MODEL QUESTION PAPER – 1

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.

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 I (40 Marks)

Attempt all questions from this Section.

***Question* 1**

(a) Choose the correct answer from the options given below : **[15]**

(i) Among the period 2 elements, the element which has the highest electron affinity is :

(A) Lithium (B) Carbon (C) Chlorine (D) Fluorine

(ii) Among the following compounds, identify the compound that has all three bonds (ionic, covalent and coordinate bonds).

(A) Ammonia (B) Ammonium chloride

(C) Sodium hydroxide (D) Calcium chloride

(iii) Identify the statement that is incorrect about alkanes :

(A) They are hydrocarbons.

(B) There is a single covalent bond between carbon and carbon.

(C) They can undergo both substitution as well as addition reactions.

(D) On complete combustion they produce carbon dioxide and water.

(iv) Which of these will act as a non-electrolyte?

(A) Liquid carbon tetrachloride (B) Acetic acid

(C) Sodium hydroxide aqueous solution acid (D) Potassium chloride aqueous solution.

(v) Which one of the following will not produce an acid when made to react with water?

(A) Carbon monoxide (B) Carbon dioxide

(C) Nitrogen dioxide (D) Sulphur trioxide

(vi) Identify the metallic oxide which is amphoteric in nature :

(A) Calcium oxide (B) Barium oxide

(C) Zinc oxide (D) Copper (II) oxide.

(vii) In the given equation identify the role played by concentrated sulphuric acid.

$S + 2H_2SO_4 \rightarrow 3SO_2 + 2H_2O$

(A) Non-volatile acid (B) Oxidising agent

(C) Dehydrating agent (D) None of the above

(viii) Nitrogen gas can be obtained by heating :

(A) Ammonium nitrate (B) Ammonium nitrite

(C) Magnesium nitride (D) Ammonium chloride

(ix) Which of the following is not a typical property of an ionic compound?

(A) High melting point.

(B) Conducts electricity in the molten and in the aqueous solution state.

(C) They are insoluble in water.

(D) They exist as oppositely charged ions even in the solid state.

(x) The metals zinc and tin are present in the alloy :

(A) Solder (B) Brass (C) Bronze (D) Duralumin

(xi) If the RMM of gas is 64, then its vapour density is :

(A) 22 (B) 32 (C) 44 (D) 64

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

(A) Hydrogen (B) Sulphur trioxide

(C) Sulphur dioxide (D) Oxygen

(xiii) The organic compound prepared when acetylene reacts with excess of hydrogen :

(A) Ethane (B) Ethene (C) Methane (D) Propane

(xiv) The IUPAC name of acetaldehyde is :

(A) Ethanoic acid (B) Methanal (C) Ethanal (D) Ethanol

(xv) The alkaline earth metal of period 3 is :

(A) Mg (B) Ca (C) Na (D) K

***Question* 2**

(a) Give one **word** or **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) A salt formed by incomplete neutralisation of an acid by a base.

(iii) A reaction in which hydrogen of an alkane is replaced by a halogen.

(iv) A definite number of water molecules bound to some salts.

(v) The process in which a substance absorbs moisture from the atmospheric air to become moist, and ultimately dissolves in the absorbed water.

(b) Give the structural formula of the following : **[5]**

(i) diethyl either (ii) 1-propanal (iii) acetone

(iv) 1, 2, dichloroethane (v) ethanoic acid

(c) State *one* appropriate observation for each of the following: **[5]**

(i) Concentrated sulphuric acid is added drop wise to a crystal of hydrated copper sulphate.

(ii) Copper sulphide is treated with dilute hydrochloric acid.

(iii) Excess of chlorine gas is reacted with ammonia gas.

(iv) A few drops of dilute hydrochloric acid are added to silver nitrate solution, followed by addition of ammonium hydroxide solution.

(v) Electricity is passed through molten lead bromide.

(d) **Name the gas** that is produced in each of the following cases. **[5]**

(i) sodium propionate is heated with soda lime.

(ii) potassium sulphite is treated with dilute hydrochloric acid.

(iii) Sulphur is treated with concentrated nitric acid.

(iv) a few crystals of KNO_3 are heated in a hard glass test tube.

