The Cathedral and John Connon School

Std: X	Preliminary Examination	Marks:80
Date:16/01/19	Chemistry	Time: 2hr

The time given at the top of the paper is the time allotted for writing the answers.

Section I is compulsory. Section II contains six questions numbered 2 to 7.

Attempt any FOUR of these questions.

When solving numerical problems, all essential working must be shown adjacent to the rest of the answer.

This question paper consists of 8 printed sides.

Section I (40 marks)

Answer ALL the questions

Q1) a. *Choose the correct answer* from the following options given: [5]

i. Electron affinity is maximum in;

a) Alkali metals
b) Alkaline earth metals
c) Halogens
d) Inert gases

ii. The gas law that relates volume of a gas to the molecules of the gas is;

a) Gay Lussac's law
b) Avogadro's law
c) Boyle's law
d) Charles' law

iii. Which of the following reactions gives copper as the product;

a) Adding dilute hydrochloric acid to copper oxide.
b) Passing dry ammonia over heated copper oxide.
c) Passing oxygen over heated copper oxide.
d) Heating of copper oxide.

iv. The volume occupied by 8gm of sulphur dioxide at stp is (atomic mass S 32, O 16)

a) 2.8 litre
b) 8.2 litre
c) 5.6 litre
d) 22.4 litre

v. To increase the pH of a neutral solution, we should add;

a) An acid
b) An acid salt
c) An alkali
d) Water

b. Write *one term* for each of the following statements. [5]

i. The process by which zinc blende is concentrated.

ii. The type of reactions that alkanes undergo.

iii. The amount of energy required to remove an electron from an isolated gaseous atom.

iv. The volume occupied by 1mole of a gas at stp.

v. The type of bond formed between two atoms in which both the atoms contribute electrons for sharing.

c. Write *balanced chemical equation* for each of the following. [5]

i. 1,2 – dibromo ethane heated with alcoholic potassium hydroxide.

ii. Red lead is warmed with concentrated hydrochloric acid.

iii. Concentrated sulphuric acid reacts with sulphur.

iv. Prepare copper oxide from copper carbonate.

v. Acetic acid reacts with sodium metal.

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[5]

d. *Identify* the gas in each of the following cases.

i. Water is added to calcium carbide.

ii. A colourless gas evolved when lead nitrate is thermally decomposed.

iii. A neutral gas released when ammonium dichromate is decomposed.

iv. The gas released on heating a mixture of sodium hydroxide solution and ammonium chloride.

v. An organic gas that is mainly responsible for the greenhouse effect.

[5]

e. i) *Calculate*

a) The number of moles and the number of molecules present in 1.4gm of ethylene gas.
b) The volume occupied by the same amount of ethylene mentioned above at stp.
c) Vapour density of ethylene.

(Atomic mass C= 12, H= 1, Avogadro's number = 6×10^{23})

ii) Write a balanced chemical equation to convert ethylene to ethane?

f. Write any two relevant observations in each case when; [5]

i. Copper carbonate is treated with dilute hydrochloric acid.

ii. Molten lead bromide is electrolyzed using graphite electrodes.

iii. A few drops of dilute sulphuric acid are added to barium chloride solution first dropwise and then in excess of dilute hydrochloric acid.

iv. Aqueous copper sulphate solution is electrolyzed using inert electrodes.

v. Ammonia reacts with excess of chlorine.

g. Give *reasons.* [5]

i. Concentrated sulphuic acid reacts with sugar to give black spongy mass.

ii. Hydrochloric acid cannot be used to make an acid salt.

iii. Anode rods are replaced from time to time during the electrolysis of molten alumina.

iv. Silver nitrate solution is not used for the electroplating process.

v. Members of the alkane family show similar chemical properties.

h i. *Draw the structures* of the following compounds. [5]

a) 2-butanol.

b) Propanoic acid

c) But-1-yne

ii. Draw the structure of an isomer of *but-1-yne* and name it in IUPAC system.

