DISCUSSION QUESTIONS

1 a) Write equation for the reaction that takes place when chlorine is bubbled into water.

(b) A glass tube filled with aqueous solution of chlorine was invested in a beaker of water and left to stand for some time in bright sunlight.

(i) State what was observed

(ii) Explain your observation in (b) (i)

(c) Dry chlorine was passed over strongly heated iron wire.
State what was observed and write equation for the reaction that took Place.

(d) State the condition(s) in each case; and write equation for the reaction of chlorine with: -

(i) Sulphur

(ii) Turpentine

(e) Write an ionic equation for a reaction which can show that chlorine is more reactive than bromine.

2. (a) (i) Distinguish between the terms **electrode** and **electrolyte**.

(ii) Name the particles by which electric current is conducted in an electrode and in an electrolyte respectively.

(b) Draw a labeled diagram to show how a solution of copper (II) sulphate can be electrolyzed using graphite electrodes; and explain how the products at the electrodes are formed.

(c) Electrolysis of copper (II) sulphate solution in (b) was repeated using copper electrodes.

(i) Identify the substance that was formed at the anode and explain briefly why the substance you have identified forms.

(ii) State **two** industrial applications of electrolysis of copper (II) sulphate solution using copper as the electrodes.

(d) When copper (II) chloride solution was electrolyzed between graphite.

3 Explain the following observations; and write equation where possible to Illustrate your answer.

(a) Aqueous hydrogen chloride reacts with magnesium producing hydrogen; Whereas, a solution of hydrogen chloride in methylbenzene has no effect on Magnesium.

(b) The PH of a solution of sodium of sodium carbonate is greater than 7, Whereas, the PH of a solution of ammonium chloride is less than 7

(c) Molten sodium chloride conducts electricity, whereas sodium chloride crystals do not.

4 (a) (i) Name one substance which is used as a raw material for preparing alcohol in your locality.

(ii) Describe how a sample of alcohol is prepared, starting from the substance you have named in (a) (i). (Diagram or equation not required)

(iii) State how the alcohol that is obtained can be purified.

(b) Alcohol, $C_2 H_5 OH$ is used as fuel.

(i) Write equation for the complete combustion of alcohol, indicating why is used as a fuel.

(ii) State the energy change involved when alcohol burns.

(c)(i) The enthalpy of combustion of alcohol in (b) is -1367 KJ $mol^{-1.}$ Calculate the enthalpy change for the combustion of 5.0g of alcohol. (H = 1, C= 12, 0 = 16).

(ii) State <u>one</u> use of alcohol other than as a fuel.

5 (a) State and explain the effect of each of the following factors on the rate of a chemical reaction.

(i) Catalyst

(ii) Temperature

(b) Dilute hydrochloric acid, reacts with magnesium to form hydrogen. Write ionic equation for the reaction.

(c) The table below shows the volumes of hydrogen that were produced per minute when a standard solution of hydrochloric acid reacted with certain lengths of magnesium ribbon.

Length of ribbon (cm)	1.0	2.0	3.0	5.0	6.0
Volume of hydrogen (cm^3)	3.8	7.2	10.6	18.2	21.6

(i) Plot a graph of volume of hydrogen against length of magnesium ribbon

(ii) Explain the shape of your graph

(iii) Determine the rate of production of hydrogen from 4.0cm of magnesium ribbon.

6. Explain the following observations and where possible in each case, write equation(s) to illustrate your answer.

(a) Dilute sulphuric acid is not suitable for preparing carbon dioxide in the laboratory.

(b) When a pellet of sodium hydroxide is left exposed in air, a white solid is deposited on the pellet.

(c) A solution of copper (II) sulphate forms a blue precipitate when mixed with ammonia solution and the precipitate dissolves in excess ammonia, giving a deep blue solution.

7 a) State what the term "hydrocarbon" means

(b) When a gaseous hydrocarbon, J, was burnt in excess oxygen, 6.6g of carbon dioxide and 2.7g of water were produced.

(i) Calculate the empirical formula of J.
(H = 1 C=12, O = 16)

(ii) Determine the molecular formula of J. (1mole of J weighs 42g).

(i) Name J

(ii) Ethane

(d) (i) Name **one** reagent that can be used to distinguish J from ethane.

(ii) State what would be observed in each case, if J and ethane were Treated separately with the reagent you have named in (d) (i)

(e) Incomplete combustion of J can cause environmental pollution. Give a brief explanation.

