

ST MARY'S HIGH SCHOOL LUKAYA (SMARL)

Uganda Lower Certificate of Education

BOT II ASSESSMENT FOR S.3

2 HOURS

INSTRUCTIONS

- This paper has two sections A and B.
- All items in Section A are compulsory and a learner gets **TWO** from Section B.
- Select **at most 1** item from each part in Section B. Answers should be written in booklets provided.

SECTION A (Compulsory)

Item 1.

A city near a large industrial area is facing significant water pollution due to heavy metals. An environmental agency has tasked a team of material chemists to develop a nanomaterial that can effectively remove heavy metals from the water.



Task:

(a) What types of nanomaterials could be used for this purpose?

(b) What properties should these nanomaterials possess to be effective in removing heavy metals?

(c) How would you ensure that the nanomaterials do not introduce new contaminants into the water?

Item 2.

Mr. Phillip a maize farmer in Mubende district notices that the soil in one of his fields/farms has become too acidic, negatively affecting crop yields and on making a research, he found out that it was the same problem even with his fellow farmers. They seek advice on how to adjust the soil pH to a more neutral level.



2

Task:

As a chemistry learner;

(a) What substances could be used to increase the soil pH?

(b) Explain the chemical interactions between these substances and the acidic components of the soil.

(c) How would you determine the correct amount of substance to apply to the soil?

SECTION B

(Answer one question in each part)

PART I

Item 3.

Abishola construction company is building a bridge in a region with significant temperature fluctuations between summer and winter seasons. They need to account for the expansion and contraction of materials.



Task;

- (a) What materials might experience temporary changes due to thermal expansion and contraction?
- (b) How do these temporary changes affect the structural integrity of the bridge?
- (c) What design considerations can be implemented to accommodate these changes?

Item 4.

A group of S.3 students is conducting an experiment to neutralize hydrochloric acid with sodium hydroxide in a chemistry lab. The learners need to understand the formation of salt in this reaction.

Task;

- (a) What is the chemical equation for the reaction between hydrochloric acid and sodium hydroxide?
- (b) Explain the process of salt formation in this acid-base reaction.

- (c) How would the student isolate the sodium chloride produced from the reaction mixture?

Part II

Item 5.

Chemistry learners were given samples labeled A, B, and C, where A is an element, B is a compound, and C is a mixture. They need to correctly identify each sample based on their properties.

Task;

- (a) What characteristics distinguish an element from a compound and a mixture?
- (b) What tests or observations could the students use to identify each sample?
- (c) Explain why elements, compounds, and mixtures have different properties.

Item 6.

Jinja City is experiencing high levels of air pollution, leading to an increase in respiratory problems among its residents. The local government seeks advice on identifying the main pollutants and mitigating their effects.



Task;

- (a) What are the primary pollutants commonly found in urban air pollution?
- (b) How do these pollutants affect human health?
- (c) What measures can the city implement to reduce air pollution and protect public health?

END

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