ICSE 2023 EXAMINATION

SPECIMEN QUESTION PAPER

CHEMISTRY

(SCIENCE PAPER – 2)

Maximum Marks: 80

Time allowed: Two hours

Answers 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 answers.

***Section A** is compulsory. Attempt **any four** questions from **Section B**.*

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

SECTION A

*(Attempt **all** questions from this Section.)*

Question 1

Choose one correct answer to the questions from the given options: [15]

(i) A weak electrolyte is:

(a) Alcohol

(b) Potassium hydroxide

(c) Ammonium hydroxide

(d) Glucose

(ii) Electron affinity is maximum in:

(a) Alkaline earth metals

(b) Halogens

(c) Inert gases

(d) Alkali metals

(iii) The main components of bronze are:

(a) Copper and tin

(b) Copper and iron

(c) Copper and lead

(d) Copper and zinc

(iv) A polar covalent compound is:

(a) Methane

(b) Ammonia

(c) Nitrogen

(d) Chlorine

(v) An acid which has two replaceable hydrogen ions:

(a) Acetic acid

(b) Hydrochloric acid

(c) Phosphoric acid

(d) Carbonic acid

(vi) The hydroxide which is soluble in excess of NaOH is:

(a) Ferric hydroxide

(b) Lead hydroxide

(c) Copper hydroxide

(d) Calcium hydroxide

(vii) If the RMM of carbon dioxide is 44, then its vapour density is:

(a) 22

(b) 32

(c) 44

(d) 88

(viii) Drying agent used to dry Hydrogen chloride gas:

(a) Concentrated Sulphuric acid

(b) Calcium oxide

(c) Sulphurous acid

(d) Calcium hydroxide

(ix) The catalyst used in the Haber's Process is:

(a) Molybdenum

(b) Platinum

(c) Nickel

(d) Finely divided Iron

(x) An aqueous compound which turns colourless phenolphthalein to pink:

(a) Ammonium hydroxide

(b) Nitric acid

(c) Anhydrous calcium chloride

(d) Sulphuric acid

(xi) The gas formed when carbon reacts with concentrated sulphuric acid:

(a) Hydrogen

(b) Sulphur trioxide

(c) Sulphur dioxide

(d) Oxygen

(xii) The organic compound prepared when Ethanol undergoes dehydration:

(a) Methane

(b) Ethane

(c) Acetylene

(d) Ethene

(xiii) The IUPAC name of methyl acetylene is:

(a) Propyne

(b) Ethene

(c) Propane

(d) Ethyne

(xiv) The product formed at the cathode in electroplating of an article with Nickel is:

(a) Hydrogen gas

(b) Nickel ions

(c) Nickel atoms

(d) Oxygen gas

(xv) An alkali metal found in period 3 and group 1 is:

(a) Magnesium

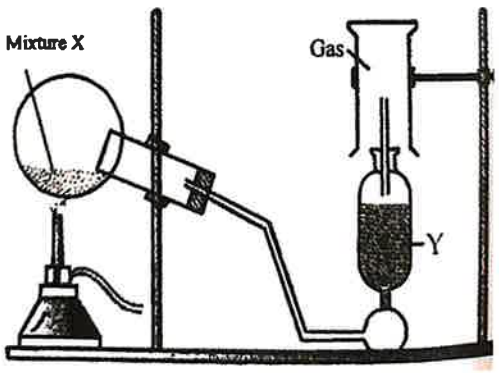
(b) Lithium

(c) Sodium

(d) Potassium

Question 2

(i) The diagram shows an experiment set up for the laboratory preparation of a pungent smelling gas. The gas is alkaline in nature. [5]



(a) Name the gas collected in the gas jar.

(b) Write a balanced chemical equation for the above preparation.

(c) How is the gas being collected?

(d) What is the purpose of using Y?

(e) How will you find that the jar is full of gas?

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

Column A		Column B	
(a)	Acid Salt	1.	Black in colour
(b)	Copper Oxide	2.	Reddish brown
(c)	Zinc hydroxide	3.	Hydrogen chloride
(d)	Copper Metal	4.	Sodium Hydrogen Carbonate
(e)	Polar compound	5.	Soluble in excess sodium hydroxide

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

(a) Ammonia in the liquefied form is _____. [neutral / basic]

(b) Organic compounds are generally insoluble in _____. [Water / Organic solvents]

(c) An inert electrode used in electrolysis of acidified water is _____. [iron / platinum]

(d) Hydrocarbons having double bond is _____. [alkenes / alkynes]

(e) An alkaline gas gives dense white fumes of _____ [NH_4OH / NH_4Cl] with hydrogen chloride gas.

(iv) Identify the following: [5]

(a) The property by which carbon bonds with itself to form a long chain.

(b) A substance that conducts electricity in molten or aqueous state.

(c) The energy required to remove an electron from the valence shell of a neutral isolated gaseous atom.

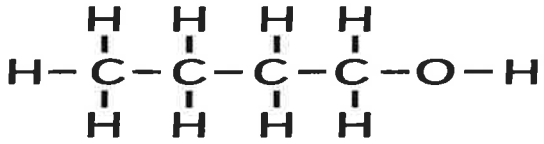
(d) The name of the process by which the Bauxite ore is concentrated.

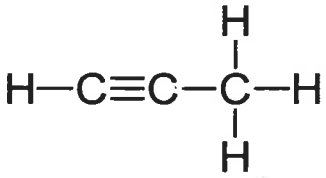
(e) The bond formed by a shared pair of electrons with both electrons coming from the same atom.

(v) (a) Draw the structural formula for the following: [5]

1. 2-pentanol
2. Ethanal
3. 1-butene

(b) Name the following organic compounds in IUPAC system:

1. 