8. a) State one word which means "formation of soap".

(b) (i) Name **one** plant product that is locally available, which can be used as a starting material for the laboratory preparation of soap.

(ii) Describe how soap solution can be prepared from the product you have named in (b) (i)

(iii) Briefly describe how a solid soap sample can be obtained from your soap solution in (b) (ii).

(c) Washing with soap in hard water is inconvenient. Explain.

(d) Some soapless detergent molecules cannot be broken down by bacteria. State the chemical nature of such molecules and give a reason why soapless detergents of such nature are disadvantageous.

9 a) Draw a labeled diagram to show the structure of an atom.

(b)i) State how the total number of electrons in an atom compares with the total number of protons.

(ii) Explain how the comparison you have stated in (b)(i) affects the stability of an atom.

(c) The full symbols of two atoms of an element are $^{16}_{8}A$ and $^{18}_{8}B$.

(i) State the group in the periodic Table to which the element belongs.

(ii) Determine the number of neutrons in the atoms of A and B respectively.

(iii) State what the atoms A and B are called

(d) The atomic numbers of elements **T, X** and **Y** are I, 6 and 11 respectively. Write the electronic configuration of each of the elements.

(e) **T** can react with both **X** and **Y** to form compounds.

(i) Using the outermost energy level electron only, draw a diagram to show the formula of the compound that can be formed when **T** reacts with **X.**

(ii) Suggest a suitable solvent for the compound that can be formed when **T** reacts with **X** and **Y** respectively; and give a reason for your choice of the solvent in each case.

10 a) Equal masses of specimens of graphite, charcoal and diamond undergo completed combustion in air, yielding an identifiable gas **G** of same mass

(i) State any conclusion that can be drawn from the above observation.

(ii) Identify **G**

(iii) Show that .5g of **G** would be yielded; if 1.5g of charcoal was completely burnt in air. (C = 12 O= 16).

(iv). State **one** difference between graphite and diamond.

(b) Wood charcoal is used in many parts of Uganda as a fuel; although environmentalists in the country discourage the practice.

(i) State what is meant by the term "Fuel".

(ii) Suggest **one** reason why environmentalists in Uganda discourage use of wood charcoal as fuel.

(c)i) Briefly describe an experiment that could be carried out to determine the energy content of wood charcoal, using locally available materials in your area.

(ii) Calculate the enthalpy of combustion of wood charcoal. (C= 12, energy content of wood charcoal = 32,000kj mol^{-1}

11 (a) Explain how a dry sample of Sulphur dioxide can be prepared from sodium sulphite .(Diagram is NOT required.

(b) State what would be observed; if into a jar containing Sulphur dioxide was

(i) Added drops of acidified potassium dichromate (VI) solution.

(ii) Lowered a wet red hibiscus flower.

(c) Concentrated nitric acid was added to sodium sulphite solution, followed by acidified lead (II) nitrate solution state and explain what was observed.

(d) Explain how sulphur dioxide can pollute the environment.

(e) State two industrial uses of sulphur dioxide.

12 Iron can rust.

(a) Write the chemical name of rust.

(b) (i) State the condition (s) necessary for ion to rust.

(ii) Draw labeled diagram(s) for a setup of an experiment which can be used to show that the condition(s) you have stated in (b) (i) is /are necessary for iron to rust.

(iii) State and explain observations that would be made if the experimental set up in the diagrams that you have drawn in (b) (ii) was allowed to stand for some days.

(c) (i) State **two** methods by which rusting can be prevented.

(ii) Give **one** reason why rusting must be prevented.

13a) Differentiate between the terms **'synthetic'** and '**natural polymers'**

b) Polyethene is an example of a synthetic polymer

(i) Write equation for the reaction leading to the formation of polyethene

(ii) State **one** use of polyethene

(iii) Name **one** natural polymer and state **one** use of it.

(c) Explain the following statements.

(i) Use of polyethene paper is discouraged by many environmentalists.

(ii) Highly branched polymers can be hazardous to aquatic organism.

(d) State what is meant by each of the term "**thermosetting plastics**" and "**Thermo softening plastics**" which are commonly used terms in polymer chemistry. In each case give **one** example

14.(i). Name any two substances that together can be used to prepare zinc carbonate, $ZnCO_3$ in the laboratory.

ii. Briefly describe how a pure dry sample of zinc carbonate can be prepared from the substances that you have named in (a) (i) and write equation to illustrate your answer.

