



(Knowledge for Development)

KIBABII UNIVERSITY
UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR

SECOND YEAR 1ST SEMESTER
MAIN 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: ASS 222/SAB 311

COURSE TITLE: SOIL FERTILITY AND PLANT NUTRITION

DATE: 25TH JANUARY 2022

TIME: 2 – 4 PM

INSTRUCTIONS TO CANDIDATES

Answer Question ONE and any other TWO Questions.

TIME: 2 Hours

This paper consists of 3 printed pages. Please Turn Over

KIBU observes ZERO tolerance to examination cheating

QUESTION ONE (COMPULSORY)

- a. Fertilizer Use Efficiency and Lime Requirement are concepts of Soil Fertility and Plant Nutrition. Differentiate between these concepts. (4 Marks)
- b. A certain Non-Governmental Organization (NGO) is promoting the use of Phosphate Rocks among the farmers in western Kenya. One farmer wanted to know why he should apply it on his farm. As a staff member of this NGO, respond to the farmer's question. (4 Marks)
- c. After a field visit, a student from the department of Agriculture and Veterinary Sciences gave a report of plant symptoms observed in the farmer's field. The emphasis of the report was Zinc deficiency. What were the observations the student made in the field? (4 Marks)
- d. Describe the importance of Land Equivalent ratio on Soil Fertility. (2 Marks)
- e. *Sesbania sesban* green manure has the following composition: 3.6% N, 0.5% P and 1.8% K.
- i) Calculate the amount of *Sesbania* that would be required to supply 75 kg N/ha for the crop of maize (3 Marks)
- ii) If the recommended rate of P for the maize above is 26 kg/ha, calculate the amount of single superphosphate (SSP) that needs to be applied together with the *Sesbania* above to satisfy the P requirement for the maize. (4 Marks)
- f. In the manufacture of P fertilizers, Give the chemical reactions when the following fertilizers are manufactured
- a) Diammonium Phosphate (DAP) (2 Marks)
- b) Triple superphosphate (TSP) (4 Marks)
- g. Explain ANY Three (3) terms that are commonly used to indicate the levels of nutrient elements in plant analysis. (3 Marks)

QUESTION TWO

- a) Patrick, a large scale maize farmer in Trans-Nzoia County has ordered a fertilizer blend of NPK 16:32:9. Calculate the amount of each ingredient required to make the blend. (12 Marks)
- b) Describe the CORE factors that determine the choice of ingredients to be used to make a fertilizer blend (8 Marks)

QUESTION THREE

- a. Root Interception and Diffusion are processes involved in the mechanisms of nutrient uptake from soil solution. With examples, explain how these processes take place. (10 Marks)
- b. Describe the factors affecting the phosphate fertilizer use. (10 Marks)

QUESTION FOUR

- a. Using Equations, differentiate between Respiration and Photosynthesis. (4 Marks)
- b. Discuss at least Four factors affecting photosynthesis process in plants. (8 Marks)
- c. Describe the nutrient uptake and transport in plants. (8 Marks)

QUESTION FIVE

Describe the Nitrogen transformations in the soil. (20 Marks)