



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (AGRICULTURAL EDUCATION AND EXTENSION)

BACHEOR OF EDUCATION (SCIENCE)

SOL 201: SOIL FERTILITY AND PLANT NUTRITION

DATE: 13/7/2021

TIME: 2.00-4.00 PM

INSTRUCTIONS:

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

SECTION A: COMPULSORY: (30 MARKS)

QUESTION ONE (30 MARKS)

- a) Explain two differences between plant nutrition and fertilization as used in soil management (2 marks)
- b) All productive soils are fertile, but all fertile soils need not be productive. Explain this statement using two clear arguments. (4 marks)
- c) Describe TWO differences in the deficiency symptoms of nitrogen as opposed to that of sulphur in a plant (4 marks)
- d) Explain FOUR roles of organic matter in the soil (4 marks)
- e) With the aid of a well labelled graph, explain how the interaction between calcium and phosphorus affect plant growth (4 marks)
- f) Describe the TWO mechanisms of ion uptake by plant roots (4 marks)
- g) Explain TWO differences in symptoms caused by nutritional deficiency in plants as opposed to those arising from pests/diseases attack (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) Discuss FIVE factors affecting nutrient uptake in a plant (10 marks)
- b) Discuss FIVE methods of amending alkaline soils (10 marks)

QUESTION THREE (20 MARKS)

- a) With the aid of a well labelled diagram, describe how liming is done in soil amendment (10 marks)
- b) Explain FIVE limitations of visual diagnosis of plant nutrients (10 marks)

QUESTION FOUR (20 MARKS)

- a) With aid of a well labelled diagram, describe phosphorus fixation in plants through the endomycorrhizal interaction (10 marks)
- b) Discuss FIVE factors affecting the timing of fertilizer application (10 marks)

QUESTION FIVE (20 MARKS)

- a) Describe the steps in preparation of farm yard manure (12 marks)
- b) Explain the FOUR transformation processes involved in nutrient cycling (8 marks)