



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHALOR OF SCIENCE (AGRICULTURAL EDUCATION AND EXTENSION)

BACHELOR OF EDUCATION (SPECIAL NEEDS EDUCATION)

BACHEOR OF EDUCATION (SCIENCE)

SOL 201: SOIL FERTILITY AND PLANT NUTRITION

DATE: 8/12/2021

TIME: 8.30-10.30 AM

INSTRUCTION TO CANDIDATES: Answer ALL questions from Section A and any other TWO from Section B:

SECTION A: COMPULSORY

QUESTION ONE (30 MARKS)

- a) Explain FOUR edaphic factors affecting soil fertility (4 marks)
- b) Explain why soil productivity is a better indicator of crop yields compared to soil fertility (2 marks)
- c) Describe TWO distinguishing symptoms between calcium and magnesium deficiency (4 marks)
- d) Describe FOUR negative effects associated with nitrogen toxicity (4 marks)
- e) Citing an example in each case, explain the two categories of available nutrients to crops (4 marks)
- f) Describe the FOUR steps in making compost manure (4 marks)
- g) Explain TWO theories of active ion uptake by plant roots (4 marks)
- h) Describe FOUR methods used in application of solid inorganic fertilizers (4 marks)

SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO (20 MARKS)

- a) Citing example in each case, discuss the three categories of inorganic fertilizers (10 marks)
- b) With the aid of a well labelled diagram, explain the Raviv and Leith nutrient curve (10 marks)

QUESTION THREE (20 MARKS)

- a) Describe the process of decomposition of organic matter in the soil (10 marks)
- b) Discuss FIVE limitations of visual diagnosis of plant nutrients (10 marks)

QUESTION FOUR (20 MARKS)

- a) With the aid of a well labelled diagram, describe nitrogen fixation in plants by nitrogen fixing bacteria (10 marks)
- b) Discuss FIVE factors affecting the timing of fertilizer application (10 marks)

QUESTION FIVE (20 MARKS)

- a) With the aid of a well labelled diagram, describe the procedure of soil sampling for nutrition analysis (10 marks)
- b) Explain the process of liming in management of acidic soils (10 marks)