Section II (40 marks)

Q 2) a) *Draw* an electron dot diagram of the ion formed when an acid is dissolved in water and name the ion so formed. [2]

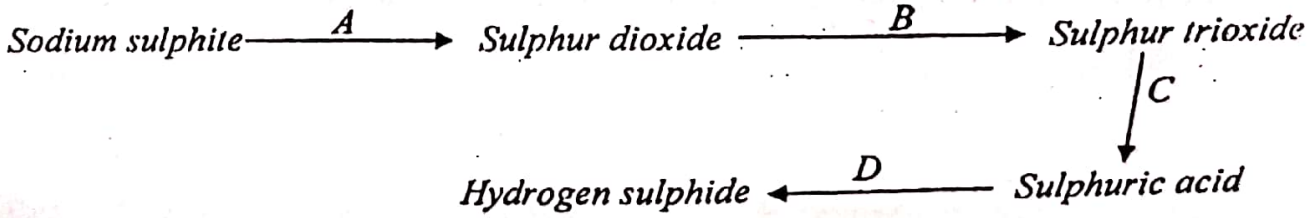
b) Write balanced chemical equation for each of the following conversions: [3]

i. Ethyl alcohol to ethyl ethanoate.

ii. Ethanol to ethene.

iii. Bromoethane to ethanol.

c) Study the following flow-chart and write balanced chemical equation/s as required below. [5]



i. Conversion A

ii. Conversion B, when carried out on a large scale with the necessary conditions.

iii. Conversion C, in two steps on a large scale preparation.

iv. Conversion D using dilute sulphuric acid.

Q 3) a) A compound 'X' consists of 4.8% carbon and 95.2% bromine by mass. [5]

i Determine the empirical formula of this compound working upto one decimal place (Atomic Mass C = 12, Br = 80)

ii If the vapour density of this compound is 252, what is the molecular formula of the compound ?

iii Draw the structure of compound X and name it in IUPAC system

b) With respect to the metallurgy of aluminium from bauxite answer the following questions [5]

i Why is bauxite treated with strong alkali for concentration of the ore ?

ii Write balanced chemical equation for the reaction taking place in the first step of the above reaction

iii In Hall Heroult's process what is the composition of the electrolyte used ?

iv Write the ionic equation for the reaction taking place at the anode for the same process

v Why is carbon powder sprinkled over the electrolytic tank during this process?

Q 4) a) i) Draw an *electron dot diagram* to show the formation of calcium oxide from calcium and oxygen atoms. [2]

ii) In this formation which element undergoes reduction? Write an ionic equation to support your answer [1]

b) $KCl + AgNO_3 \longrightarrow KNO_3 + AgCl$ [2]

When potassium chloride solution is mixed with silver nitrate solution, 2.87gm of silver chloride is formed.

Calculate the weight of silver nitrate used in the reaction mixture.

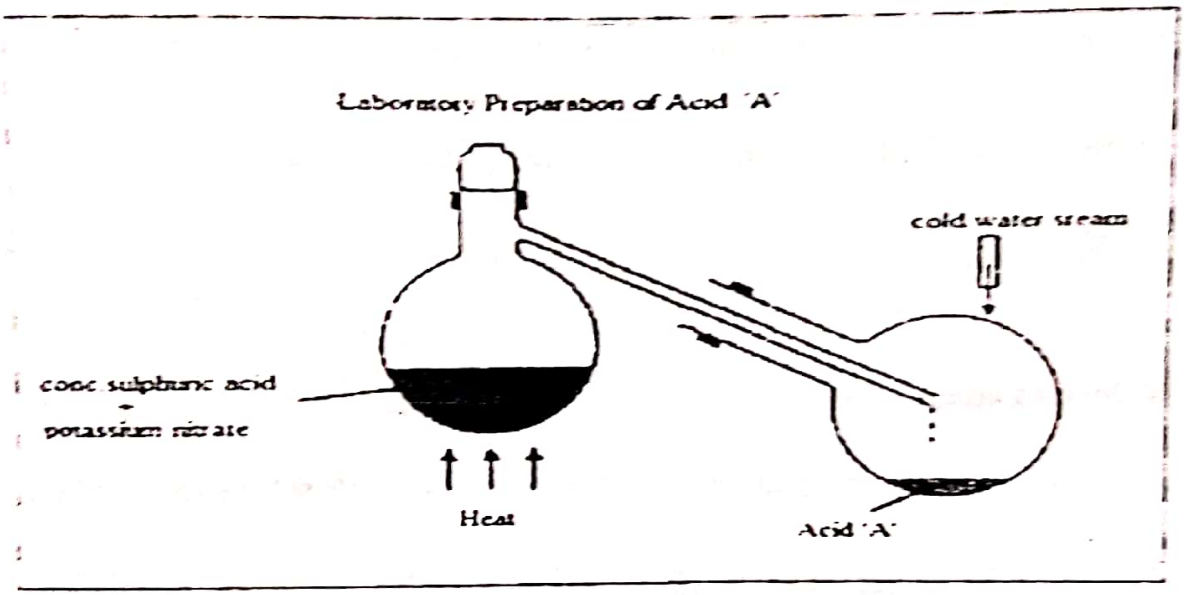
(Atomic mass K = 39, Cl = 35.5, Ag = 108, N = 14, O = 16)

