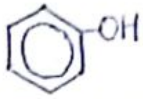


Candidate's Name:
Mr. JIGA BRIAN JACKSON

Signature: Bigad 0779058429

Random No.					Personal No.		

(Do not write your school / Centre Name or Number anywhere on this booklet.)

545/1
CHEMISTRY
Paper 1
June/July 2024
2 hours

UNITED TEACHERS' EDUCATION BUREAU

MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY

Paper 1

2 hours

New Tower Secondary Curriculum.

INSTRUCTIONS TO CANDIDATES:

This paper consists of two *sections* A *and* B. *It has six examination items.*

Section A *has* two *compulsory items.*

Section B *has* two *parts.* I *and* II. *Answer* one *item from each part.*

Answers to section A *must be written in the spaces provided while those of section* B *must be written on the answer booklet(s) provided.*

Any additional item(s) answered will not be scored.

Turn over

JIGA BRIAN JACKSON 0779058429.

"SUGGESTED MARKING SCHEME"

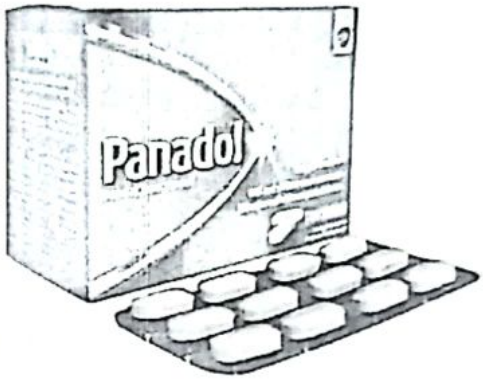
SECTION A

Answer **all** *questions in this section.*

Item 1:

Two students, Peter and James were suffering from the same illness. They were both diagonised with a bacteria infection from the nearby health centre III. They both later bought medicine from different pharmacies in their villages. Peter after using the medicine, the illness was cured while as for Peter the headace was cured but the infection persisted.

Support Material



As a chemistry student,

(a) Help to categorise the medicine the students bought.

James bought an antibiotic drug while Peter bought an analgesics or Pain killer. Score 02.

(b) State the function of the drugs the students bought.

Antibiotics kill or slow down the growth of bacteria. Score 02.

OR

Analgesics relieve pain

Treat infections caused by bacteria.

(c) Explain the side effects of the drugs stating the mitigations.

Antibiotics cause allergic reactions and diarrhoea, because they are easily broken down by the acid in the stomach. Mitigation

- Avoid self-medication,
- Take upon prescription by a trained medical practitioner.

Score 03.

(d) Evaluate the two drugs.

Similarity: Both antibiotics and analgesics are modern medicines.

Difference: Antibiotics treat infections caused by bacteria while analgesics relieve pain.

1 Similarity + 1 Difference = Score 02

Total = 07 Score.

Item 2.

Parents of Nyabikoni Secondary School complained about how fast the shirts of their S.3 students got stained brown. The wardens when contacted by the parents about the issue, advised the parents to buy for their children the best detergents that would help them to remove the brown stains from their uniforms.

Support materials

As a Chemistry student in S.3 help the parents to make the best choices on the market.

Tasks:

(a) Guide the S.1 students on the categories of detergents on market recommending the best with a reason.

Soapy detergents and soapless detergent. Score 02.

(b) Show how the recommended detergent removes the stains from the shirts.

How the detergent works. Mode of action. Score 02

Detergents consist of two parts, hydrophilic head, polar and hydrophobic non-polar tail. The polar head dissolves in water while the non-polar tail dissolve in the dirt or stain. During wash, the surface tension of between dirt or stain and water is lowered, on continuous agitation, the dirt or stains is removed from the fabric

(c) Comment on the dangers / side effects of the recommended product to the environment.

1) • Contain chemicals that cause redness and pain of the eyes thus led to loss of vision. ✓ effect ✓ explanation.

2) • Soapless detergents are non biodegradable, result to reduced soil fertility when poorly disposed off.

01 Effect + 01 Explanation = Score 02

N.B Award any one effect given and explained.

• Soapless detergents catain phospheter and surfactants that promote growth of algae bloom, resulting to reduced oxygen concentration in water, death of aquatic animals like fish.

(d) Advise the students on how the above dangers can be mitigated.