(v) concentrated hydrochloric acid is made to react with manganese dioxide.

(e) From the list given below, select the word(s) required to correctly complete blanks (i) to (v) in the following passage. The words from the list are to be used only once. Write the answers as (a) (i), (ii), (iii) and so on. Do not copy the passage. **[5]**

[ammonia, ammonium, carbonate, carbon dioxide, hydrogen, hydronium, hydroxide, precipitate, salt, water]:

(i) A solution **M** turns blue litmus red, so it must contain (i) ..... ions; another solution **O** turns red litmus blue and hence, must contain (ii) ..... ions.

(ii) When solution **M** and **O** are mixed together, the products will be (iii) ..... and (iv) .....

(iii) If a piece of magnesium was put into a solution **M**, (v) ..... gas would be evolved.

SECTION II (40 Marks)

*Attempt any **four** questions from this Section*

***Question* 3**

(a) An element Z has atomic number 16. Answer the following questions on Z: **[2]**

(i) State the period and group to which Z belongs.

(ii) What kind of a compound is formed between Z and hydrogen ?

(b) M is a metal above hydrogen in the activity series and its oxide has the formula M_2O. This oxide when dissolved in water forms the corresponding hydroxide which is a good conductor of electricity. In the above context answer the following : **[2]**

(i) What kind of combination (bond) exists between M and O ?

(ii) How many electrons are there in the outermost shell of M ?

(c) In electrolysis of molten lead bromide : **[3]**

(i) State the reaction taking place at the cathode.

(ii) Which electrode: anode or cathode is the oxidising electrode ? Why ?

(d) Name the kind of particles present in : **[3]**

(i) Carbonic acid (ii) Sulphuric acid (iii) Carbon tetrachloride

***Question* 4**

(a) Name the following : **[2]**

(i) A compound added to lower the fusion temperature of electrolytic bath in the extraction of aluminium.

(ii) The ore of zinc containing its sulphide.

(b) Prepare : Lead sulphate from lead carbonate. **[2]**

(c) Give balanced chemical equations to prepare the following salts : **[3]**

(i) Sodium sulphate using dilute sulphuric acid

(ii) Copper chloride using copper carbonate.

(d) Give one equation each to show the following properties of sulphuric acid : **[3]**

(i) Dehydrating property (ii) Acidic nature (iii) As a non-volatile acid

***Question* 5**

(a) Define : **[2]**

(i) Mole (ii) Gay-Lussac's law

(b) (i) The vapour density of a gas is 8. What would be the volume occupied by 24·0 g of the gas at STP? **[2]**

(ii) A vessel contains **X** number of molecules of hydrogen gas at a certain temperature and pressure. How many molecules of nitrogen gas would be present in the same vessel under the same conditons of temperature and pressure?

(c) A cylinder contains 68 g of ammonia gas at S.T.P. **[3]**

(i) What is the volume occupied by this gas ?

(ii) How many moles of ammonia are present in the cylinder ?

(iii) How many molecules of ammonia are present in the cylinder ? [N–14, H–1]

(d) Solve the following : **[3]**

What volume of oxygen is required to burn completely 90 dm^3 of butane under similar conditions of temperature and pressure?

$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$

***Question* 6**

(a) Give balanced equations for the following: **[2]**

(i) Laboratory preparation of nitric acid.

(ii) Preparation of ethanol from monochloroethane and aq. sodium hydroxide.

(b) Name the product formed in the following : **[2]**

(i) Catalytic hydrogenation of ethyne.

(ii) Reaction of sodium with ethanol.

(c) Aluminium is obtained from alumina. Answer the following : **[3]**

(i) Electrolyte used (ii) Write the reaction at cathode

(iii) Why is anode replaced ?

(d) Write balanced equations for the following reactions to take place: **[3]**

(i) Preparation of ethyne from ethylene dibromide.

(ii) Preparation of ester using carboxylic acid.

(iii) Preparation of ethene using alkyl halide.

