KARNATAKA ICSE SCHOOLS ASSOCIATION

ICSE STD. X Preparatory Examination 2025

Subject – Chemistry

Duration: 2 Hours **Maximum Marks: 80** **Date: 20.01.2025**

Answer to this paper must be written on the paper provided separately.

*You will **not** be allowed to write during first **15** minutes.*
This time is to be spent in reading the question paper.
The time given at the head of this Paper is the time allowed for writing the answer.

Section A** is compulsory. Attempt **any four** questions from **Section B.
The intended marks for questions or parts of questions are given in the bracket [ ].

SECTION A (40 Marks)
*(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) During the electrolysis of copper sulphate solution using platinum electrodes, which of the following statements is correct?
P. When the deposition of Cu ions is completed then electrolysis of water takes place
Q. The blue colour of the solution gradually fades due to the reduction of Cu^{2+} ions

(a) Only P
(b) Only Q
(c) Both P and Q
(d) Neither P and Q

(ii) Arun tested a salt solution by adding ammonium hydroxide dropwise, forming a dirty green precipitate. On adding excess ammonium hydroxide, the precipitate is insoluble. The cation present in the salt is:

(a) Zinc ion
(b) Copper(II) ion
(c) Calcium ion
(d) Iron(II) ion

(iii) Calculate the volume occupied by 3.4 g of ammonia at S.T.P.

(a) 4.48 litre
(b) 6.05 litre
(c) 5.48 litre
(d) 3.63 litre

(iv) The equation below shows the reaction between element 'M' and dilute hydrochloric acid.

$$M(s) + 2HCl\ (aq.) \rightarrow MCl_2\ (aq.) + H_2(g)$$

Which particles are responsible for conducting electricity in dilute hydrochloric acid and compound MCl_2?

(a) Electrons
(b) Both positive and negative ions
(c) Only negative ions
(d) Only negative ions

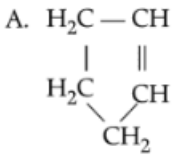
(v) **Assertion (A):** Hydrogen chloride gas is purified by passing it through conc. H_2SO_4.
Reason (R): Concentrated sulphuric acid is used as the drying agent.

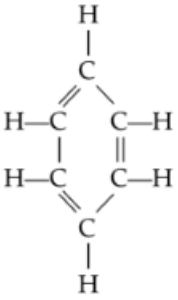
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

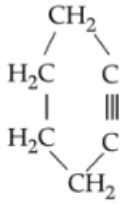
(vi) An element A belonging in Period 3 and Group II will have:

(a) 2 shells and 3 valence electrons
(b) 3 shells and 3 valence electrons
(c) 2 shells and 2 valence electrons
(d) 3 shells and 2 valence electrons

(vii) Which of the following organic compounds is of benzene?

A. 

B. 

C. 

(a) Compound A
(b) Compound B
(c) Compound C
(d) Compound B and C

(viii) Which of the following is the atomic number of an element that forms basic oxide?

(a) 18
(b) 17
(c) 19
(d) 15

(ix) A sulphate which forms a gelatinous white precipitate with sodium hydroxide and is also soluble in excess of it:

(a) Ferrous sulphate
(b) Zinc sulphate
(c) Copper sulphate
(d) Ferric sulphate

(x) Which of the following electronic configuration suggests an element with the highest electropositivity ?

(a) 2,1
(b) 2,2
(c) 2,7
(d) 2,8

(xi) **Assertion (A):** Alkali metals are stored under oil to prevent reaction with air.
Reason (R): Alkali metals slowly react with oxygen and moisture in the air.

(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

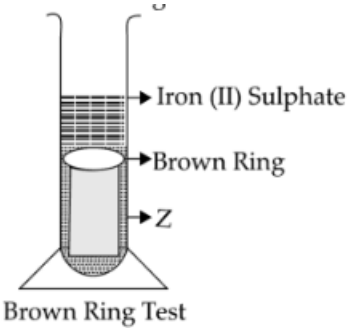
(xii) What is the ratio between the volumes occupied by carbon dioxide (CO_2) and hydrogen (H_2) when 22 grams of CO_2 and 4 grams of H_2 are measured under the same conditions of temperature and pressure?