- Wash the affected part or area with plenty of clean water.
- Proper disposal of detergents

SECTION B

Part 1

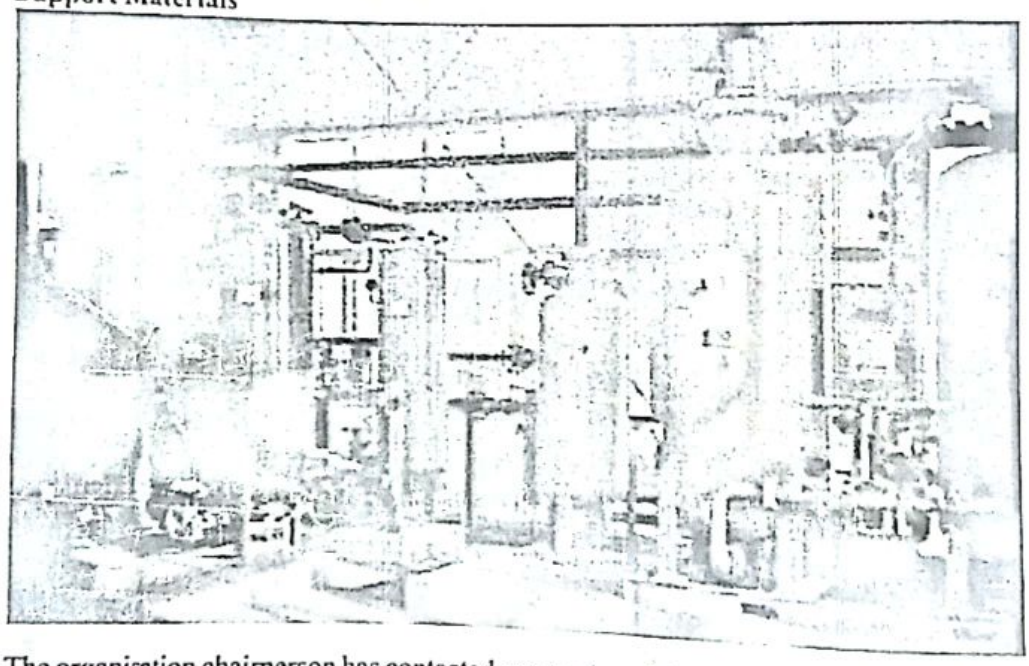
Answer one *item from this part.*

Item 3.

People of Kalangala Island have got limited supply of soap yet they grow alot of palm oil plants. They have knowledge about the manufacture of soap but they have a limited supply of sodium hydroxide which is a raw material for the manufacture of soap.

An organisation wants to set up a Sodium hydroxide manufacturing factory in the area but they have little knowledge about the process and its impact on the environment.

Support Materials



The organisation chairperson has contacted you to give advice on how to manufacture Sodium hydroxide and its related dangers to the people and environment.

Task:

Make a write up you would use.

CamScanner

SECTION B : PART 1

ITEM 3.

MANUFACTURE OF SODIUM HYDROXIDE

Raw materials

- Concentrated sodium chloride solution or Brine or rock salt (Rm1)
- Graphite (Rm2)

= Score 02 (Rm1 + Rm2)

Process of production

Sodium hydroxide is manufactured by electrolysis of concentrated sodium chloride solution using a mercury cell made up of graphite anode and mercury cathode. (V)

Concentrated sodium chloride solution contains sodium ions and chloride ions.

The sodium ions migrate to the mercury cathode, forming sodium amalgam.

Liquid sodium amalgam flows by grazity from the electrolyzer to the carbon-filled decomposers, where deionized water is added forming sodium hydroxide, hydrogen gas and mercury.

The mercury is then pumped back to the cell inlet and the process of electrolysis is repeated.

While the chloride ions migrate to the graphite anode producing chlorine gas which is collected in tight closed tanks.

* Vessel + Chemical process. + Conversion to desired product + coherence.

Score Ch = 03

Side effect of the process of production;

- Suffocation of workers due to release of hydrogen in confined spaces. Mitigated; Installing effective exhaust ventilation to ensure fresh air supply.
- Burns caused by contact with hot surfaces such as hot solutions and electrolysis cells. Mitigated; Use of appropriate PPE by the workers.
- Exposure to chlorine by the workers and the residents as well causes burning of eyes, nose and mouth. Mitigation
  - install effective exhaust ventilation
  - Use appropriate PPE

* Any one effect given, explained + Mitigation = Score 03.

Benefits of the process of production.

- Source of employment opportunity to the residents, earn salary, improved standards of living.