***Question* 7**

(a) (i) Name the other ion formed when ammonia dissolves in water. **[2]**

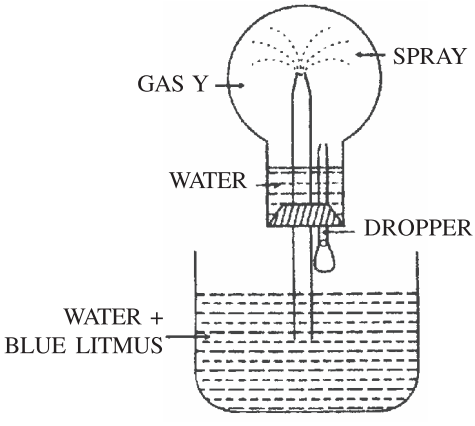
(ii) Give one test that can be used to detect the presence of the ion produced.

(b) Give balanced chemical equations for the following : **[2]**

(i) When calcium hydroxide is heated with ammonium chloride crystals.

(ii) When dilute nitric acid is added to copper.

(c) Study the figure given below and answer the questions that follow : **[3]**



(i) Identify the gas Y.

(ii) What property of gas Y does this experiment demonstrate ?

(iii) Name another gas which has the same property and can be demonstrated through the experiment.

(d) State your observations in each of the following : **[3]**

(i) When dilute hydrochloric acid is added to calcium hydrogen carbonate.

(ii) At the cathode when acidified aqueous copper sulphate solution is electrolyzed with copper electrodes.

(iii) When moist starch iodide paper is introduced into chlorine gas.

***Question* 8**

(a) Write your observations for the following : **[2]**

(i) Ammonium hydroxide solution is added to Calcium nitrate solution and zinc nitrate solution.

(ii) HCl acid is added to Potassium carbonate and potassium sulphite.

(b) Draw the structure of the stable positive ion formed when an acid dissolves in water. **[2]**

(c) State the inference drawn from the following observations : **[3]**

(i) On carrying out the flame test with a salt P a brick red flame was obtained. What is the cation in P ?

(ii) A gas Q turns moist lead acetate paper silvery black. Identify the gas Q.

(iii) pH of liquid R is 10. What kind of substance is R ?

(d) Give a chemical test to distinguish between the following pairs of compounds: **[3]**

(i) Sodium chloride solution and sodium nitrate solution.

(ii) Hydrogen chloride gas and hydrogen sulphide gas.

(iii) Ethene gas and ethyne gas.

MODEL QUESTION PAPER – 2

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.

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 strong electrolyte is :

(a) Alcohol (b) Potassium hydroxide

(c) Ammonium hydroxide (d) Glucose

(ii) Ionisation potential is maximum in :

(a) Alkaline earth metals (b) Halogens

(c) Inert gases (d) Alkali metals

(iii) The main components of brass are :

(a) Copper and tin (b) Copper and iron (c) Copper and lead (d) Copper and zinc

(iv) A triple covalent compound is :

(a) Methane (b) Ammonia (c) Nitrogen (d) Chlorine

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

(a) Acetic acid (b) Hydrochloric acid (c) Phosphoric acid (d) Carbonic acid

(vi) The hydroxide which is soluble in excess of NH_4OH is :

(a) Ferric hydroxide (b) Lead hydroxide

(c) Copper hydroxide (d) Calcium hydroxide

(vii) If the RMM of carbon monoxide is 28, then its vapour density is :

(a) 7 (b) 56 (c) 14 (d) 88

(viii) Drying agent used to dry Ammonia :

(a) Concentrated Sulphuric acid (b) Calcium oxide

(c) Sulphurous acid (d) Calcium hydroxide

(ix) The percentage of nitrogen present in urea $(NH_2)_2CO$ is : [R.A.M. of N = 14, C = 12, O = 16, H = 1]

(a) 23·36 (b) 46·67 (c) 19·35 (d) 43·87

(x) An aqueous compound which turns methyl orange yellow :

(a) Ammonium hydroxide (b) Nitric acid

(c) Anhydrous calcium chloride (d) Sulphuric acid

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

(a) Hydrogen (b) Sulphur trioxide (c) Sulphur dioxide (d) Oxygen

(xii) The organic compound prepared when calcium carbide reacts with water :

(a) Methane (b) Ethane (c) Acetylene (d) Ethene

(xiii) The IUPAC name of acetylene is :

