

PROPOSED ASSESSMENT GRID

TEST TAKER'S

NAME

WABWIRE SAMSON

STREAM

SIGNATURE

[Signature]

CHEMISTRY PAPER 1

SENIOR 3

INSTRUCTION: RESPOND TO ALL ITEMS

DURATION: 1:30 MINUTES

ITEM 1

The Ministry of Energy and Mineral development has discovered some traces of sodium in Karamoja region of North Eastern Uganda. Residents have heard about the information are curious to know its composition and properties.



The area Member of Parliament has organized a sensitization workshop to be guided on environmental concerns of this product. You have been contacted to give some views as chemistry student.

Task.

Using the knowledge of chemistry, you have attained.

a) Explain

i)

Category of the product

It's a metal.

✓^c

✓^p

03

Score 03: All 3

Score 02: Any 2

Score 01: Any 1

Score 00: None

LOSES ITS OUTERMOST ELECTRON TO FORM A CATION. FOR EXAMPLE SODIUM.

- ii) Likely properties of the product.
(03 scores)

Score 03: At least 4 properties identified. It has low melting point ductile soft shiny appearance 03

Score 02: At least 2 properties identified. It has shiny appearance 02

Score 01: Any one property.

Score 00: No property.

- b) Help to guide him on the uses of the product. (01 score)

Used to make alloys like sodium amalgam. 01

Accept any other use.

- c) Settle their worries on whether the product is environmentally friendly or not. (02 scores)

Excessive sodium can alter natural ecosystem, soil composition thus affecting plant growth and this can be mitigated by reduced use of sodium-based fertilizers. 02

ITEM 2

The manager of the laundry department of a new cleaning service unit in one village where they use spring water has failed to raise profits in the project.



They use too much of the detergent during the washing process. He keeps purchasing the same detergent and still no change thus making losses and puzzled.

Task.

- a) As a chemistry student, guide the branch manager to understand the problems he makes while choosing the product. (02 scores)

Chose a soapy detergent instead of soapless detergents.

02

- b) Help him to understand how the product works. (03 scores)

Soap molecules contains two parts: the hydrophilic part and hydrophobic part. During washing, the surface tension between water and dirt/oil is lowered. With constant agitation, the dirt is removed off the cloth.

- c) Advice on the challenges associated with long term use of the product. (02 scores)

Soap contain chemicals which cause skin burns and hence pain. This can be mitigated by thoroughly washing the affected areas.

02

- d) Advice on the choice of the products. (03 scores)

ITEM 3

Manufacture of Oxygen.

Raw materials: ✓ ^{Rm}
Air.

Reject - Liquid air.

02

Process of production.

Air is passed through air filters to remove dust and smoke particles. ✓ ^{Pr}

Air is passed through concentrated sodium hydroxide solution to remove carbon dioxide. ✓ ^{CP}

Air is then passed through silica gel to absorb water vapour.

Carbon dioxide and water vapour are removed from air before it is liquefied because they solidify and block the apparatus. ✓ ^{Ch}

The remaining components of air are repeatedly compressed at 200 atmospheres and allowed to cool at about -200°C to obtain liquid air.

The liquid air is fractionally distilled using a fractionating column. ✓

Nitrogen boils off first because it has a lower boiling point (-196°C) leaving behind oxygen with higher boiling point (-183°C). Both nitrogen and oxygen collected contain traces of noble gases. ✓ ^{Cd}

Pure oxygen is then stored under pressure in steel cylinders.

score 03, 4-5 mentioned (V, CP, Ch, Pr, Cd)

score 02; Any 3 mentioned

score 01; Any one mentioned

score 00, No process of production.

Side effect of the process of production of oxygen and mitigation.

Explosion of Oxygen cylinders: ^S due to high pressure ⁰³ leading to damage

This can cause other materials to catch fire hence damage of equipments and injury to workers. This can be mitigated by regular maintenance and monitoring of cylinders.

Accept any other side effect + Explanation + Mitigation.

Score 03: One side effect + Explanation + Mitigation.

Score 02: one side effect + Explanation
or side effect + Mitigation.

Score 01: One side effect
or Explanation
or Mitigation.

Score 00: None identified.

Social benefits. ^{Sb}

Source of employment opportunities which results into increased income among the residents hence improved standards of living. ⁰³

Accept any other social benefit + Social benefit effect + Impact of the benefit.

Score 03: one social benefit + Effect of the benefit + Impact of benefit.

Score 02: one social benefit + Effect of the benefit
or social benefit + Impact of benefit.
or Effect of benefit + Impact of benefit.

Score 01: one social benefit.
or one effect of benefit.
or one impact of benefit.

Score 00: None identified.