



MASENO UNIVERSITY
UNIVERSITY EXAMINATIONS 2016/2017

**THIRD YEAR SECOND SEMESTER EXAMINATION FOR
THE DEGREE OF BACHELOR OF SCIENCE AND
PLANT NUTRITION, AGRONOMY AND HORTICULTURE
WITH INFORMATION TECHNOLOGY**

MAIN CAMPUS

ASS 302: SOIL FERTILITY MANAGEMENT

Date: 8th June, 2017

Time: 3.30 - 6.30pm

INSTRUCTIONS:

- Answer ALL Questions in section A and any TWO in section B.



SECTION A: Answer ALL questions in this section.

QUESTION 1

- a) Distinguish between soil fertility and soil productivity. (4 marks)
- b) Use appropriate examples to explain why a fertile soil is not necessarily a productive one. (4 marks)
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QUESTION 2

If wheat straw is incorporated into the soil and maize planted without the addition of urea, what would you observe on the maize plants? Explain your answer. (3 marks)

QUESTION 3

Discuss the factors you would consider in deciding the rate of fertilizer application for a maize crop. (8 marks)

QUESTION 4

- a) What are green manures? (2 marks)
- b) Explain why the adoption of green manures for soil fertility management is low among the smallholder farmers in Kenya. (3 marks)

QUESTION 5

- a) Describe the effect of pH on the availability of phosphorus in soils. (3 marks)
- b) Apart from soil pH, state three other factors that determine nutrient availability in soils. (3 marks)

SECTION B: Answer any two questions in this section

QUESTION 6

- a) Outline ways in which nitrogen is lost from the soil. **(5 marks)**
- b) Discuss the available options to replenish nitrogen and phosphorus on smallholder farms, clearly indicating the nutrient sources that are available to the farmer.

(15 marks)

QUESTION 7

- a) State Mitscherlich's law of diminishing returns and hence explain why in practical agriculture, it is not recommended to fertilize crops for maximum yields. **(4 marks)**
- b) Calculate the amount of mono ammonium phosphate (MAP) (11:46:0) that should be applied to a 2 hectare farm if the recommended amount of P that should be applied to maize in this area is 60 kg/ha. **(3 marks)**
- c) If the recommended amount of N to be applied in 'b' above is 120 kg/ha, calculate the amount of urea (46: 0: 0) that should be applied with the MAP to provide the required N rate. **(3 marks)**
- d) Discuss the advantages of using organic materials as sources of plant nutrients. **(10 marks)**

QUESTION 8

Discuss fertilizer management practices that can be used to increase fertilizer use efficiency.

(20 marks)
