



(Knowledge for Development)

KIBABII UNIVERSITY
UNIVERSITY EXAMINATIONS
2016/2017 ACADEMIC YEAR

THIRD YEAR 1ST SEMESTER
SPECIAL/SUPPLEMENTARY EXAMINATION

**FOR THE DEGREE OF BACHELOR OF SCIENCE AGRICULTURE AND
BIOTECHNOLOGY, BACHELOR OF SCIENCE AGRICULTURE
EDUCATION AND EXTENSION, BACHELOR OF SCIENCE
AGRICULTURE ECONOMICS AND RESOURCE MANAGEMENT &
BACHELOR OF EDUCATION SCIENCE**

COURSE CODE: SAB 311

COURSE TITLE: SOIL FERTILITY AND PLANT NUTRITION

DATE: 14TH SEPT. 2017

TIME: 3PM – 5 PM

INSTRUCTIONS TO CANDIDATES

Answer all Questions in section A and any other two (2) Questions in section B.

TIME: 2 Hours

This paper consists of 2 printed pages. Please Turn Over

KIBU observes ZERO tolerance to examination cheating



SECTION A = 30 MARKS (Compulsory)

1. a) Define the following terms as used in soil fertility and plant nutrition:

- i) Soil Productivity (1 Mark)
- ii) Rhizosphere (1 Mark)
- iii) Micronutrients (1 Mark)
- iv) Firing (1 Mark)
- v) Base saturation (1 Mark)

b) Explain the importance of the following equipments/chemicals that was used during the soil fertility practicals:

- i) Soil Auger (1 Mark)
 - ii) Buffer 7 (1 Mark)
 - iii) Composite sample (1 Mark)
 - iv) Ratio of 1:2.5 (1 Mark)
 - v) Soil sampling (1 Mark)
- c) Define a buffer solution (1 mark)
- d) i) Differentiate between calcitic and dolomitic lime (2 marks)
- ii) Define lime requirement (2 marks)
 - iii) State ways in which N_2 is converted into forms that a plant can absorb (4 marks)
 - iv) State the deficiency symptoms of Boron element in plants (2 marks)
- e) i) Define Land Equivalent Ratio (LER) (1 marks)
- ii) Under what conditions is band placement method appropriate? (4 Marks)
 - iii) Explain the relationship between nutrient mobility in plants and appearance of deficiency symptoms. (4 marks)

SECTION B = 40 MARKS (Attempt any two Questions in this section)

2. Describe the factors that affect photosynthesis process (20 marks)
3. a) Discuss the drawbacks to the use of PR for direct application (6 marks)
- b) Describe the procedure of analyzing soil pH using the water method (9 marks)

c) Discuss the basic functions of soil

(5 Marks)

4. a) With the help equations, explain the following Nitrogen cycle processes:

i) Volatilization

(2 Marks)

ii) Nitrification

(2 Marks)

iii) Immobilization

(2 Marks)

iv) Ammonification

(2 Marks)

v) Denitrification

(2 Marks)

b) Differentiate between Nitrogen fixation and Phosphorus fixation (4 marks)

c) Discuss the conditions under which soil testing and sampling is useful (6 marks)