

KIYALA HIGH SCHOOL
MID-TERM TWO ASSESSMENT TEST 2024

CHEMISTRY

S.4

Time: 2 Hours

TCS. copy

INSTRUCTIONS:

- This paper consists of **four** assessment items.
- Section A has **two compulsory** item.
- Section B has **two** items, Attempt **all** the items
- Use of **illustrations** and **drawings** will earn you more scores.
- Any additional item answered will not be **scored**.

SECTION A

Answer the all item in this section

Item 1

Most of the youths in ADUK village in eastern Uganda are involved in cutting trees, burning the wood and finally using the finally using products for cooking. Residents are frustrated with toxic fumes from the activities. They are curious and beseech to know the nature and composition of the product and why the activities.



The chairperson has contacted you as a chemistry student for guidance on what she is about to communicate in the community meeting.

Tasks:

(a) Guide the chairperson on

(i) Nature of the product

Non renewable [✓] fuel/resource; because [✓] it ^{cannot} be restored/replenished.

An example; [✓] Wood charcoal

03 scores

(ii) Composition of the product

Wood charcoal is made up of;

Carbon,

02 scores

(b) Her concern is "can these activities have any impact to their community?" Advise her.

Deforestation [✓] hence [✓] soil erosion and depletion of oxygen content. Mitigation: [✓] Avoid cutting down trees.

Wood charcoal is made up of;

Charcoal burning results into

i) Exposure to hazardous substances including Carbonmonoxide hence suffocation and death.

ii) Mitigation;

06

ii) Global warming which leads to [✓] climate change due to high levels of carbon dioxide produced.

(c) "Are these activities worth benefiting the residents?" Take her through

Mitigation: [✓] Use of renewable fuels.

i) Wood charcoal is used in sugar industries to decolourise [✓] sugar since it has ability to absorb colour.

ii) Used in gas masks to absorb toxic gases since it has porous surfaces (great adsorption capability).

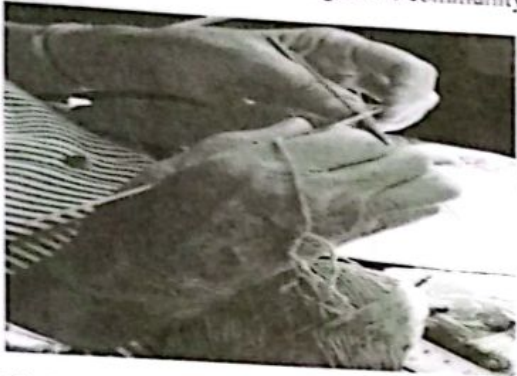
04

iii) It's a constituent of gun powder.

iv) Used as antizotic tablet (powder for indigestion sufferers).

Item 2

A new knitting firm in Entebbe Uganda makes sweaters from cotton. However, clients are complaining that these are easily decomposed by moths and carpet beetles. The operations manager has heard of nylon as an alternative. She is uncertain of its nature, composition and effect on the natural well-being of the community.



She has contacted you as someone with knowledge of chemistry to guide her in making a better choice.

Tasks;

(a) Guide the manager on

(i) The composition of the selected alternative material

Nylon is made of a polyamide which is a repeating unit linked by amide link extracted from petroleum.

Category;

Synthetic fibre; because it's made by man.
example; nylon.

(ii) The characteristics of the material

Nylon is very strong.

Does not absorb water

It is elastic.

Dries quickly.

Nylon is lustrous.

standards of living of people.

Gov't revenue will increase from taxes imposed on the plant hence improved infrastructures i.e roads.

(b) He is inquisitive about its use. Advise her

- Nylon is used as plastic in manufacturing machine parts.
- Used to make a fishnet
- Used for making parachutes, seatbelts, ropes, tent etc. 04
- Used in clothing industry.

(c) "Will the selected alternative have an effect on natural well-being of the community?" Take him through

- Nylon is a biggest source of ocean & shoreline pollution because, when it is washed, it releases microplastics.
- Causes green house gas emission since it's a petroleum-based made.
- When burnt, it releases toxic fumes.
- Nylon is non-biodegradable. 06
mitigation → reduce its usage.
Recycling of nylon.

SECTION B

Attempt all items in this section.

Item 3

Uganda electrical engineers' forum has raised a concern of reduced copper wires in the country.

In response, the government has contracted an investor to set up a new copper extraction plant in Kasere, a copper ore rich district.



Unfortunately, the investor has some doubts on his scientific knowledge on the production process and the likely impact on the environment.

Task;

As a chemistry student, write a message to the investor to settle his doubts before his final interaction with residents.

Item 4

The ladies in Otunu women's group in Mbarara district have given up on using soap in their homesteads due to its price fluctuation in the region.

The chairperson of the group has a suggestion of processing liquid soap as an alternative since it's cheaper.



However, she has some doubts whether it's a better choice and its impact to their ecosystem.

Task;

She has approached you as a chemistry student settle her doubts. Write a message to guide her in her presentation in the forthcoming group meeting.

Compiled by Solomon

AN ADVICE TO THE INVENTOR ON THE NEW COPPER EXTRACTION PLANT.

Raw materials;

Ore (Copper pyrites).

Silicon (IV) oxide

T/S 02/

Process of production;

The copper pyrites are first concentrated by froth flotation. The conc. dried ore is then roasted in air to obtain Iron(II) oxide, Copper(I) Sulphide and Sulphur dioxide gas. Iron(II) oxide impurity is removed by heating the roasted production above with silicon dioxide in a blast furnace in absence of air and molten slag is tapped off. The Copper(I) sulphide is heated in controlled amount of air to form impure copper.

T/S 03/

Impure copper is purified by electrolysis using impure copper as anode and pure copper as cathode using acidified Copper(II) Sulphate solution as an electrolyte.

Side effects:

• Toxic fumes from the process of production can lead to suffocation and death

• Sulphur dioxide produced as a by product can react with water vapour in atmosphere forming acidic rains that affect walls of houses

Mitigation

• Create sulphuric acid manufacturing plant nearby to use the Sulphur dioxide.

• Proper Control of waste gas.

T/S 04/

Social benefits.

• The plant will provide employment opportunities to residents, this gives them salaries hence increasing standards of living of people.

T/S 05/

• Gov't revenue will increase from taxes imposed on the plant hence improved infrastructures i.e roads.

The produced copper can be processed into copper wires which can be exported hence generating income.

Item 4

Type of product; Soapless detergent $\frac{1}{5}$ $\frac{02}{1}$
Example liquid soap.

Use of the product;
used as a cleansing agent for washing and cleaning surfaces. $\frac{1}{5}$ $\frac{01}{1}$

Evaluation of the product;

Similarities:

Both are effective cleansing agents in soft water.
Both are salt of organic acids of long carbon chain.

Differences:

Soapless detergent (liquid soap)

- Does not form scum with hard water.
- Contains phosphates which are nutrients for algae growth in the process.
- Non-biodegradable.
- Expensive to manufacture.
- Produced from sulphuric acid and an alcohol.

Soap (soapy detergent)

- Forms scum with hard water.
- Biodegradable.
- Cheaper to manufacture.
- Produced from sodium hydroxide and oil/fat.

Side effects;

Pollutes the environment since its non-biodegradable.

Mitigation;

Minimize its disposal to the environment.

Contains phosphates which are nutrients for algae, this promotes algae growth in the process oxygen is cut off leading to suffocation and death of aquatic.

$\frac{1}{5}$ $\frac{06}{1}$