* Any one social benefit given + effect of benefit + Impact of benefit

Total 11

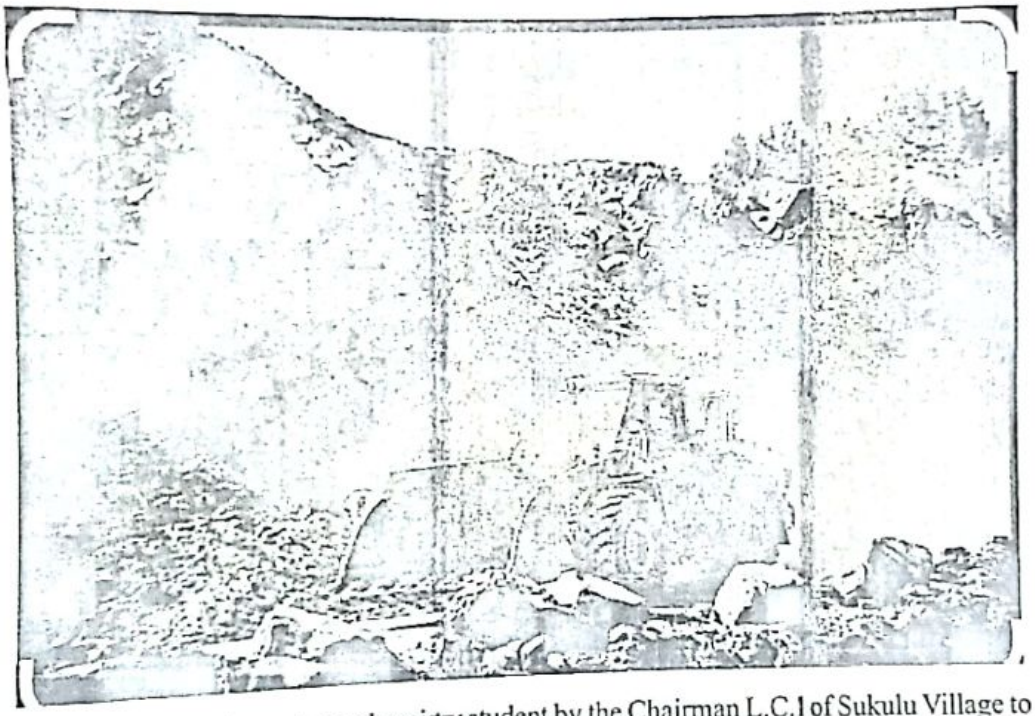
Item 4.

Due to rapid infrustructural development in most of the towns in the country, the demand for iron has increased since it gives buildings a good artistic impression.

The government has recently discovered the presence of iron ore deposits in Sikulu hills in Eastern Uganda. The government wants to setup a factory to extract iron in its impure form for a continuous supply.

However, the residents are worried about the environmental effects due to the iron extraction and have put alot of resistance to frustrate the project.

Support Material



You have been selected as a chemistry student by the Chairman L.C.1 of Sukulu Village to comfort the residents that the factory is a necessary evil.

Task:

Make a write up you will use upon meeting the community.

SECTION B: PART 1

ITEM 4

Any 2 Rm Score 02

Raw materials.

- Coke ✓ Rm1
- limestone or Calcium carbonate ✓ Rm2
- Iron ore or Iron(III) oxide or Haematite. ✓ Rm3

Production process Score 03

Haematite, coke and calcium carbonate are fed into the blast furnace from the top. ✓ V (Vessel)

Hot air is blown in the furnace from the bottom.

Coke is oxidised by the hot air to carbon dioxide gas. The carbon dioxide gas formed is then reacted with excess carbon or coke to produce Carbon monoxide gas. ✓ CP Chemical Process

Carbon monoxide gas produced then reacts with haematite, Eg Iron(III) oxide to produce molten iron and carbon dioxide ✓ Cd Conversion to desired product

$$3CO_{(g)} + Fe_2O_{3(s)} \longrightarrow 3CO_{2(g)} + 2Fe_{(l)}$$

Molten iron then flows to the bottom of the furnace

Calcium oxide from thermal decomposition of Calcium carbonate reacts with acidic impurities from the ore with silicon(IV) oxide and aluminium oxide to produce calcium silicate and ~~aluminium~~ calcium aluminate respectively, which is collected as slag. Molten iron is then tapped off and cooled to solidify into metal iron, which is further processed to iron containing materials eg iron bars. ✓ CP Chemical process.

