THE SCHOLAR HIGH SCHOOL
PRELIMINARY EXAMINATION
JANUARY 2019

CHEMISTRY

STD: X SCIENCE Paper – 2 MARKS: 80

(Two hours)

Answer to this paper must be written on the paper provided separately.
You will not be allowed to write during the 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 I is compulsory. Attempt any four questions from Section II.
The intended marks for questions or parts of questions are given in brackets [].

SECTION I (40 Marks)
Attempt all questions from this Section

Question 1

(a) Give one word or a phrase for the following statements: [5]

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

(ii) The property by which certain salts, when exposed to the atmosphere, absorb moisture without dissolving in it.

(iii) The process of heating the concentrated ore in a absence or limited supply of air at a temperature just below its melting point.

(iv) A mixture of one part of concentrated nitric acid and three parts of concentrated hydrochloric acid.

(v) The amount of energy required to remove a loosely bound electron from the outermost shell of an isolated gaseous atom.

(b) Write a balanced chemical equation for each of the following: [5]

(i) Catalytic oxidation of ammonia.

(ii) Action of cold, dilute nitric acid on copper.

(iii) Reaction of zinc oxide with sodium hydroxide solution.

(iv) Reaction between acetic acid with ethanol in the presence of concentrated sulphuric acid.

(v) Action of concentrated sulphuric acid on carbon.

(c) Choose the correct answer from the options given below: [5]

(i) Hydrogen chloride gas is dried by:

(a) Anhydrous phosphorus pentoxide

(b) Concentrated sulphuric acid

(c) Anhydrous calcium chloride

(d) Calcium oxide

(ii) An element in period 3 whose electron affinity is zero:

(a) Neon

(b) Sulphur

(c) Sodium

(d) Argon

(iii) The gas law which relates the volume of a gas to the number of molecules of the gas is:

(a) Avogadro's law

(b) Gay-lussac's law

(c) Bolyle's law

(d) Charle's law

(iv) A compound X consists of only molecules. Hence X will have:

(a) A crystalline hard structure

(b) A low melting point and low boiling point

(c) An ionic bond

(d) A strong force of attraction between its molecules

(v) Sulphide Ores is generally concentrated by:

(a) Roasting

(b) Froth floatation process

(c) Reduction by carbon

(d) Tempering

[5]

(d) State one relevant observation for each of the following:

(i) Dilute hydrochloric acid is added to silver nitrate solution.

(ii) Excess of ammonium hydroxide solution is added to copper sulphate solution.

(iii) A piece of moist blue litmus paper is placed in the jar of chlorine.

(iv) Few drops of bromine solution in carbon tetrachloride are added to ethene.

(v) Electricity is passed through molten lead bromide.

(e) (i) Draw the structural formula for each of the following: [5]

1) 2, 2- dimethyl propan-1-ol

2) Butraldehyde

3) 2- chloro butene

(ii) Write the structural isomers of C_5H_8.

(f) Identify the following substances which are underlined: [5]

(i) An anion which gives brown ring test.

(ii) An ion which imparts violet colour to the flame.

(iii) An alloy composed of Pb and Sn.

(iv) A yellow explosive liquid obtained when excess of chlorine reacts with ammonia gas.

(v) An acid which is present in vinegar.

(g) (i) Calculate the percentage of sulphur in iron (III) sulphate, $Fe_2(SO_4)_3$. [2]

Fe = 56, S = 32, O = 16.

(ii) Given: $2C_2H_6 + 7O_2 \longrightarrow 4CO_2 + 6H_2O$ [2]

2000 c.c of O_2 was burnt with 400 c.c of ethane

Calculate: 1) The volume of CO_2 formed and
2) Unused O_2

(iii) A vessel contains X moles of oxygen gas. The same vessel contains chlorine under similar conditions of temperature and pressure. How many moles of chlorine are present in the vessel? [1]

(h) Fill in the blanks: [5]

(i) A base reacts with an acid to form a _____ and water only.

(ii) A solution of a _____ electrolyte will contain both ions and molecules of the solute.

(iii) The tendency to gain an electron _____ on moving down a group.

(iv) During the electrolysis of acidulated water, _____ is liberated at the cathode.

(v) Spurious alcohol contains large amounts of _____ in the mixture.

