SOIL 320

CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS.

SECOND YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR SCIENCE IN AGRICULTURE

SOIL 320: SOIL FERTILITY AND PLANT NUTRITION

STREAMS: BSC (AGRIC, HORT, NARE)   **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 5/12/2018   **2.30 P.M - 4.30 P.M**

INSTRUCTIONS:
- **Answer ALL Questions in Section A and any TWO Questions in Section B**

QUESTION ONE: [30 MARKS]
(a) Explain the two concepts used for establishing and maintain the fertility status of a soil and their limitations.   [6 Marks]

(b) Outline the four solid phase forms of essential plant mineral nutrient elements.   [4 Marks]

QUESTION TWO
Explain seven characteristics of an ideal soil.   [7 Marks]

QUESTION THREE
You have been tasked to carry out a diagnosis of the soil-plant system in order to advise Chogoria farmers on management of a seemingly failing maize crop. Explain eight requirements for this exercise.   [8 Marks]

QUESTION FOUR
Define rhizosphere and explain its superiority over bulk soil in crop growth.   [5 Marks]

SECTION B: [40 MARKS]
QUESTION FIVE
(a) Nitrogen is an essential macronutrient in plant nutrition. Explain:
   (i) Four deficiency symptoms of N.   [4 Marks]
   (ii) Six excess or toxicity symptoms of N.   [6 Marks]

(b) Explain wilting in plants and its possible causes. [10 Marks]

QUESTION SIX

(a) Discuss three sources of plant available phosphorous and its excess or toxicity symptoms.

[10 Marks]

(b) Organic matter is an important component of fertile soils.
      (i) What are its benefits on the soil physical characteristics? [5 Marks]
      (ii) Explain the adverse effects of organic matter additions. [5 Marks]

QUESTION SEVEN

(a) Explain three processes by which nutrient ions are brought into proximity with plant roots for absorption. [10 Marks]

(b) Outline four plant available forms of potassium and its deficiency symptoms. [10 Marks]
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