Ch ✓

Impact of the production process. (Effect; explanation; mitigation) ✓E ✓E ✓M

Carbon dioxide gas released from the furnace, is a green house gas ✓E whose accumulation in the atmosphere destroys the ozone layer therefore resulting to global warming. ✓E Mitigated Through caring out afforestation and re-afforestation since the plants and trees use carbon dioxide during photosynthesis, reducing its concentration in the atmosphere. ✓M

Score 03

Social benefits (Social benefit; effect of benefit; Impact)

Source of employment opportunity ✓Sb to the residents of sikulu hills, ✓Sbe earn money in form of salary → therefore improve their standards of living. ✓SbI

Score 03

TOTAL = 11

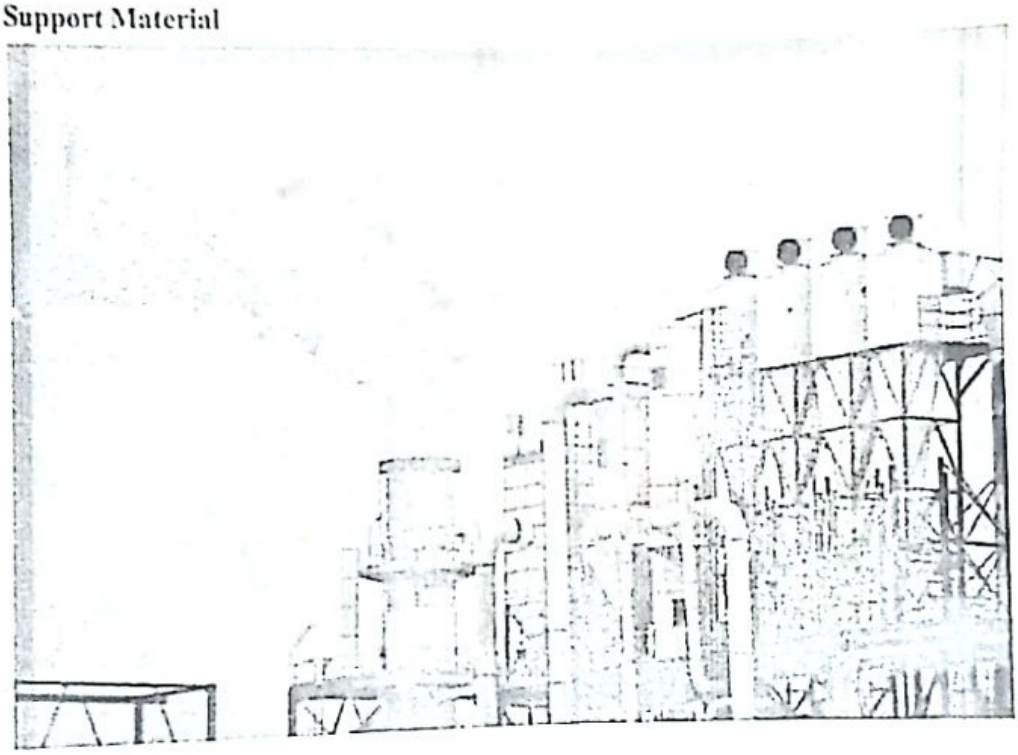
Part 2.

Answer **one** *item from this part*

Item 5.

A technical team from National Environment Management Authority (NEMA) is making research about the air quality in Namanve industrial park in Mukono District. The area has many industries that release waste gases to the atmosphere. The authority has engaged stake holders including your school to make a detailed research report.

Support Material



Task:

As the Chairperson of the Environment club at your school, prepare a detailed report for them to use as a research tool.

CamScanner

SECTION B; PART 2

ITEM 5.

Air is a renewable natural resource, because cannot exhausted or used up or can be used and replaced at the same rate and time. Other examples of renewable natural resources include water, wind.

Category; Reason; Example = Score 03.

Air is mixture of gases composed of mainly nitrogen and oxygen with over 99% and other gases includes carbon dioxide, argon.

Composition of natural resource any two given = score 02

Impact of activities on natural resources, how it occurs and mitigation.

Toxic fumes, containing carbon monoxide gas and sulphur dioxide and nitrogen dioxide pollute the air since they are pollutants released from industries. Mitigation • Use of filters or scrubbers on factory and power station chimneys to remove sulphur dioxide.

• Fitting of catalytic converters in chimneys and exhaust pipes to remove nitrogen monoxides and Carbon dioxide.

Any one effect given; explained; mitigated = Score 03.

Benefit of the natural resource to everyday life.

• Air is essential during respiration, during the process food is broken down to release energy for proper functing of the body.

• Air is essential during photosynthesis, since it contains carbon dioxide gas used by plants in the formation of glucose

• Any one benefit + Explanation = Score 02

Total 10

C
R
E
Score 03

CP1
CP2
Score 02

Category C
Reason R
Example E
CRE ✓✓✓
CR ✓✓
CE ✓✓
RE/RC ✓

effect
explained
mitigated

B
E
(Benefit)
Explanation