



**ST JULIAN HIGH SCHOOL-GAYAZA
O-LEVEL CHEMISTRY SEMINAR
DATE: 20TH SEPTEMBER, 2025**

FOREWORD

I welcome you to our second annual O-level chemistry seminar. This seminar has been organised for you to interact with the experienced facilitators of chemistry who are going to guide you on the approach to item response and also to make you aware of the Dos and Don'ts while responding to the tasks so that you excel in your final examinations. I congratulate you upon making the right choice to come and be part of this arrangement.

KIWAFU MATHIAS

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HEAD OF CHEMISTRY DEPARTMENT.

SET 1

Section A

Respond to all items in this section

Item 1

Kane got injured by a panga while clearing one of his gardens. A neighbour rushed him to a nearby clinic where he was given aspirin and penicillin tablets. After taking the tablets for some days, Kane felt better.

Kane is seeking more information on the tablets he was given. He has approached you for help.

Task

As a Chemistry learner;

- Identify the category of the products given to Kane.
- State the functions/uses of the products Kane was given.
- Explain to Kane why excessive/prolonged use of the products he was given is bad.
- Compare the products Kane was given with those obtained from plants and animals.

Item 2

John and Sarah are senior three learners tasked with making a presentation on how sodium chloride and carbon dioxide are formed from their constituent elements, highlighting their uses, and discussing their impacts on the environment if any.

However, they do not know how to do it and have approached you for help

They have the following information about the elements involved.

Task

As a Chemistry learner, help John and Sarah;

They have the following information about the elements involved.

Element	Carbon	Oxygen	Sodium	Chlorine
Atomic number	6	8	11	17

Task

As a Chemistry learner, help John and Sarah;

Explain the categories of elements involved.

Understand how the compounds are formed from their constituent elements using dot-cross structures.

Highlight uses for the compounds.

Explain the impacts of one of the compounds on the environment.

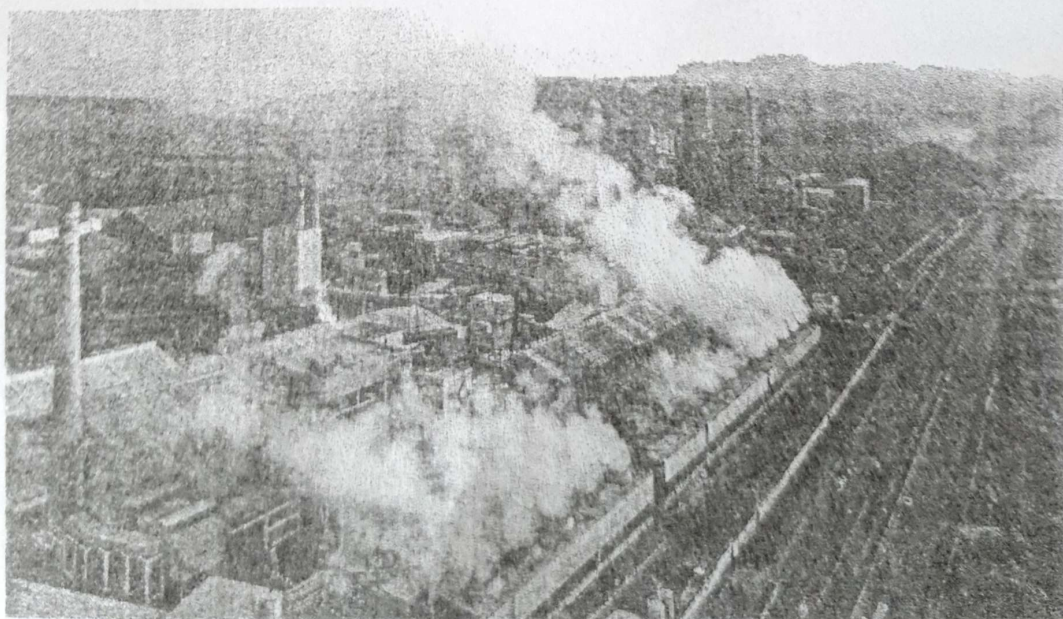
SECTION B

Part I

Respond to one item from this part

Item 3.

