



# MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRIBUSINESS MANAGEMENT AND TRADE

FOURTH YEAR SPECIAL/ SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

SOL 201: SOIL FERTILITY AND PLANT NUTRITION

DATE: 20/01/2021

TIME: 2.00-4.00 PM

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## INSTRUCTIONS:

Answer *ALL* questions from Section A and any other *TWO* from Section B:

### SECTION A: COMPULSORY: (30 MARKS)

#### QUESTION ONE

- a) Explain THREE differences between soil fertility and soil productivity (3 marks)
- b) Explain FOUR functions of Nitrogen in a plant (4 marks)
- c) Describe FOUR deficiency symptoms of calcium in a plant (4 marks)
- d) (i) Describe any FOUR components of organic matter (4 marks)  
(ii) Explain FOUR functions of organic matter to the soil (4 marks)
- e) Describe the TWO categories of soil microflora (4 marks)
- f) Describe the THREE types of inorganic fertilizers (3 marks)
- g) Giving an example differentiate between fertilizer grade and fertilizer ratio (4 marks)

### SECTION B: Answer any TWO Questions (40 Marks)

#### QUESTION TWO

- a) Discuss SIX disadvantages of organic fertilizers (12 marks)
- b) Describe FOUR practices involved in maintenance of organic matter in the soil (8 marks)

### QUESTION THREE

- a) Discuss SIX factors affecting microbial activity in the soil (12 marks)
- b) Describe the FOUR transformation processes involved in nutrient cycling (8 marks)

### QUESTION FOUR

- a) Describe the role of the following elements in plant nutrients
  - i. Sulphur (3 marks)
  - ii. Potassium (3 marks)
  - iii. copper (3 marks)
  - iv. Boron (3 marks)
- b) For each of the plant nutrient in Question 4 (a) above, describe the deficiency symptoms (8 marks)

### QUESTION FIVE

Giving an example in each case, describe two roles of the following microorganisms in the soil

- a) Bacteria (5 marks)
- b) Protozoa (5 marks)
- c) Fungi (5 marks)
- d) Algae (5 marks)