

SOIL 320

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE
OF BACHELOR OF SCIENCE (AGRICULTURE, NATURAL RESOURCE
& HORTICULTURE)**

SOIL 320: SOIL FERTILITY AND PLANT NUTRITION

STREAMS: BSC (AGRIC, NARE & HORT)

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 06/12/2017

2.30 P.M. – 4.30 P.M.

INSTRUCTIONS: Answer all questions in section A and any Two question in section B

SECTION A (30 MARKS)

1. Briefly explain six benefits of liming acid soils. [6 marks]
2. Explain the disadvantages of using manure fertilizers in plant nutrition. [9 marks]
3. Briefly discuss the 3 steps involved in the mineralization of organic matter. [8 marks]
4. (a) Explain the Liebig's law of the minimum. [2 marks]
(b) Explain the factors that determine the availability of nutrients to plants. [5 marks]

SECTION B (40 MARKS)

5. (a) Explain six benefits of Boron nutrition in plant growth and its deficiency symptoms. [9 marks]
(b) With the help of a diagram, explain the major components of the available soil nitrogen balance sheet highlighting the gains and losses. [11 marks]
6. (a) Explain the factors to consider in calculating the total amount of fertilizer to be applied in a given soil. [3 marks]
(b) Suppose you receive information that to obtain good yields from a new hybrid maize variety on the Chuka University farm, you need to apply 75kg of phosphorus per hectare. How many kilograms of single super phosphate (SSP: 0: 24: 0) should you apply to obtain optimum maize yields. [7 marks]
(c) Discuss ten factors that influence phosphorus availability. [10 marks]

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7. (a) Discuss ten general properties of soil colloids. [10 marks]
- (b) Explain the term carbon to nitrogen ratio (C:N) and the general rule for decomposition of organic residues on the basis of this ratio. [5 marks]
- (c) Explain the factors that influence the amount of nutrient that manure provides and its subsequent availability to plants. [5 marks]
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