



**MASENO UNIVERSITY**

**UNIVERSITY EXAMINATIONS 2013/2014**

SECOND YEAR FIRST SEMESTER EXAMINATIONS FOR THE  
DEGREE OF BACHELOR OF SCIENCE, BACHELOR OF SCIENCE  
IN SOIL SCIENCE, BACHELOR OF SCIENCE IN AGRONOMY  
AND BACHELOR OF SCIENCE IN HORTICULTURE WITH  
INFORMATION TECHNOLOGY

(MAIN CAMPUS)

**ASS 202/SHC 209: SOIL BIOLOGY**

*Date: 18<sup>th</sup> November, 2013*

*Time: 8.30 - 10.30 a.m.*

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**INSTRUCTIONS:**

- Answer ALL questions in Section A and ANY TWO questions in Section B.

**INSTRUCTIONS:**

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This paper comprises sections A and B.

Answer ALL questions in section A and any TWO questions in section B.

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**SECTION A**

Q1. Distinguish between the following terms

- a) Humus and organic matter (2 marks)
- b) Humic and non humic substances (2 marks)
- c) Mineralization and immobilization (2 marks)

Q2 a) Outline the importance of organic matter in soil. (6 marks)

- b) State any two farming practices that could lead to a decline in soil organic matter. (2 marks)
- c) State any three practices that can be used to maintain or increase the level of organic matter in soils. (3 marks)

Q3. Use the information provided in the table below to determine whether net mineralization or immobilization will occur when the organic materials' are applied to the soil and hence identify which of these materials will be best as a nitrogen source for crops. (7 marks)

Organic material	%Nitrogen	% Carbon
Wheat straw	0.5	45
Mature alfalfa hay	1.72	43
Tithonia	3.1	42

- 4a. What are mycorrhizae. (2 marks)
- b) State the importance of mycorrhizae in soils. (2 marks)
- 5a. Define the term nitrogen fixation. (2 marks)
- b) Explain any five factors that affect nitrogen fixation by plants. (5 marks)
- c) Describe the benefits to both the rhizobia and the legume in the nitrogen fixing symbiosis. (2 marks)
- d) State three circumstances in which it may be necessary to inoculate legumes with nitrogen fixing bacteria. (3 marks)

**SECTION B: ANSWER ONLY TWO QUESTIONS**

- Q6 a) Describe the decomposition process by microorganisms, clearly indicating the sequence in which the various organic compounds are degraded and the products of the decomposition process. (7 marks)
- b) Using a named microorganism, discuss any four factors affecting microbial growth and activities in soils. (8 marks)
- Q7) Discuss the influence of plants on the microorganisms in the rhizosphere and vice versa i.e. the influence of microrganisms on plants in the rhizopshere. (15 marks)
- Q8). Describe the pathways by which nitrogen is gained or lost in the soil and clearly indicate the transformations that it undergoes in the soil. (15 marks)
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