(a) Propyne (b) Ethene (c) Propane (d) Ethyne

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

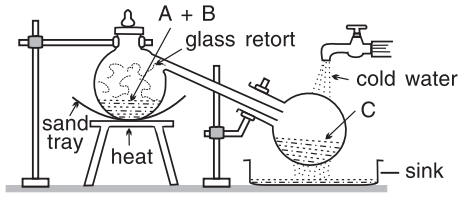
(a) Hydrogen gas (b) Silver ions (c) Silver atoms (d) Oxygen gas

(xv) An inert gas found in period 3 and group 1 is :

(a) Neon (b) Helium (c) Argon (d) Nitrogen

Question 2

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



(i) Name A (a liquid), B (a solid) and C (a liquid). (Do not give the formulae).

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

(iii) Why is an all glass apparatus used ?

(iv) The acid prepared is yellow in colour. Why ?

(v) How is this colour removed ?

(b) Match Column A with Column B. **[5]**

Column A	**Column B**
(i) Acid Salt	1. Black in colour
(ii) Manganese dioxide	2. Brown ppt.
(iii) Lead hydroxide	3. Hydrogen chloride
(iv) Ferric hydroxide	4. Calcium Hydrogen Carbonate
(v) Polar compound	5. Soluble in excess sodium hydroxide

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

(i) HCl in the liquefied form is ..... [neutral / acidic]

(ii) Organic compounds are generally soluble in ..... [Water / Organic solvents]

(iii) An inert electrode used in electrolysis of copper sulphate solution is ..... . [Copper / platinum]

(iv) Hydrocarbons having triple bond is ..... [alkenes / alkynes]

(v) An acidic gas gives dense white fumes of ..... [NH_4OH / NH_4C1] with ammonia.

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

(i) The compound formed by carbon and hydrogen only.

(ii) A substance that do not conduct electricity in molten or aqueous state.

(iii) The energy released when an atom in the gaseous state accepts an electron to form an anion.

(iv) The name of the process by which aluminium is obtained from alumina.

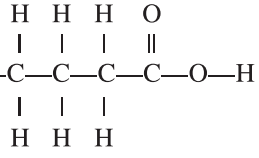
(v) The bond formed by mutual sharing of a shared pair of electrons.

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

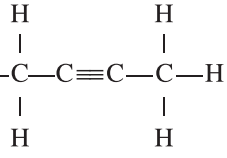
1. 2-pentanal 2. 2-methyl butanol 3. 1-butyne

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

1.



2.



SECTION B

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

Question 3

(a) Identify the Anion present in each of the following compounds : **[2]**

(i) When Silver nitrate solution is added to a solution of compound B, a white precipitate soluble in ammonium hydroxide solution is formed.

(ii) When dilute Sulphuric acid is added to compound D, a gas is produced which turns lime water milky and also turns acidified potassium dichromate solution green.

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

(i) C + Conc. HNO_3 →

(ii) Na_2SO_3 + HCl →

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

(i) Na, K, Cl, Si, S (increasing order of ionisation potential)

(ii) Be, Li, F, C, B, N, 0 (increasing order of non-metallic character)

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

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

(i) In a electrovalent compound, the bond is formed due to ..... of electrons. (sharing / transfer)

(ii) A molecule which has two lone pairs of electrons ..... . (NH_3 / H_2O)

(iii) Compounds which do not have ions in pure state but conduct electricity in aqueous solutions are ..... covalent compounds. (polar / non polar).

***Question* 4**

(a) What is the role played by the following substances in the extraction of Aluminium ? **[2]**

(i) Caustic soda (ii) Fluorspar

(b) Calculate : **[2]**

A gas cylinder is filled with hydrogen and it holds 50 g of gas. The same cylinder holds 200 g of gas X and 500 g of gas Y under same temperature and pressure conditions. Calculate the vapour density of gas X and molecular mass of gas Y.

(c) The following questions are pertaining to the laboratory preparation of Ammonia gas. **[3]**

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

(ii) Why is a higher ratio by weight of the alkali used ?

(iii) How is Ammonia gas collected?

