

**ASS 305**



**MASINDE MULIRO UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
(MMUST)  
SCHOOL OF AGRICULTURE, VETERINARY SCIENCES AND  
TECHNOLOGY (SAVET)**

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS  
2023/2024 ACADEMIC YEAR**

**MAIN EXAMS  
OF  
BACHELOR OF AGRICULTURE AND  
BIOTECHNOLOGY/AGED/EDUCATION)**

**COURSE CODE: ASS 305**

**COURSE TITLE: SOIL FERTILITY AND PLANT NUTRITION**

**DATE: 15.12.23**

**TIME: 3-5PM**

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**INSTRUCTIONS TO CANDIDATES**

This paper is divided into two sections, **A and B**. Answer ALL Questions in SECTION A and any Two in SECTION B

*MMUST observes ZERO tolerance to examination cheating*

This Paper Consists of 2 Printed Pages. Please Turn Over

**SECTION A: ANSWER ALL QUESTIONS (40 MARKS)**

Q1. Define the following terms;

i) Plant nutrition

ii) Soil fertility

iii) Immobile nutrients

iv) Denitrification

v) Macro nutrients

**(5mks)**

Q2. Describe how chemical soil properties may influence nutrient uptake in plants.

**(4mks)**

Q3. Outline three requirements that a plant nutrient must fulfill for it to be

considered as essential in plant nutrition

**(3mks)**

Q4. Outline four roles of sulphur in plants.

**(4mks)**

Q5. Illustrate other sources of plant nutrition for a farmer who cannot afford to buy

chemical fertilizers

**(4mks)**

Q6. Explain the importance of soil and plant tissue testing in agriculture **(6mks)**

Q7. Describe briefly the visual deficiency symptoms of nitrogen in plants **(4mks)**

Q8. Explain how abiotic factors influence biological nitrogen fixation process in plant

**(4mks)**

Q9. Briefly discuss factor that influence soil fertility of a soil

**(6mks)**

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Q13. a) A farmer in Kakamega tested her soils and the tests revealed organic matter content to be less than 1%. She was advised to apply cattle manure.

i) Being an extension officer, what precaution measures should you advise the farmer to put in place in order to achieve best results? **(5mks)**

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ii) The soil of the farmer was found to be silicate clay; how will the presence of manure affect the underlying soil properties **(5mks)**

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b) Discuss how temperature and use of artificial chemicals affect the performance of most micro-organism. **(5mks)**

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**SECTION B**

Q10. i) A small-scale farmer at Suswa junction in Kakamega municipality has been advised to apply 60kg P/ha in order to get a maize grain yield of 4 t/ha. This farmer has only 0.25 ha of land to grow maize. Calculate the amount of fertilizer, in kg/ha, which he would need to apply to attain the 60 kg P/ha rate from each of the following sources;

Fertilizer A: 18 – 46 – 0

Fertilizer B: 0 – 20 – 0

Fertilizer C: 0 – 10 – 0

**(8mks)**

i) Discuss 5 precautions to be considered during visual nutrient deficiency analysis/observation in the field **(7mks)**

Q11. i) Discuss, how crop rotation cultivation system can contribute immensely to nutrient exchange and availability in most soils in Kenya. **(9mks)**

ii) Discuss how education, availability of labour and land size affects the choice and application of fertilizer by farmers. **(6mks)**

Q12. i) Discuss, how denitrification and nitrogen fixation contributed to availability of available nitrogen to the plants? **(8mks)**

ii) Discuss, why yields of most crops are in the decline despite Kenya having most educated personnel in the field of agriculture? **(7mks)**