In Kayunga District, investor plans to build an acid production factory to meet the growing demand for acid batteries due to increased automobile usage. However, local residents are protesting the project, citing environmental concerns and lack of benefits for their community.



The locals are also questioning how the acid production will be done. To address their concerns, the investor and the help of the LC1 have organized a radio talk show on one of the local radio stations. Your head teacher has been invited as one of the guest speakers.

Task

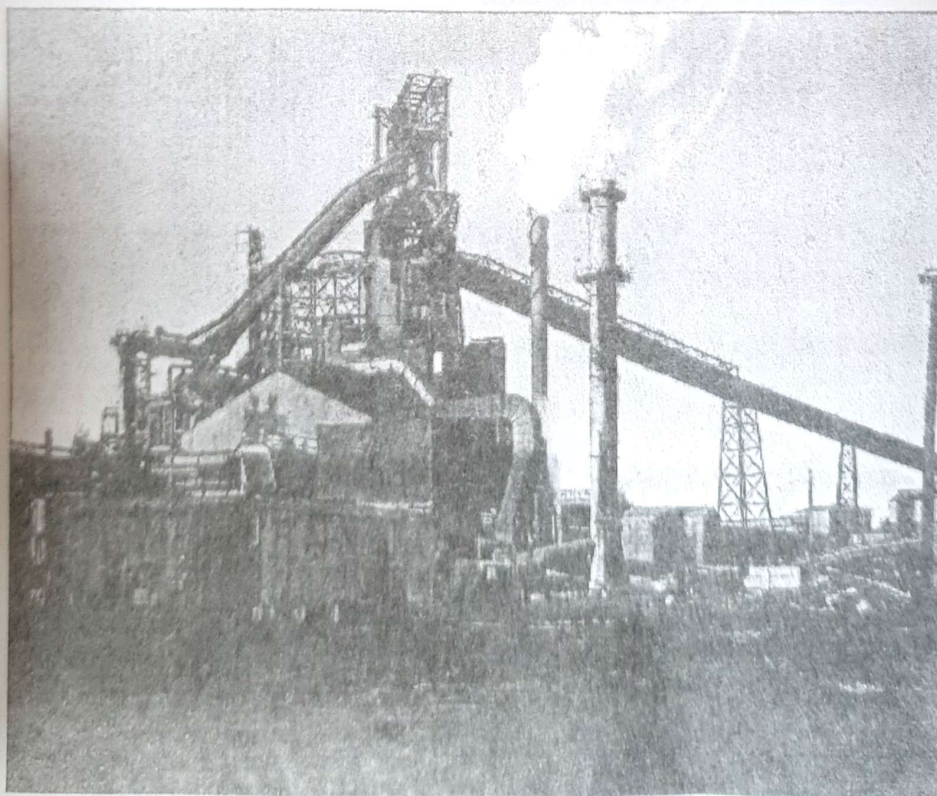
As Chemistry learner, write a brief message your head teacher will deliver to the locals.

Item 4

In order to continue supplying iron which is a raw material for its ever-growing iron and steel industry, government is planning to construct an iron production plant in one of the villages in Kigezi District.

This is because the area is rich in iron ores.

However, the community is concerned about its environmental impact. They are also wondering if there any other social benefits associated with the plant apart from job opportunities.



The law also requires that the locals should be sensitised about the whole production process.

Your Chemistry teacher has been asked to carry out the sensitisation and she given you an assignment to prepare for her a write-up for sensitisation.

Task

As a Chemistry learner, make a write-up for the teacher.

Part II

Respond to one item from this part.

Item 5.