(d) Explain the following : **[3]**

(i) HCl gas dissolved in toluene does not affect litmus.

(ii) An inverted funnel is used to dissolve Ammonia gas in water.

(iii) A bottle of liquor ammonia should be opened very carefully.

***Question* 5**

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

(ii) Give the ionic equation when hydrogen chloride is dissolved in water.

(b) Name a probable Cation present based on the following observations: **[2]**

(i) Green precipitate insoluble in Ammonium Hydroxide.

(ii) Gelatinous white precipitate soluble in excess of NaOH solution.

(c) Give balanced chemical equations for the following: **[3]**

(i) Laboratory Preparation of Ethylene.

(ii) Preparation of Ethanol by hydrolysis of alkyl halide.

(iii) Ethene reacting with bromine.

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

(i) When excess Ammonia is passed through an aqueous solution of Zinc Nitrate.

(ii) Copper Sulphate crystals are heated strongly.

(iii) Ammonium hydroxide is added to Copper Sulphate solution in excess.

***Question* 6**

(a) Define : **[2]**

(i) Electron affinity. (ii) Catenation.

(b) 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 : $2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$

(c) State the catalyst required for the following processes : **[3]**

(i) Contact process (ii) Ostwald process (iii) Haber process

(d) Write a balanced reaction where sulphuric acid shows the following properties : **[3]**

(i) Oxidising agent (ii) Non Volatile Acid (iii) Dehydrating agent

***Question* 7**

(a) An organic compound contains : H = 6·32%, N = 17·76%. In the vapour state, this compound is 39·5 times as heavy as the same volume of hydrogen. Find its molecular formula of the compound. (At.wt. : H = 1, N = 14) **[2]**

(b) Identify the alkyl group in the following organic compounds: **[2]**

(i) CH_3CHO (ii) C_3HCOOH

(c) During the electrolysis of Copper II Sulphate solution using platinum as cathode and graphite as anode : **[3]**

(a) State your observation at the anode.

(b) State the change noticed in the electrolyte.

(c) Write the reaction at the anode.

(d) Choose the answer which fits the description from the list given below : **[3]**

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

(a) A base insoluble in water.

(b) An oxide which is yellow when hot and white when cold.

(c) A neutral oxide.

***Question* 8**

(a) Draw the electron dot structure for the following : **[2]**

(i) NH_4^+ (ii) CCl_4

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

(i) Sodium Sulphite and Sodium Sulphate by using dilute HC1.

(ii) Ammonium chloride and Sodium chloride by using Calcium hydroxide.

(c) Name the following : **[3]**

(i) Substances containing ions only (ii) Substances containing ions as well as molecules

(iii) Substances containing molecules only

(d) An element X has atomic number 12. Answer the following questions. **[3]**

(i) State the period and group to which it belongs :

(ii) Is it a Metal or Non Metal?

(iii) Write the formula between X and Hydrogen.

MODEL QUESTION PAPER – 3

CHEMISTRY

(SCIENCE PAPER – 2)

Maximum Marks : 80

Time allowed : Two hours

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***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) The type of bonding present in the hydrogen chloride molecule :

(a) Ionic bond (b) Double covalent bond

(c) Polar covalent bond (d) Triple covalent bond

(ii) A compound with Empirical formula XY_2, has vapour density equal to its empirical formula weight, its molecular formula is :

(a) XY_2 (b) X_3Y_6 (c) X_2Y_4 (d) X_6H_{12}

(iii) Identify one statement that does not hold true for electrorefining of copper :

(a) Electrolyte is acidified $CuSO_4$ solution (b) Cathode is a thin strip of impure copper

(c) Anode dissolves in the electrolyte (d) Anode gets thicker.

(iv) The observation when ammonium salt reacts with caustic soda :

(a) A reddish brown gas

(b) A colourless gas which gives dense white fumes with conc. HCl

(c) A green coloured gas which turns moist blue litmus paper red.

(d) A colourless gas which turns lime water milky.