(b) State what would be observed and write equation for the reaction that would take place in each case if

i. Zinc carbonate was heated strongly

ii. Dilute nitric acid was added to zinc carbonate

(c) Write equation to show the effect of heat on zinc nitrite

(d) Dilute sodium hydroxide was added gradually to aqueous zinc nitrate until the alkali was in excess. State what was observed and write ionic equation (s) to illustrate your observation (s).

15. (a) (i) Write equation for the reaction leading to the formation of hydrogen chloride during its laboratory preparation

(ii) With aid of a labeled diagram, explain the laboratory preparation of hydrogen chloride.

(iii) State how you would test for hydrogen chloride.

(b) Solutions of hydrogen chloride in methylbenzene and in water were prepared, and each tested with litmus papers.

State what was observed in each case and briefly explain your observation.

(c) The reaction below illustrates the laboratory preparation of chlorine from potassium Manganate (VII)

$2KMnO_4(s) + 16HCl(aq) \longrightarrow 2MnCl_2(aq) + 5Cl_2(g) + 2KCl(aq) + 8H_2O_{(l)}$

(c) Calculate the mass of potassium manganate (vii) that would be required to react with hydrochloric acid to produce 2240.0cm3 of dry chlorine, measured at s.t.p (1 mole of a gas occupies 22, 400cm3 at s.t.p).

(d) Aqueous sodium chloride can undergo electrolysis to produce chlorine or oxygen.

i. Name the substance (s) that can be used as electrodes during electrolysis of sodium chloride

ii. State the conditions of electrolysis of sodium chloride which will result in the production at the anode of

- ❖ Chlorine
- ❖ Oxygen

iii. Write equation for the reaction that results in the formation of oxygen as in (d) (ii).

16. (a) Explain how nitric acid can be prepared in the laboratory.

(No diagram is required, but your answer should include equation for reaction leading to formation of nitric acid)

(b) Write equation to show the effect of heat on;

i. Potassium nitrate

ii. Silver nitrate

(c) Calcium nitrate decomposes when heated to produce nitrogen dioxide as shown by the following equation

$2Ca(NO_3)_2(s) \longrightarrow 2CaO(s) + 4NO_2(g) + O_2(g)$

Calculate the mass of calcium nitrate that when heated would produce 8960cm^3 of nitrogen dioxide measured at s.t.p (N=14, O=16, Ca=40, 1 mole of a gas occupies 22r4dm^3 at s.t.p)

(d) (i) Write equation for the reaction of concentrated nitric acid with carbons

(ii) State one use of nitric acid other than preparation of nitrates.

17. (a) State what is meant by the term **'hard water'**.

(b) Write the name and formula of one compound which when dissolved in water can cause:

(i) Temporary hardness of water

(ii) Permanent hardness of water

(c) (i) Explain, giving ionic equations, why boiling can only remove temporary hardness, whereas addition of sodium carbonate can remove both temporary and permanent hardness of water.

(d) State two advantages and one disadvantage of hard water

18 (a) Briefly describe how a pure dry sample of zinc sulphate – 7- water can be prepared in the laboratory

(b) Zinc sulphate – 7- water was heated gently and then strongly until there was no further change.

i. State what was observed

ii. Write equation (s) for the reaction (s) that took place

(c) (i) The residue from (b) was dissolved in dilute nitric acid. Write equation for the reaction that took place.

(ii) State and explain what would be observed when dilute sodium hydroxide solution was added drop wise until in excess to the aqueous solution obtained in (c) (i).

19. Name any two compounds that together can be used in the laboratory preparation of ammonia and write equation for the reaction leading to the formation of ammonia

(b) State one compound that is used as a drying agent for ammonia

(ii) Give a reason for your answer in (b) (i)

(c) Draw a labeled diagram for the setup of apparatus that can be used to prepare a dry sample of ammonia in the laboratory; and give a reason for the method of collection in your diagram.

(d) Write equation for the reaction that takes place during the

i. industrial preparation of ammonia by the Haber process.

ii. Removal of temporary hardness of water using ammonium hydroxide.

20. (a) Write equation for the reaction that occurs

i. During commercial preparation of ammonia by the Haber process

ii. During laboratory preparation of hydrogen chloride

iii. When ammonia is exposed to hydrogen chloride.