Studies and surveys in and around Jinja District by NEMA found that air quality is generally poor. This is due to rapid urbanization which has caused increased gas emissions from motor vehicles and industries. The locals seem not concerned about this situation. This is because many have not known the long-term consequences of the gas emissions.

The District Environmental Club (DEC) to which you are a member of, has got concerned about this development. Therefore, the DEC is planning to create awareness to the people through sensitization workshops organized in the different villages within the district. You have been chosen as one of the key speakers.

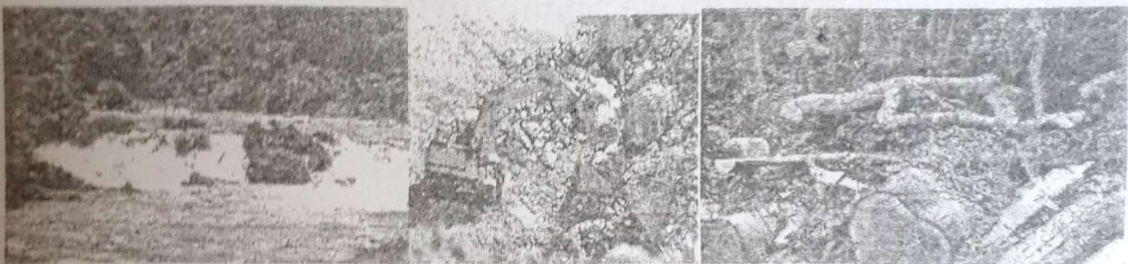
Task

As a Chemistry learner, prepare a short presentation that you will deliver during the workshop.

Item 6

Natural forests and fresh water bodies like lakes, swamps and rivers have been heavily encroached on as a result of rapid urbanization. The rocks are also not spared either.

As a result, on World Environment Day, the Ugandan government, through National Environmental Management Authority (NEMA), wishes to raise public awareness among the citizens on the ongoing developments.



Your school is among the schools selected for the attend and make a presentation on the World Environment Day. The theme for the day is "**NATURAL RESOURCES ARE BASIC NECESITIES**". The science club at your school has selected you to give a presentation on the occasion.

TASK

Write the short message you will use during the celebrations.

SET 2

Section A

Respond to all items in this section

Item 1

While at a party, John was served several beverages and one was labeled "the best industrial gin". He became curious about this beverage and wants to know about more about it. He has approached you for help.

Task

As a Chemistry learner;

- (e) Identify the category of the substance in the beverage.
- (f) State other use of the substance in the beverage.
- (g) Advise John on the challenges associated with prolonged/excessive use of the gin.

Item 2

Peter, a farmer in a rural area hired a piece of land to grow maize for sale. He registered low yields even when the rainfall was very favorable.

He later learnt from his friend that the soil lacked nitrogen and was advised by his friend to use either ammonium nitrate, or urea, .

He needs guidance on which product to use.

(C=12; H=1; N=14; O=16)

Task:

As a Chemistry learner,

- (a) Identify the category of products.
- (b) Help Peter identify a better alternative product.
- (c) State for what other purpose can the products be used for?
- (d) Advise peter on the dangers associated with the prolonged use of the products on the environment and how to avoid them.

SECTION B

Part I

Respond to one item from this part

Item 3.

Most residents in northern Uganda plant cassava for domestic use and they sell the surplus. They were advised that cassava can be converted into ethanol on a large scale. However, they are wondering how this can be done and whether it is having impacts to the environment. One of the members has approached you for a dvice.