(v) The process of electrolysis is :

(a) Oxidation reaction (b) Reduction reaction (c) Redox reaction (d) Displacement reaction

(vi) The IUPAC name of acetylene is :

(a) Propane (b) Propyne (c) Ethene (d) Ethyne

(vii) –CHO group is the functional group of :

(a) 2-butylene (b) Pentanal (c) Acetic acid (d) Ethyl alcohol

(viii) Fused alumina is reduced to aluminium by electrolytic reduction since :

(a) Alumina is highly stable (b) Alumina is least stable

(c) Alumina is not reduced by drying agents. (d) Alumina is not reduced by reducing agents.

(ix) The catalyst preferred in Haber's process is :

(a) Finely divided iron (b) Graphite

(c) Vanadium pentoxide (d) Platinum

(x) Addition reaction is a characteristic property of :

(a) Alcohols (b) Alkanes (c) Alkenes (d) Alkyl Halides

(xi) The gas evolved when concentrated sulphuric acid reacts with zinc :

(a) Sulphur dioxide (b) Carbon dioxide (c) Hydrogen sulphide (d) Hydrogen

(xii) An acid obtained when concentrated nitric acid reacts with sulphur :

(a) Carbonic acid (b) Sulphuric acid (c) Nitric acid (d) Hydrochloric acid

(xiii) The hydroxide soluble in excess of sodium hydroxide is :

(a) Calcium hydroxide (b) Lead hydroxide

(c) Magnesium hydroxide (d) Ferrous hydroxide

(xiv) The common name of the ore of aluminum is :

(a) Haematite (b) Calamine (c) Cryolite (d) Hydrated aluminum oxide

(xv) A hydrocarbon with triple bond is :

(a) Acetylene (b) Ethylene (c) Ethane (d) Methane

***Question* 2**

(a) From the list of substances, choose one substance in each case which matches the descriptions given below : **[5]**

(ethene, ammonia, acetylene, ammonium chloride, nitric oxide, copper nitrate, water, sodium nitrate)

(i) A compound with two lone pairs.

(ii) A nitrate which produces a black oxide on heating.

(iii) A covalent compound which produces ions when dissolved in water.

(iv) A salt which does not contain a metal ion.

(v) An unsaturated hydrocarbon with a triple bond between carbon atoms.

(b) (i) Give a difference between ionization and electrolytic dissociation. **[5]**

(ii) 112 mL of a gaseous fluoride of a non-metal Phosphorus at S.T.P. has a mass of 0·63 g. Calculate the relative molecular mass of the fluoride.

(iii) If this compound given in (ii) has only one atom of Phosphorus, then determine its formula. [At. Wt. P =31, F =19]

(c) Atom Y has 2 electrons in N shell, Atom X has atomic number 17 and atom Z_6. Answer the following questions: **[5]**

(i) Which atom is likely to form a cation ?

(ii) What is the formula of the compound formed between X and Z ?

(iii) Draw the electron dot diagram of the compound of X and Y ?

(iv) State 2 properties of the compound formed between X and Z.

(d) Complete the following table : **[5]**

Types of organic compound	General formula	Types of chemical reaction
(i) Alkane		
(ii) Alkene		Both substitution and addition reactions.
(iii) Alkyne		

(e) (i) What do you mean by an acid salt ? **[5]**

(ii) Define the term 'Electron affinity'.

(iii) State what do you see when a basic gas is passed over heated copper oxide.

(iv) Write a balanced equation for the above reaction in (iii).

(v) Draw an electron dot diagram of ions formed when basic gas dissolved in water.

SECTION B

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

***Question* 3**

(a) This question relates to the preparation of Nitric acid on a large scale. **[2]**

(i) Name the reactant used in this process.

(ii) State the conditions under which the reactions occur.

(b) State the type of bonding of the oxide of the element 'A' having electronic configuration 2, 8, 8, 2. **[2]**

(c) Write one equation in each case to show the action of sulphuric acid on : **[3]**

(i) Metal bicarbonate

(ii) Sugar

(iii) Sulphur

(d) 'M' is an element above Fe in the activity series of metals. Select the correct answer in each case from (i) to (iii). **[3]**

(i) $M - 3e^- \rightarrow M^{3+}$: The process takes place by oxidation/reduction.

(ii) $M^{3+} \rightarrow M$: The cation gets reduced/oxidised to neutral atom.