(b) State one physical similarity and one physical difference between ammonia and hydrogen chloride other than their solubilities in water.

(c) Write ionic equation for the reaction that would take place. If;

(i) Ammonia was bubbled through aluminum sulphate solution until there was no further change.

(ii) Sodium hydrogen carbonate was dropped into aqueous hydrogen chloride.

(d) State what would be observed and write equation for the reaction that would take place if dry ammonia was passed over strongly heated lead (ii) oxide.

(e) Draw a labeled diagram for the setup of apparatus to show combustion of ammonia.

(f) Describe the reaction (s) of ammonia with oxygen.

(g) Ammonium sulphate, $(NH4)_2SO_4$ and ammonium nitrate, NH_4NO_3 are the common Nitrogen – fertilizers (N-fertilizers) on the markets. Justify the observation that ammonium nitrate is a better N-fertilizer than ammonium sulphate

(N=14) NH_4NO_3 = 80 and $(NH4)_2SO_4$ = 132)

21. (a) State what is meant by the term enthalpy of neutralization and write equation to illustrate your answer

(b) The table below shows the temperature of the resultant solution formed when various volumes of 2m sodium hydroxide solution was added to 20cm3 portions of 2m hydrochloric acid.

Volume of sodium hydroxide (cm^3)	0	5	10	15	20	25	30	35
Volume of sodium hydroxide and hydrochloric acid (cm^3)	20	25	30	35	40	45	50	55
Temperature (^0C)	22	25.6	29.2	32.8	35.6	31.8	27.8	23.8

Plot a graph of temperature against volume of sodium hydroxide

(c) Using the graph, determine

i. The volume of sodium hydroxide required to completely neutralize 20.0cm^3 of 2M hydrochloric acid.

ii. Temperature of the resultant solution at the neutralization point.

(d) Calculate the;

i. Number of moles of hydrochloric used.

ii. Molar enthalpy of neutralization of hydrochloric acid
(Specific heat capacity of resultant solution is 4.2KJ/kg ^0C; density of the resultant solution is 1g/cm^3)

(e) State whether you would expect the enthalpy of neutralization of ethanoic acid by sodium hydroxide to be lower, equal or greater than that of hydrochloric acid. Explain your answer.

22. (a) Lemon juice turns blue litmus paper pink, which means it contains a weak acid

i. Define the term "acid"

ii. State what is meant by the term "weak acid"

iii. Write the name of acid which is in lemon juice.

(b) Limestone is an impure calcium carbonate, which is often used in the laboratory preparation of carbon dioxide because it readily reacts with acids forming the gas according to the following ionic equation

$$CO_3^{2-}(s) + 2H^+_{(aq)} \longrightarrow H_2O_{(l)} + CO_{2(g)}$$

i. State the condition (s) under which acids react with limestone

Briefly explain how carbon dioxide can be purified, dried and collected during its preparation.

23. (a) State what is meant by the term ***rusting*** (1mark)

(b) Describe **one** test in each case that would be carried out to show that rust contains:

(i) water.

(ii) iron (III) ions. (3marks

(c) Describe an experiment you would carry out to show that iron does not rust in air free water. (5marks)

(d) Two irons nails are coated, one with a thin layer of zinc, and the other one with a thin layer of tin.

(i) State what would happen to the nail in each case when the coating is cracked to expose the iron. (2marks)

(ii) Explain your answer in (d) (i) above. (3marks)

s (e) State **one** method of preventing iron from rusting apart from using zinc or tin.

24. A piece of magnesium ribbon was burnt in air.

(a) State what was observed. (1mark)

(b) One of the products of burning magnesium in air is magnesium nitride. Name the other product. ($1/2$mark)

(c) When 0.36g of magnesium was heated strongly in pure nitrogen 0.5g of magnesium nitride was formed.

(i) Calculate the simplest formula of magnesium nitride. (N = 14, Mg = 24) (2marks)

(ii) Write equation for the reaction that takes place when magnesium nitride is dissolved in water. ($1\ 1/2$marks)

(d) Excess aqueous ammonia was added to a solution of aluminium nitrate.

