



# AITEL EXAMINATION

UGANDA CERTIFICATE OF LOWER SECONDARY CURRICULUM  
S3 CHEMISTRY END OF YEAR

TIME: 2:15HRS

**Instructions: Do all numbers in this paper.**

1. Matter exists in four different forms that is solid, liquid, gas and plasma which have got different particle.
  - a) Using the idea above, explain why a wooden table is a solid not a liquid.(03 marks)

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- b) When a gas changes to a solid, the process is called deposition. What name is given to the reverse process? (01 mark)

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2. This question is about compounds. You are required to write down all the elements making up each compound(04 marks)

| Compound          | Elements |
|-------------------|----------|
| Water             |          |
| Sodium hydroxide  |          |
| Methane           |          |
| Hydrochloric acid |          |

3. Air quality in Kampala city has deteriorated due to emissions of poisonous gases from old cars. To tackle the problem, modern cars have catalytic converters installed in them. Discuss how installation of catalytic converters in cars has improved the air quality in Kampala. (04 marks)

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4. When water is heated, it can evaporate and boil.

a) Differentiate between boiling and evaporation. (02 marks)

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b) What is the name of the process when water changes to? (02 marks)

i. Water vapor

ii. Ice

5. This question is about physical and chemical changes.

Use “true” or “false” to answer the following questions. (04 marks)

- Digestion is a physical change .....
- Boiling of an egg is a chemical change .....
- Physical changes are reversible .....
- Chemical changes produce no new substances .....

6a).Suggest 3 properties of a homologous series.

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b).write the structural formula of the following organic compounds and state both the family and the functional group of that family. Finally give the IUPAC names of these compounds.

i). C<sub>6</sub>H<sub>12</sub>

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ii). C<sub>8</sub>H<sub>18</sub>

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7. Most substances around us are compounds. Compounds are made of elements.

a) Explain what you understand by the term “element”. (02 marks)

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b) Identify the name of any one element present in the shell of an egg and its symbol. (02 marks)

Name .....

Symbol .....

6.

a) <sup>32</sup><sub>16</sub>S and <sup>33</sup><sub>16</sub>S are isotopes of sulfur.

Use your knowledge of neutrons, protons and electrons to answer the following questions.

i. Describe how these isotopes of sulfur are the same and how they are different. (02 marks)

Same

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Different

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ii. Explain why each of these isotopes have an overall charge of zero.(01 mark)

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iii. Explain why both isotopes have the same chemical properties. (01 mark)

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b) The ions formed by sulfur (sulfide ions),  $S^{2-}$ , have the electronic structure 2,8,8.

i. Explain why sulfide ions have a charge of 2-. (01 mark)

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ii. Give the formula of (02 marks)

- An anion which has the same electronic structure as  $S^{2-}$
- .....

- A cation which has the same electronic structure as  $S^{2-}$
- .....

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## SECTION B (60 MARKS)

8.The properties of substances A, B, C and D where investigated and results below found  
Substance A has a bitter and slippery or soapy feeling.

Substance B and C both have a sour taste

B ionizes (or dissociates) only partially in solution while C ionizes completely in solution.

Substance D changes colour when separately added to A, B and C.

a) Identify with one example, the substance which is (06 marks)

i. A strong acid

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For example

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ii. An indicator

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For example

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iii. A weak acid

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For example

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iv. An alkali

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For example

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9.Explain the following observations

a) It is very easy to move our hand in air, but to do so in a block of wood, we need a Karate expert. (03 marks)

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b) Wet clothes hanging on a line become dry even in a cold weather. (02 marks)

c) If you put some sugar in tea, the tea will become sweet even if you don't stir it. (02 marks)

10. Recently oil was discovered in Uganda. However, scientists say we can't use the crude oil without processing it.

Write brief notes about processing crude oil to obtain petrol. (05 marks)

(Diagram not required)

b. What is the main composition of bio gas and the uses of it to the people of Uganda.

c. State one other product of biogas and its use to people especially in rural areas.

## Section B

Activity of integration

Theme. Carbon in environment

Question.11

Read properly upto the end and answer after.

Every home in Uganda has either been infected or affected by HIV and AIDS. They have either lost a relative or have suffered as a loss of a bread winner. Air pollution has gone steps ahead of HIV in affecting Ugandans as it has claimed more lives than HIV, Daniel Okello, the director in charge of environment at Kampala Capital City Authority (KCCA), has said. “We lost 23,000 people in 2019 due to HIV in Uganda. In the same period, 26000 people died as a result of cardiovascular diseases linked to air pollution,” he said. Okello was speaking during the launch of the air quality awareness week at the Uganda Media Centre in Kampala, May 4/11. The event, themed “Be air aware, be prepared”, attracted top officials from the National Environment Management Authority (NEMA), Makerere University and Ministry of Health, who called for increased awareness and actions to curb air pollution. Okello mentioned of two types of air pollution -outdoor pollution and household or indoor pollution which are all greatest environmental threat to human health around country pointing out Kampala; Mukono and Jinja with the poorest air quality, which is five times way above the critical threshold of World Health Organization. Okello said indoor air pollution resulting from cooking with biomass fuel particularly charcoal, firewood, coal, burning of organic fuels such as kerosene, burning of grass and waste products. Partial combustion of these fuels leads to emission of carbon monoxide gas, which is poisonous if inhaled. Worse than indoor air pollution, he added, is outdoor air pollution which include old cars spewing fumes. As the cars burn fuels, such as diesel and petrol to power engines, they release poisonous gases such as carbon monoxide and also lead from motor vehicle emissions, dust from unpaved roads and construction sites, factories release fumes filled with Sulphur dioxide gas which leads to acid rains and carbon monoxide gas which is poisonous. Burning of wastes including plastics, produces dioxins and furans, which cause cancer. Dr Ivan Kimuli from Makerere University’s lung institute said they have done studies that indicate that

11% of the population suffers from asthma and that was being aggravated by poor air quality and the same study indicated that children in rural settings had "better and less damaged lungs" than those in urban settings, who were exposed to pollutants in the air. NEMA's director for environment monitoring and compliance, Waiswa Ayazika, said: "the government is currently making a clear plan to improve air quality involving every body's responsibility to save the current and future generation." It is said the most common effective of air pollution is coming from burning carbon based fuels.

Question. You are required to write a letter to the director of NEMA seeking for a permission to carry out sensitisation to people of Butanya telling them, what air pollution is, defining clearly carbon based substances as the major source of air pollution once burnt and suggesting the measures to control air pollution..

END