SECTION II (40 Marks)

Attempt any four questions from this Section

Question 2

(a) Arrange the following elements as directed: [3]

(i) Cl, Mg, P, Na (in increasing order of atomic size)

(ii) Li, F, C, O (in increasing order of electron affinity)

(iii) Cl, I, F, Br (in increasing order of electronegativity)

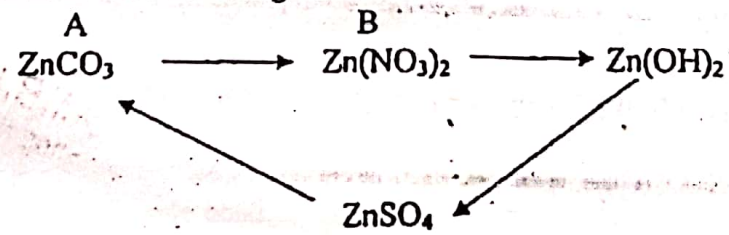
(b) Draw electron dot structures of: [3]

(i) Magnesium Chloride

(ii) Ammonia

[Atomic No.: Mg = 12, Cl = 17, N = 7, H = 1]

(c) Write balanced equations for the following conversions: [4]



Question 3

(a) $3\ Cu + 8\ HNO_3 \longrightarrow 3\ Cu(NO_3)_2 + 4H_2O + 2NO$ [4]

(H=1, N=14, O=16, Cu=64)

Calculate from the equation:

(i) The mass of copper needed to react with 63g of HNO_3.

(ii) The volume of nitric oxide at S.T.P obtained from 63g of HNO_3.

(b) The following questions refer to the electrolysis of copper sulphate solution using copper electrodes: [4]

(i) Compare the change in mass of the cathode with the change in mass of the anode.

(ii) What happens to the colour of copper sulphate solution, if platinum electrodes are used?

(iii) Write the ionic equations for the reactions taking place at the cathode and anode.

(c) What is the significance of following in the extraction of Aluminium from its Ore: [2]

(i) Caustic alkali (ii) Cryolite

Question 4

(a) A solid organic compound contained 2.15% of hydrogen, 26.8% of ~~oxygen~~ Carbon, and the rest of oxygen. Take the molecular weight of the compound as 90. Find the empirical and molecular formula of the compound. H = 1, C = 12, O = 16 [3]

(b) Copy and complete the following table: [3]

Name of the Process	Catalyst	Temperature	Equation of the reaction
Haber's process			

(c) Give a chemical test to distinguish between the following pairs of compound: [4]

(i) Hydrogen chloride gas and hydrogen sulphide gas.

(ii) Dilute hydrochloric acid and dilute sulphuric acid

(iii) Iron (II) sulphate and iron (III) sulphate

(iv) Oxygen gas and carbon dioxide gas.

Question 5

(a) Write a balanced chemical reaction for the following conversions with conditions: [3]

(i) Sodium ethanoate to methane

(ii) Ethanol to ethene

(iii) Ethyne to acetylene di-iodide

(b) [3]

(i) Give a balanced chemical equation for the laboratory method of preparation of nitric acid.

(ii) Explain why the apparatus is completely made up of glass in the above laboratory preparation?

(iii) Pure nitric acid is colourless but the colour of nitric acid obtained in the laboratory has yellow brown tinge. Explain any one method to remove this yellow tinge.

(c) Sulphuric acid is manufactured industrially by contact process. Answer the questions given below related to it: [4]

(i) Name the catalyst used in the conversion of sulphur dioxide to sulphur trioxide.

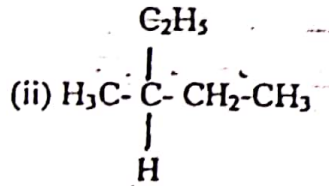
(ii) Why is sulphur trioxide not dissolved in water?

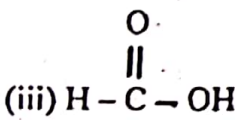
(iii) What is the alternative method that yields 98% of sulphuric acid? Give balanced chemical equations in support of your answer.

Question 6

(a) Write IUPAC name of the following organic compounds: [3]

(i) $H_3C - C \equiv C - H$

(ii)


(iii)


(b) In the electroplating of silver: [3]

(i) Name the cathode and anode used.

(ii) The overall strength of silver ions remains constant in the reaction. Why?

(c) [4]

(i) Name the chief ore of Aluminium

(ii) Name the process used to concentrate the above mentioned ore.

(iii) Give cathode and anode reactions involved in extraction of aluminium from the above mentioned ore.

Question 7

[2]

(a) Give Reasons:

(i) The reducing power of elements increases as one goes down a group.

(ii) Molten NaCl conduct electricity but CCl_4 does not.

(b) Select the method of preparation of the salts from the following options given below and use the method only once: [3]

[Precipitation, Displacement, Direct synthesis, Neutralization]

(i) Iron (III) Chloride

(ii) Sodium Nitrate

(iii) Lead Sulphate

(c) Study the table and answer the following questions: [5]

Atom	Atomic No.
A	11
B	17

(i) Compare the positions of A and B in the periodic table

(ii) Which is more metallic?

(iii) Which atom will form Anion?

(iv) What type of bond is formed between A and B?