(i) State what was observed. (01mark)

(ii) Write ionic equation of the reaction(s) that took place (1½ marks)

e) (i) Draw a labelled diagram to show that ammonia is highly soluble in water. (4marks)

(i) State one use of ammonia gas. (½ mark)

f) Write equation to show the effect of heat on each of the following substances.

i) Silver nitrate. ($1\ 1/2$marks)

ii)Potassium nitrate. ($1\ 1/2$marks)

iii) lead(ii) nitrate ($1\ 1/2$marks)

iv)ammonium nitrite ($1\ 1/2$marks)

25.(a) Explain how a sizeable quantity of oxygen can be prepared from hydrogen peroxide at room temperature.

(Diagram not required; but your answer must include equation) ($5\ 1/2$marks

(b) A few drops of hydrogen peroxide solution were added to an acidified solution of iron (II) chloride. State what was observed, (1mark)

(c) Sodium hydroxide solution was added drop-wise to the product in (b) until the alkali was in excess.

(i) State what was observed. (1mark)

(ii) Write an ionic equation for the reaction that took place. ($1\ 1/2$marks).

(d) Write equation to show reaction that takes place in each case when phosphorus and sodium are burnt separately in excess oxygen. (3marks)

(e) The products in (d) were dissolved separately in water and the solutions tested with litmus paper.

State what;

(i) Was observed in each case. (2marks)

ii)The reaction between substances in the two solutions is known as. (1mark)

(f) 20.0cm^3 of a solution of a basic compound W of concentration 0.5 mol dm^{-3} reacted exactly with 16.7cm^3 of another compound Y of concentration 0.2mol dm^{-3}.

Calculate the mole ratio in which Y reacts with W. ($2^1/_2$marks)

26.(a) (i) State what is meant by the term " ***ore***'. (1mark)

(ii)Name one ore of iron from which the metal can be extracted and write its formula (1mark)

(b) During the extraction of iron, the ore is first roasted in air before it is introduced into the blast furnace together with coke and limestone

(i) Name one other raw material added to the blast furnace and write equation to show how it is useful in extraction of iron from haematite . (2marks)

(ii) Explain why the ore is roasted in air. ($2^1/_2$marks)

(c) A series of reactions occur in a blast furnace during the extraction of iron from haematite. Describe; and write equation for one of these reactions which involves.

(i) the reduction of hematite ($2^1/_2$marks)

(ii) the formation of slag. (3marks)

(d) Describe the reaction of iron with water. (3marks)

27(a) Define the term *"rate of a reaction"*. (1mark)

(b) Experimental data that was obtained when the rate of decomposition of hydrogen peroxide at room temperature was studied, are shown in the table below.

Time (mins)	0	1	2	3	4	5	6	7	8
Volume of oxygen(cm^3)	0	37	67	87	107	114	120	120	120

(i) Plot a graph of volume of oxygen against time. (4mark)

(ii) Using your graph determine the rates of the reaction after 2 and 4 minutes respectively.

(iii) Compare the rates of reaction that you have determined in (ii) and explain your answer.

(iv) Give a reason for the shape of your graph after 6minutes. (2marks)

(d) Other than concentration of hydrogen peroxide and temperature of the reaction, state one factor that would as well affect the rate of decomposition of hydrogen peroxide and explain its effect on the rate of the reaction. (3marks)

28 (a). Stoichiometric amounts of iron filings and sulphur were ground together and the mixture heated in a dry test tube.
Write equation for the reaction that took place. ($1^1/_2$marks).
(b). State what would be observed if to the product in (a) in a test tube, was added dilute hydrochloric acid. ($1^1/_2$marks)
(c) The resultant mixture in the beaker in (b) was treated with aqueous ammonia until the alkali was in excess.
State what was observed. ($1^1/_2$marks).
(d) Outline with the aid of equations, how sulphuric acid is manufactured on a large scale by the contact process, starting from sulphur. (6marks)
(e) One of the reactions in the contact process is reversible. Identify the reaction and use it to explain what is meant by a **''reversible reaction''**

(f) (i) Name one reagent, which is used in the confirmatory test for sulphur dioxide and state what is observed when sulphur dioxide is treated with the reagent. (2marks)
(ii). Write equation to show the effect of warm concentrated sulphuric acid on glucose, $\mathbf{C_6H_{12}O_6}$
g) Electrolysis of dilute sulphuric acid between platinum electrodes leads to the formation of two gases X at the anode and Y at the cathode, in the volume ratio of; 1: 2. i) Identify; gas X and Y (1mark)
ii)Write equation for the reaction that takes place at the anode. ($1^1/_2$marks)
iii) Describe a chemical test that can be carried out to identify gas X and Y. (3marks
iv)State any conclusion that can be drawn from the relative quantities of the products at the anode and the cathode. (1mark)