c) Write balanced chemical equation s to prepare the following salts and name the method of preparation for each. [3]

i. Lead chloride ii. Iron (II) chloride

d) What is the difference between calcination and roasting of ores? Name any one metallic ore for which roasting is carried out? [2]

Q 5) a) Study the following diagram depicting the laboratory preparation of an acid 'A' and answer the following questions. [5]



i. Write balanced chemical equation for the reaction taking place in reaction mixture.

ii. Write any two important precautions to be taken during this process.

iii. Write balanced chemical equations for the following reactions of A

a. Copper metal with hot concentrated A
b. Decomposition of A

iv. How will you distinguish between A and dilute sulphuric acid by a chemical test?

b) ***Identify the anion*** present in the following salts X, Y and Z based on the observations given below. [3]

i. Adding dilute hydrochloric acid to X produces a gas which turns lead acetate paper black.

ii. Adding dilute hydrochloric acid to Y produces a gas which turns acidified potassium dichromate solution colorless.

iii. Z when thermally decomposed produces dense brown fumes and leaves white residue.

c) Fill in the blanks.(you may write only the answers) [2]

i Duralumin contains _____ as the base metal.

ii Brass is an alloy of _____ and _____

iii The non-metallic component of stainless steel is _____

Q 6) a) *Draw a neat labelled diagram* of electroplating of an iron spoon with nickel and answer the following questions [5]

i Write the ionic equation for the reaction taking place at the cathode

ii Write any two important precautions taken during this process.

iii Write any two reasons for electroplating of an article.

b) Answer the following questions. [5]

i Write a balanced chemical equation to obtain hydrogen chloride using sulphuric acid.

ii How do you test hydrogen chloride gas ?

iii What is the drying agent used during the laboratory preparation of hydrogen chloride gas? Give the reason for your choice.

iv What do you observe when hydrogen chloride gas is passed through the solution of lead nitrate?

v Write a balanced chemical equation for converting ethene to 1,2-dichloroethane.

Q 7) a) *Copy and complete* the table given below. [2]

Cation	***Observation with dropwise NaOH solution***	***Observation with excess of NaOH solution***
	Rust brown precipitate	Insoluble
Cu^{2+}		
	White precipitate	Insoluble

b) The elements of group II A are written below(from top to bottom), answer the questions using this information. [5]

Be

Mg

Ca

Sr

Ba

i. Which one of these elements will form the ions readily? Why?

ii. Arrange these elements in increasing order of their electronegativity.

iii. If an element of period 2, group IIA combines with chlorine what type of bond will be formed? Write the chemical formula of this compound.

iv. Comment on the ionization potential of *Mg* in comparison with the element present to its left in the same period.

v. Are the elements given above good oxidizing agents or reducing agents? Why?

c) Chemical reaction of ammonia with air in presence of a catalyst is used to manufacture an acid on a large scale. [3]

a) Write a balanced chemical equation for this oxidation process.

b) Name this commercial process.

c) What do you observe when ammonia is passed over heated lead oxide? What property of ammonia is exhibited here?