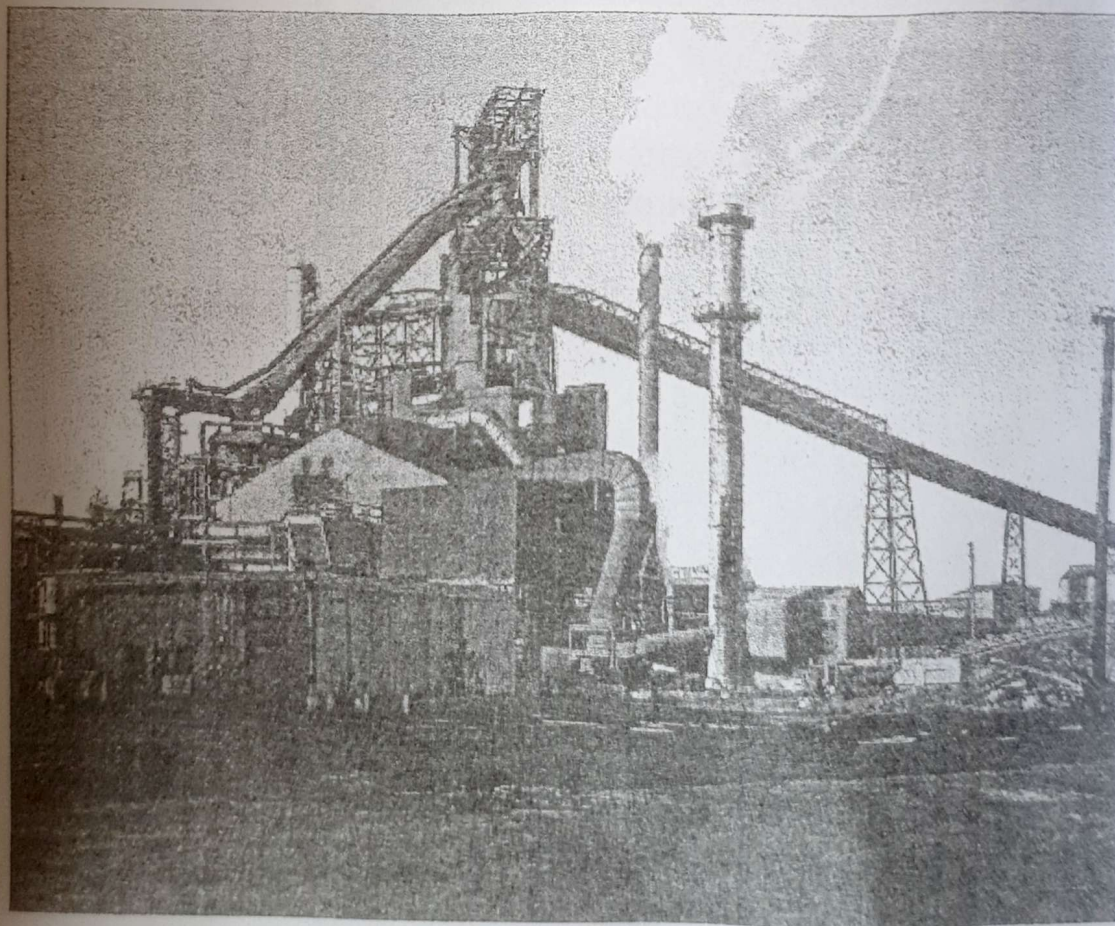
Task.

As a Chemistry learner, prepare a written message that can help the residents.

Item 4

In Uganda, aluminium is widely used for household items (like pots and kettles) and construction (for windows, doors, and partitions). To meet this demand and utilise local bauxite resources, the government plans to establish an aluminium production factory in Jinja district.

However, the local community want to understand how aluminium will be produced from bauxite and if there are any social benefits associated with plant.



Additionally, residents are concerned about potential impacts beyond air and water pollution and want assurance of the mitigation measures.

You have been identified as knowledgeable person to sensitise the residents.