2. 

SECTION B

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

Question 3

(i) Identify the Anion present in each of the following compounds. [2]

(a) When Barium Chloride Solution is added to a solution of compound B, a white precipitate insoluble in dilute Hydrochloric acid is formed.

(b) When dilute Sulphuric acid is added to compound D, a gas is produced which turns lime water milky but has no effect on acidified potassium dichromate solution.

(ii) Write the products and balance the equation. [2]

(a) S+ Conc HNO_3 →

(b) ZnS + HCl →

(iii) Arrange the following as per the instruction given in the brackets: [3]

(a) Na, K, Cl, Si, S. (increasing order of electro negativity)

(b) Be, Li, F, C, B, N, O (increasing order of metallic character)

(c) Br, F, I, Cl (increasing order of atomic size)

(iv) Fill in the blanks selecting the appropriate word from the given choice: [3]

(a) In a covalent compound the bond is formed due to _____ of electrons (sharing / transfer)

(b) A molecule which has a single lone pair of electrons _____. (NH_3 / H_2O)

(c) Electrovalent compounds do not conduct electricity in their _____ state. (molten / solid)

Question 4

(i) For each of the substances given below, what is the role played in the extraction of Aluminum. [2]

(a) Cryolite

(b) Graphite

(ii) Calculate: [2]

(a) A gas cylinder is filled with hydrogen and it holds 5 gms of gas. The same cylinder holds 85 gms of gas X under same temperature and pressure. Calculate the vapour density of gas X.

(b) Give the empirical formula of CH_3COOH.

(iii) The following questions are pertaining to the laboratory preparation of Hydrogen chloride gas. [3]

(a) Write a balanced chemical equation for its preparation mentioning the condition required.

(b) Why is concentrated Nitric Acid not used in the preparation of Hydrogen Chloride gas?

(c) How is Hydrogen Chloride gas collected?

(iv) Explain the following: [3]

(a) Concentrated Nitric acid appears yellow when it is left standing in a glass bottle.

(b) An inverted Funnel is used to dissolve Hydrogen Chloride gas in water.

(c) All apparatus made of glass is used in the laboratory preparation of Nitric acid.

Question 5

(i) (a) State one property of Ammonia demonstrated in the Fountain Experiment. [2]

(b) Give the ionic equation when Ammonium Hydroxide is dissolved in water.

(ii) Name a probable Cation present based on the following Observations: [2]

(a) Reddish brown precipitate insoluble in Ammonium Hydroxide.

(b) Blue coloured sulphate solution.

(iii) Give balanced chemical equation for the following: [3]

(a) Laboratory Preparation of Methane from Sodium Acetate.

(b) Preparation of Ethyne from 1, 2 dibromoethane.

(c) Ethene reacting with Chlorine.

(iv) State one relevant observation for each of the following reactions: [3]

(a) When excess Ammonia is passed through an aqueous solution of Lead Nitrate.

(b) Copper Sulphate solution is electrolysed using Copper electrodes.

(c) Ammonium hydroxide is added to Ferrous Sulphate solution.

Question 6

(i) Define: [2]

(a) Gay Lussac's law of combining volume.

(b) Vapour Density

(ii) Solve: [2]

1250cc of oxygen was burnt with 300cc of ethane (C_2H_6). Calculate the volume of the unused oxygen.and the volume of the carbon dioxide formed.

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

(iii) State the conditions required for the following reactions: [3]

(a) Conversion of Sulphur dioxide to Sulphur trioxide.

(b) Conversion of Ammonia to Nitric acid

(c) Conversion of Nitrogen to Ammonia

(iv) Choose the role played by concentrated Sulphuric acid as A, B, C which is responsible for the reactions 1 to 3. [3]

A. Oxidizing agent

B. Non Volatile Acid

C. Dehydrating agent

1. $NaNO_3 + H_2SO_4 \xrightarrow{<200^oC} NaHSO_4 + HNO_3$

2. $CuSO_4.5H_2O \xrightarrow{H_2SO_4} CuSO_4 + 5H_2O$

3. $S + 2H_2SO_4 \longrightarrow 3SO_2 + 2H_2O.$

Question 7

(i) Find the empirical formula and molecular formula of an organic compound from the data given below: [2]

C = 75.92% H = 6.32%, N = 17.76% its vapour density is 39.5

(At.wt: C=12, H=1, N=14)

(ii) Identify the functional group in the following organic compounds: [2]

(a) HCHO

(b) C_2H_5COOH

(iii) During the Electrolysis of Copper II Sulphate solution using platinum as cathode and graphite as anode. [3]

(a) State what you observe at the cathode.

(b) State the change noticed in the electrolyte.

(c) Write the reaction at the cathode.

(iv) Choose the answer from the list which fits the description. [3]

[CaO, CO_2, NaOH, $Fe(OH)_3$, CO]

(a) A basic oxide.

(b) An oxide which is acidic.

(c) An Alkali.

Question 8

(i) Draw the electron dot structure for the following. [2]

(a) H_3O^+

(b) CH_4

(ii) Distinguish between the following as directed: [2]

(a) Sodium Carbonate and Sodium Sulphate by using dilute HCl

(b) Ammonium Sulphate and Sodium Sulphate by using Calcium hydroxide.

(iii) Name the particles present in: [3]

(a) Strong Electrolyte

(b) Weak Electrolyte

(c) Non Electrolyte

(iv) An element X has atomic number 17. Answer the following questions. [3]

(a) State the period & group to which it belongs:

(b) Is it a Metal or Non Metal?

(c) Write the formula between X and Hydrogen.