(a) 4:1
(b) 1:4
(c) 2:16
(d) 16:2

(xiii) Aqueous lead (II) nitrate can be distinguish from aqueous zinc nitrate by adding any of the following solution in excess, except:

(a) Aqueous sodium sulphate
(b) Dilute sulphuric acid
(c) Sodium hydroxide solution
(d) Aqueous potassium chloride

(xiv) Which ion is determined by the test shown in the image?



Brown Ring Test

(a) Chloride
(b) Nitrate
(c) Sulphate
(d) Phosphate

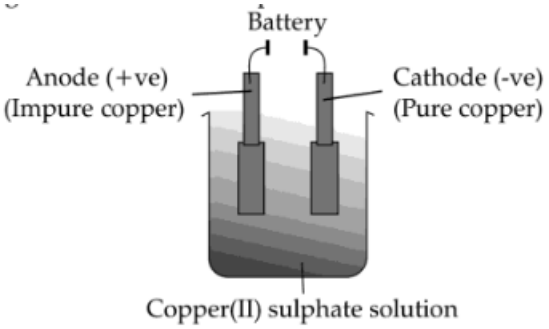
(xv) What distinguish amphoteric oxides from other types of oxides?

(a) They react with acids to form salt and water.
(b) They react with bases to form salt and water.
(c) They react with both acids and bases to form salt and water.
(d) They do not react with either acids or bases.

Question 2

(i) Copper sulphate solution is electrolyzed using copper electrodes. **[5]**

Study the diagram given alongside and answer the questions that follow.



(a) Which electrode to your left or right is known as the oxidizing electrode and why?
(b) Write the equation representing the reaction that occurs at the electrode mention in (a).
(c) State two appropriate observation for the above electrolysis reaction.

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

Column A	**Column B**
(a) Sulphuric acid	1. Coating of a metal on cathode
(b) Electroplating	2. Contact process
(c) Carbon tetrachloride	3. K, Na, Li, Rb
(d) Complete shell	4. Covalent compound
(e) Alkali metals	5. Noble gas

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

(a) If an element as seven electrons in the outermost shell, then it is likely to have the _____ [smallest/largest] atomic radius among all the elements in the same period.
(b) _____ [Sulphuric acid/Nitric acid] forms dense white fumes when exposed to moist air.
(c) A _____ [reddish brown/dirty green] coloured precipitate is formed wen ammonium hydroxide is added to a solution of ferric chloride.
(d) Alkanes undergo _____ [addition/substitution] reactions.
(e) In a/an _____ [neutral/alkaline] solution phenolphthalein is colourless.

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

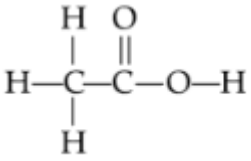
(a) The type of bonding found between the atoms in a molecule of hydrogen gas.
(b) The gas which turns acidified potassium dichromate clear green.
(c) A homogeneous mixture of two or more metals or non-metals in a definite proportion in their molten state.
(d) The energy released when an atom in the gaseous state accepts an electron.
(e) The property by which carbon links with itself to form a long chain.

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

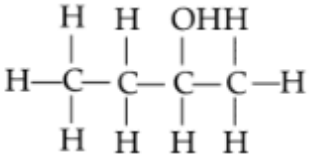
(1) Pentanal
(2) 2-butene
(3) Methanol

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

(1)



(2)



SECTION B (40 Marks)

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

Question 3

(i) Electron affinities of two elements A and B are given below: [4]

A= -3.60 eV B= -3.80 eV

(a) Which of them will ionise more easily and why?
(b) What happens to the electron affinity going down the group?
(c) Which element in Period 2 has zero electron affinity.

(ii) Neena used following methods for preparation of salts. [4]
[Neutralisation, Displacement, Precipitation, Neutralisation by titration]
The list of salts is given below. Identify the most appropriate method from the list given above for their preparation.