Task

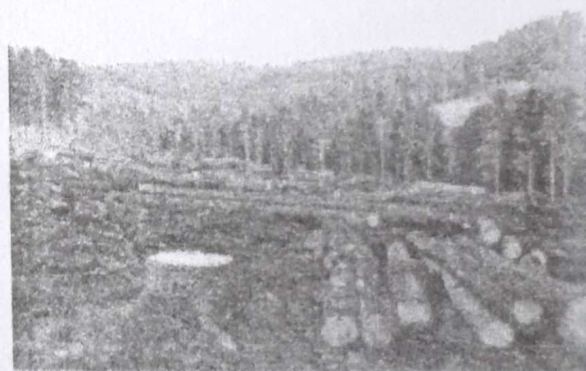
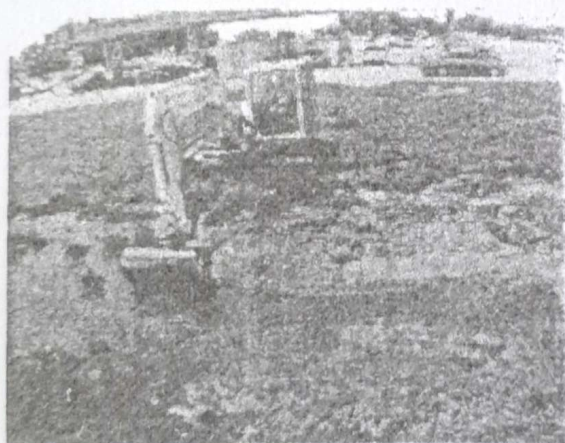
Make a write-up that you would use to during the sensitisation workshops.

Part ii

Respond to one item from this part.

Item 5.

In many parts of Kampala city, swampy areas have been reclaimed by the locals for settlement and other human activities. Still, in these swampy areas, milling machines have also been installed to process maize flour and rice. These happenings have attracted the attention of the concerned authorities.



As a result, the area Environment Officer made a radio talk show on sustainable use of natural resources on one of the radio stations in city. Unfortunately, Mary a resident of the area only heard the concluding statement, "From the presentation, I kindly request everybody to use our natural resources sustainably".

Mary is now confused and wants to understand the detail of the talk show. She has approached you for help.

Task:

As a Chemistry student, prepare a short presentation you will share with Mary.

Item 6

An Environmental Officer in Hoima district observed that there is an alarming increase in cutting down trees in her district. This is partly due to need for charcoal and timber, and also areas for expansion of agriculture.



As a result, she organized a workshop where she sensitized the residents about the ongoing developments.

The School's science club of which you are a secretary, attended the workshop. The head teacher has requested the club to make a presentation to the rest of the learners.

Task

As a learner of Chemistry, make a write-up of the message that the environmental officer delivered in the workshop.

SET 3

Section A

Respond to all items in this section

Item 1

Sarah who operates a food restaurant near your school often complains of his foods getting spoilt easily. She also frequently registers a low-turn up of customers since, many of them complain of food not being delicious and not appealing.

She has been advised by her friend to use products that many be local or synthetic to improve on her foods and win back her customers. She needs further guidance and thus, has approached you.

Task

As a Chemistry learner;

- (h) Point out the best product she can use.
(Or identify the category of products that Sarah can be use).
- (i) Explain to her the functions of the products.
- (j) Discuss why excessive use of the products is bad.
- (k) Advise her on which product is better to use; artificial products or natural products.

Item 2

Eve wants to invest cash prize she won in a competition in making school uniforms which are environmentally-friendly.

She is aware of the various types of materials that can be used in the fabrics.

However, she lacks knowledge of the best material for the fabric she intends to use and has approached you for advice.

Task:

As a Chemistry learner;

- (e) With reasons, help Eve categorize the materials she can use.
- (g) Explain how suitable the suggested materials identified are.
State for other purpose can the materials be used for?
- (h) advise Eve on the side effects of using the suggested materials on the environment and how to avoid them

SECTION B

Part I

Respond to one item from this part

Item 3

In Paul's home, meals are prepared using either wood charcoal or liquefied petroleum gas (LPG). However, recent environmental concerns about the impact of using those materials, have compelled Paul to seek guidance from you.

Task

As a Chemistry learner, prepare a write-up to inform and guide Paul.