(iii) M reacts with conc. H_2SO_4 – to liberate hydrogen/sulphur dioxide gas.

***Question* 4**

(a) An organic compound X has the following composition : O = 71·19%, H = 2·22% **[2]**

[At. mass C = 12, H = 1, O = 16]

(i) Find its empirical formula.

(ii) If in the gaseous state, its vapour density is 45. Find its molecular formula.

(b) Give the laboratory preparation of : **[2]**

(i) Ammonia

(ii) Nitric acid

(c) Distinguish the following by a chemical test : **[3]**

(i) Ammonia solution and acid solution.

(ii) Saturated and unsaturated compounds.

(iii) Ferrous chloride and ferric chloride.

(d) Select the correct property of sulphuric acid from A to D, which relates to the respective conversions given below using sulphuric acid. **[3]**

A. Dehydrating nature B. Non-volatile acid C. Acidic nature D. Oxidising agent

(i) $Na_2SO_3 + H_2SO_4 \rightarrow Na_2SO_4 + H_2O + SO_2$

(ii) $S + 2H_2SO_4 \rightarrow 3SO_2 + 2H_2O$

(iii) $CH_3 - CH_2 - OH \rightarrow H_2C = CH_2$

***Question* 5**

(a) Draw electron dot diagram of a positive ion formed when Hydrochloric acid dissolves in water. **[2]**

(b) Give the balanced equation for the following reactions : **[2]**

(i) Carbon with nitric acid.

(ii) Lead nitrate and hydrochloric acid.

(c) Give a chemical test to distinguish : **[3]**

(i) Ammonium hydroxide and sodium hydroxide.

(ii) Potassium carbonate and potassium sulphite

(iii) Zinc chloride and calcium chloride.

(d) The following questions refer to the electroplating of an article with silver : **[3]**

(i) Name the electrode formed by the article to be plated.

(ii) Name the electrolyte used.

(iii) Silver nitrate is a good electrolyte. Why it is not used ?

***Question* 6**

(a) Give balanced chemical equations for the following conversions : **[2]**

(i) Copper sulphate to inky blue solution

(ii) Methane to chloroform

(b) Name the product formed when : **[2]**

(i) Aluminium reacts with caustic soda solution

(ii) Sulphuric acid is added to sulphur.

(c) Give the structural formula of : **[3]**

(i) Acetic acid (ii) Acetaldehyde (iii) 1, 2 dichloroethane

(d) State your observations when : **[3]**

(i) Ethylene gas is passed through bromine water

(ii) Silver nitrate reacts with hydrochloric acid.

(iii) Barium chloride is added to sulphuric acid.

***Question* 7**

(a) (i) In the laboratory preparation what must be added to sodium chloride to obtain HCl gas ? **[2]**

(ii) How is hydrogen chloride gas dried ?

(b) Name the product formed when copper nitrate is heated. **[2]**

(c) Give reasons for the following : **[3]**

(i) Electronegativity is seen to increase across a Period from left to right in the Modern periodic table .

(ii) Electrolysis of water is considered to be an example of catalysis.

(iii) Water is not added to sulphuric acid to dilute it.

(d) (i) Name a drying agent for ammonia. **[3]**

(ii) How is hydrochloric acid prepared from HCl gas ?

(iii) Give the equations occurring at anode in the extraction of Aluminium.

***Question* 8**

(a) Define – 'Isomerism'. Give an example (with I.U.P.A.C. name) showing Position isomerism. **[2]**

(b) If 6·21 g of lead is combined with 4·26 g of chlorine, what is the empirical formula of the compound formed ? **[2]**
(At. wt. Lead = 207, Chlorine = 35·5).

(c) A double bond hydrocarbon X with 2 carbon atoms is bubbled through bromine dissolved in carbon tetrachloride. **[3]**

(i) Draw the structure of the compound formed.

(ii) What is your observation ?

(iii) Name the compound formed when steam reacts with X.

(d) Name the following : **[3]**

(i) A gas other than oxygen obtained at the anode during electrolytic reduction of fused alumina [Al_2O_3].

(ii) An alkaline earth metal in period 2 of the periodic table.

(iii) The chemical name of the main ore of zinc.