(a) Potassium hydroxide+ Hydrochloric acid
(b) Barium chloride + Sodium hydroxide
(c) Zinc oxide+ Sulphuric acid
(d) Magnesium+ Hydrochloric acid

(iii) Sulphuric acid is prepared by contact process for industrial purpose. Answer the following pertaining to preparation of sulphuric acid. [3]

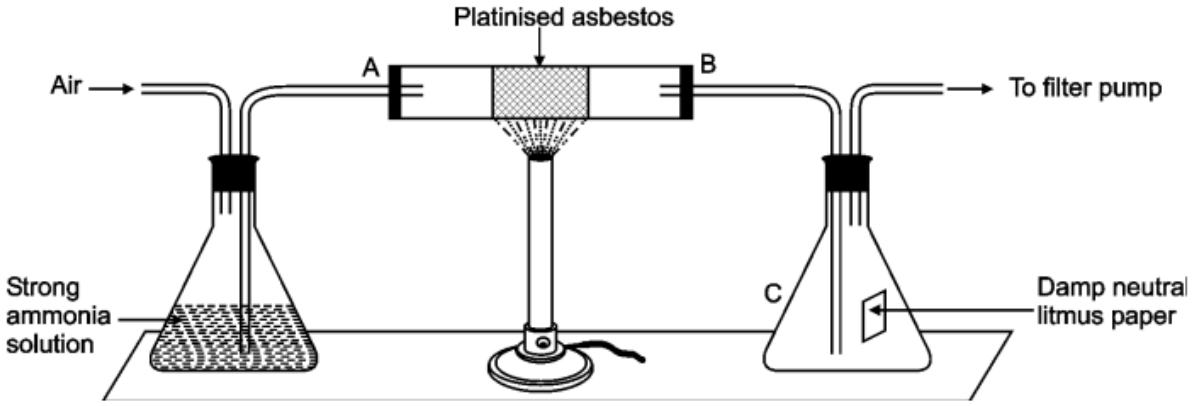
(a) Name the gas that combines with sulphur dioxide during the contact process.
(b) Write equation when the product formed in the above [(iii) (a)] reaction combines with concentrated sulphuric acid and name the product formed.

Question 4

(i) Potassium nitrate is used for the preparation of nitric acid in the laboratory. The reaction mixture is heated below 200^{o} C [4]

(a) Give a balanced chemical equation for the preparation of nitric acid in the laboratory using potassium nitrate.
(b) Why the reaction mixture should not be heated above 200^{o} C
(c) Concentrated nitric acid is heated with copper turnings. Write the equation and any one observation.

(ii) When air is drawn through the apparatus shown below, certain observations are made. Answer the questions based on the set up given below. [3]



(a) What is the purpose of platinised asbestos?
(b) The platinised asbestos continues to glow even after the burner is removed. Give reason.
(c) A colourless liquid condenses at B. Name the liquid.
(d) Name the gas that gets oxidised in flask "C"

(iii) Answer the following questions based on the extraction of aluminium from alumina by Hall- Heroult's Process. [2]
(a) Why is the powdered coke sprinkled on top of the electrolyte?
(b) Name the electrode where aluminium is collected.

Question 5

(i) In the preparation of ammonia in industry, the raw materials are nitrogen and hydrogen. These are mixed together in the correct proportion to get maximum yield of ammonia. [5]
(a) Write the balanced chemical equation for the preparation of ammonia.
(b) Name the above process.
(c) Rajat used 400 litres of gaseous mixture for preparing ammonia. How much hydrogen would there in 400 litres of the mixture?
(d) If all the nitrogen and hydrogen were converted into ammonia, find the volume of ammonia formed in litres.
(e) It was an exothermic process. What is meant by exothermic?

(ii) A fuse wire is an alloy is made of tin and lead. It is a safety device that prevents the damage of electronic gadgets due to excessive flow of current. [2]

(a) Can copper replace tin when making such an alloys? Justify your answer.