Item 4

Akello, a re-known businesswoman in Gulu district wants to expand her sources of income by investing in granite stone quarrying. This is because of the many on-going construction works in the district that require stones as one of the materials. However, she does not know the negative impact of the activity she is yet to invest in.



She is also seeking advice, on what could be the other benefits of her activity to the society.

Task

As a Chemistry learner, write a message to guide Akello.

Part II

Respond to one item from this part.

Item 5.

In Uganda, ammonium nitrate is primarily used in agriculture as a fertilizer and for explosives in the mining sector. To reduce reliance on its importation, government has teamed up with some foreign investors to set up an ammonium nitrate production plant in a certain area. However, the residents of area need to be sensitized about the industrial process and the associated impact.

You have been chosen as lead speaker for the team to sensitize the residents.

Task

As a learner of Chemistry, prepare a write-up that you will use to sensitize the residents.

Item 6.

Oil deposits were discovered in the western Uganda and a Chinese investor/company has been contracted by the government to construct a plant and refine it. However, the community members are worried about the impact of refinery and also, they don't know how they will benefit. Therefore, a meeting has been organized to sensitize the members about the process and its implication.

Task

As a learner of Chemistry, make a write up of your expectations in the meeting.

End

PRACTICALS

Item 1

In Jinja district, waste water from manufacturing industry is discharged into River Nile. The waste water contains traces of hydrochloric acid which has threatened the lives of fresh water fish in the river.

To solve the problem the industry is exploring the use of an alkali solution to neutralize the acid in waste water before it is discharged. However, the reaction produces heat which can pose a possible threat of explosion within the industry.

The waste water treatment vessel can only withstand heat ranging from 0 – 2.52KJ.

The alkali reacts with hydrochloric acid according to the following equation.



And heat produced varies with volume of the alkali added.

You are provided with;

- BA1 which is a sample solution of the alkali.
- BA2 which is dilute hydrochloric acid.
- Any other apparatus from the chemistry laboratory.

Task

As a chemistry learner;

(a) Design an experiment that can be used to determine the amount of heat produced.

(Your design should include; aim, hypothesis, variables, apparatus and materials, procedure, risks and mitigations)

(b) Carry out the experiment and record your results.

(A minimum of six readings required)

(c) Analyse and interpret your results

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d) Make a Conclusion and recommendation

Item 2

Otim a farmer in northern Uganda uses lime water to reduce soil acidity in his vegetable garden. He has bought lime water from different suppliers A and B but he is unsure which one is more effective.

A local agriculture officer explains that the lime water sample with higher alkalinity (Better at neutralizing acid) requires a larger volume of dilute hydrochloric acid in titration test to reach neutralization. The agriculture club at your school has been asked to help Otim by pipetting fixed volumes of lime water sample separately and titrating them with dilute hydrochloric acid solution using phenolphthalein indicator. They have approached you for guidance. You have been provided with;

- . BA1 – dilute hydrochloric acid (to simulate acid in the soil)
- . BA2 – limewater sample from supplier A.
- . BA3 – limewater sample from supplier B.
- . Phenolphthalein indicator.

Any other apparatus from the chemistry laboratory.

Task

As a chemistry learner;

a) Design an experiment you will carry out to help Otim. (Your design should include; aim, hypothesis, variables, apparatus and materials, procedure, risks and mitigations)

b) Carry out the experiment and record your results. (A minimum of six readings required)

c) Show the analysis of your results and make your conclusion.

d) Make a Conclusion and recommendation

Item 3

Sodium carbonate (baking soda) is commonly used in homes to clean utensils stained with acidic foods. Grace observed that when warm water is used with baking soda to clean acidic food stained, bubbling occurs faster and ends more quickly than when cold water is used. She wondered why.

To help Grace understand this, you have been approached to model the reaction in the laboratory using hydrochloric acid and sodium carbonate solution, which also produces bubbling of carbon dioxide gas.