29(a) Name **one** reagent that can be used to distinguish between members of the following pairs of ions and State what would be observed in each case, if a member of each of the pairs of ion above was treated with the reagent you have named

(i) $Al^{3+}_{(aq)}$ and $Pb^{2+}_{(aq)}$
(ii) Fe^{2+} and Fe^{3+}
(iii) Zn^{2+} and Al^{3+}
(iv) Cl^- and SO_4^{2-}
(v) $CO_3^{2-}{}_{(aq)}$ and $HCO_3^{-}{}_{(aq)}$
(vi) C_2H_4 and C_2H_6

30 (a). Name the crystalline allotropes of carbon. (1mark)
(b) State; (i) one property of each of the allotropes of carbon that you have named in (a) . (2marks)

(ii) **one** use of each of the allotropes of carbon that you have named in (a), based on the property, which you have stated in (b). (1mark)

(c) Name one allotrope of carbon that is used;
(i) for making shoe polish. ($^1/_2$mark
(ii) in sugar industry. ($^1/_2$mark

. (d) (i) Draw a labelled diagram of the setup of apparatus to show how a dry sample of carbon dioxide can be prepared from marble chips in the laboratory.

(ii) Write equation for the reaction leading to the formation of carbon dioxide.

(e) State what is observed and write equation(s) in each case when;
(i) burning magnesium is lowered into a gas jar of carbon dioxide. (3marks)
(ii) carbon dioxide is bubbled into aqueous sodium hydroxide until there is no further change. (4marks)

PRACTICAL EXPERIMENT.

31. You are provided with the following:
BA1, which is a solution containing 0.1 moles per dm^3 of a monobasic acid, Q.
BA2, which is a solution made by dissolving 5.0gl-1 of substance Y, which is an impure sodium hydroxide. You are required to determine the percentage purity of Y.
Procedure:
Pipette 25.0cm^3 (or 20.0cm3) of BA2 into a flask. Add 2-3 drops of methyl orange indicator and titrate with BA1 from the burette. Repeat the procedure until you obtain consistent results.
Record your results in the table in the table below.
Results:
Volume of pipette used ..... cm^3.

Experiment number	1	2	3
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of BA1 used (cm^3)			

Titre values of BA1 used for calculating average volume.
Average volume of BA1 used.
Questions.
(a) Calculate the;

(ii) Number of moles of sodium hydroxide that reacted
(iii) Concentration in moles of sodium hydroxide per litre of BA2
(iv) Mass of sodium hydroxide in one litre of BA2 (Na=23, H=1, O=16)

(b) Determine the percentage purity of Y

32. You are provided with substance Y which contains two cations and one anion. Carry out the following tests on Y to identify the cations and anion present. Identify any gas(es) that may be evolved. Record your observations and deductions in the table below.

TESTS	OBSERVATIONS	DEDUCTIONS
(a) Heat one spatula endful of Y in a dry test tube, first gently then strongly until there is no further change.		
(b) To two spatula endful of Y in a test tube, add about $5cm^3$ of dilute nitric acid. To the resultant solution, add dilute ammonia solution dropwise until in excess. Filter, keep both the filtrate and residue.		
(c) To the filtrate from (b), add dilute nitric acid drop wise until the filtrate is just acidic. Divide the resultant solution into two portions.		
(i) To the first portion of the acidic solution, add dilute sodium hydroxide solution drop wise until in excess.		
(ii) To the second portion of the acidic solution, add dilute ammonia solution dropwise until in excess.		
(d) Wash the residue from (b) and dry it. Dissolve the dry residue in minimum dilute nitric acid. Divide the resultant solution into four portions.		

(i)	To the first portion of the solution, add dilute sodium hydroxide dropwise until in excess.		
(ii)	To the second portion of the solution, add dilute ammonia solution dropwise until in excess.		
(iii)	To the third portion, add 2-3 drops of dilute sulphuric acid and warm.		
(iv)	Use the fourth portion to carry out a test of your own choice to confirm one of the cations in Y. TEST…… …… ……		