(b) Name the alloy of lead and tin

(iii) Rajeev found light bluish colour salt **'P'** in the laboratory. On heating, it produced black residue and a colourless gas. Salt **'P'** also produced brisk effervescence with dilute HCl and the gas evolved turns lime water milky, but no action with acidified potassium dichromate solution. [3]

(a) Name the cation present in the salt sample that Rajeev found in the laboratory?

(b) Name the gas evolved when the sample was heated.

(c) Identify the salt sample based on the observation Rajeev recorded.

Question 6

(i) Atomic number of element A is 11 and it forms an ionic compound with B.

(a) Which of the following atomic numbers will match B? [3]

i. 14

ii. 10

iii. 9

(b) Draw the electron dot structure of the compound formed between A and B

(c) What is the name given to the members of the group to which B belongs?

(d) Element _____ is the reducing agent.

(ii) Shubha wants to electroplate her key chain with nickel to prevent rusting.

(a) Which electrolyte can Shubha use to electroplate her key chain?

(b) Name the anode in the above process. [3]

(c) Write the equation for the reaction taking place at the anode.

(iii) Salt **P** and **Q** undergo reactions as described below. Identify the anion present in these salts on the basis of the observation given below. [2]

(a) When silver nitrate solution is added to solution of **P**, a white precipitate, insoluble in dilute nitric acid is formed.

(b) When dilute sulphuric acid is added to Q, a gas is produced which turns acidified potassium dichromate solution from orange to green.

(iv) Reema found a hard crystalline solid **ML_2**. This solid substance could conduct electricity in both molten and aqueous state and has high melting and boiling point.

(a) On carrying out electrolysis of aqueous **ML_2**, the cathode size increased and anode became thinner. The anode is made of _____. (metal **M**, Carbon)

(b) **ML_2** is conductor due to presence of free_____. (ions, electrons)

Question 7

(i) Kavya needs 59g of ammonium sulphate for her plant. She uses ammonia and sulphuric acid to prepare ammonium sulphate. Calculate the volume of ammonia required at s.t.p. to prepare the fertilizer. [N=14, S=32, H=1, O=16] [3]

(ii) 300 cc of ethane undergoes complete combustion with 1250 cc of oxygen to give carbon dioxide and water according to the equation given below. [3]

$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$

(a) Calculate the total volume of carbon dioxide produced?

(b) Name and find the volume of unused gas.

(c) Name the law that explains the concept for calculation of combining of gas volumes.

(iii) The pH value of pure water is 7. Compare the pH values of the following solution with water. [2]

(a) Sulphur dioxide is hydrolysed with water.

(b) Ammonia is hydrolysed with water.

(iv) Draw the electron dot diagram for ammonium ion. [2]

Question 8

(i) Preeti wanted to prepare a saturated hydrocarbon from an unsaturated hydrocarbon (C_2H_4) at 200 ^oC as follows: [2]

$$C_2H_4 + H_2 \xrightarrow{X} A$$

(a) Identify 'X' where 'X' is the catalyst used for the reaction.

(b) Write the structural formula of the compound (A).

(ii) Complete and balance the equations given below: [2]

$$C_2H_5COONa + NaOH \xrightarrow[CaO]{\Delta} \_\_\_\_\_ + \_\_\_\_\_$$

$$CaC_2 + H_2O \rightarrow \_\_\_\_\_ + \_\_\_\_\_$$

(iii) A compound X (having vinegar like smell) when treated with ethanol in presence of the acid Z, gives a compound Y which has a fruity smell. The reaction is:

$$C_2H_5OH + X \xrightarrow{Z} Y + H_2O$$ [3]

(a) Identify Y and Z

(b) Write the structural formula of 'X'

(c) Name the above reaction.

(iv) Compound **A** and **B** are treated with bromine dissolved in carbon tetrachloride and A does not react while B gives 1,2-dibromoethane. [3]

(a) Identify to which homologous series do A and B belong?

(b) Give the structural formula for **B.**

(c) Give any one observation for the above reaction.