You are provided with;

- . BA1 which is sodium carbonate solution.
- . BA2 which is hydrochloric acid solution to create a similar acidic atmosphere.
- . Any other apparatus from the chemistry laboratory.

Task

As a chemistry student;

a) Design an experiment you will use to help Grace verify her observation.

(Your design should include; aim, hypothesis, variables, apparatus and materials, procedure, risks and mitigations)

b) Carry out the experiment and record your results.

(A minimum of six readings required)

c) Show the analysis of your results and make your conclusion.

Item 4

Mr. Odong is planning to make a metallic roof for his family house, but he found that some metals commonly used as building materials are vulnerable to damage caused by acidic rain.

The metals react with acids producing heat. The best metal is the one that is least reactive under acidic conditions producing the lowest temperature rise within a short time.

He has invited you to help, select the better metal by testing metals R and Q. the plan is to add fixed amount of each metal separately to sulphuric acid solution and measure the temperature change over a short period of time.

You have been provided with;

- . BA1 which is a solution of sulphuric acid to create a similar acid atmosphere.
- . Metals R and Q.
- . Any other apparatus from chemistry laboratory.

Task

As a chemistry learner;

- Design an experiment you will use to safely determine the best metal.
(Your design should include; aim, hypothesis, variables, apparatus and materials, procedure, risks and mitigations).
- Carry out the experiment and record your results.
(A minimum of six readings required)
- Show the analysis of your results and make your conclusion.

Item 5

The administration at a new seed secondary school in Uganda recently installed two new water sources to meet domestic needs.

One draws water from a shallow well near the kitchen and the other from a deep borehole near the dormitory. The house keeping staff observed that more soap was being used when washing dishes and clothes with water from the shallow well compared to the bore hole water. They wondered why this was the case. A chemistry teacher later explained that the amount of soap required to form a permanent lather depends on the type of water used.

The school science club wants to verify whether this explanation is correct but the members are unsure how to the investigation. They plan to determine the volume of soap solution needed to produce a suitable lather for each water sample in order to compare the water sources scientifically.

You have been contacted for help and you are provided with the

following.

- BA1 which is soap solution.
- BA2 and BA3 water samples collected from the shallow well and the borehole respectively.
- Any other apparatus from the chemistry laboratory.

Task

As a chemistry learner with the materials provided;

- a) Design an experiment that can be used to help the science club.
(Your design should include; aim, hypothesis, variables, apparatus and materials, procedure, risks and mitigations)
- b) Carry out the experiment and record your results.
(A minimum of six readings required)
- c) Show the analysis of your results and make your conclusion.

INSTRUCTIONS TO THE TEACHER ON THE PRACTICAL ITEMS

Item 1

BA1 prepare 1.5M NaOH, BA2 prepare 1.5M HCl; measuring cylinder/pipette; retort stand; burette; thermometer

Item 2

BA1 prepare 0.1M HCl; BA2 limewater from supplier A prepared by dissolving 3.28g of calcium hydroxide in distilled water to make 1l of the solution; BA3 limewater from supplier B prepared by dissolving 2.74g of calcium hydroxide in distilled water to make 1l of the solution; conical flask; retort stand; conical flask; measuring cylinder/pipette; phenolphthalein indicator

Item 3

BA1 prepare 0.5M sodium carbonate solution, BA2 prepare 1.0M HCl; thermometer; stopwatch; conical flask; plastic beaker

Item 4

BA1 prepare 1.0M HCl; Metal R – zinc granules; Metal Q – iron fillings; thermometer; stopwatch/clock

Item 5

BA1 is a soap solution made by dissolving 6g of white star soap per litre of solution.

BA2 is water sample from the shallow well made by dissolving 2.4g of magnesium sulphate per litre of solution.

BA3 is water sample from the borehole made by dissolving 1.0g of magnesium sulphate per litre of solution.

Burette; retort stand; conical flask; dropper; measuring cylinder

END