning of ethane in plentiful supply of air.
- Action of water on calcium carbide.
- Heating of Ethanol at 170°C in the presence of concentrated sulphuric acid.