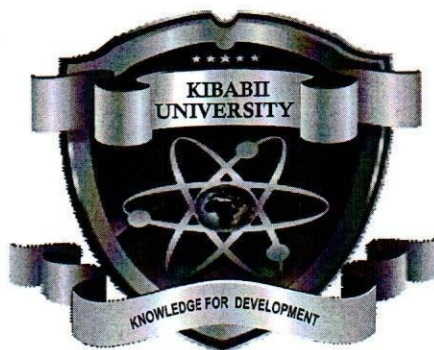


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150



(Knowledge for Development)

KIBABII UNIVERSITY
UNIVERSITY EXAMINATIONS
2022/2023 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 EDUCATION
SCIENCE**

COURSE CODE: ASS 222

COURSE TITLE: SOIL FERTILITY AND PLANT NUTRITION

DATE: 14TH DECEMBER 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

14. Soil Fertility and Integrated Soil Fertility Management are concepts of Soil Fertility and Plant Nutrition. Differentiate between these concepts. (4 Marks)
15. A Non-Governmental Organization (NGO) is promoting the use of Phosphate Rocks among the farmers in western Kenya. One farmer wanted to know the composition of Phosphate Rocks. As a staff member of this NGO, respond to the farmer's question. (4 Marks)
16. During practical lesson, a student from the Department of Agriculture and Veterinary Sciences gave a report of plant symptoms observed in the greenhouse experiment. The emphasis of the report was Boron deficiency. What were the observations the student made from the greenhouse experiment? (4 Marks)
17. Define the term lime requirement. (2 Marks)
- e. *Mucuna spp* green manure has the following composition: 4.8% N, 0.9% P and 2.7% K.
- Calculate the amount of *Mucuna* that would be required to supply 75 kg N/ha for the crop of millet (3 Marks)
 - If the recommended rate of P for the Millet above is 30 kg/ha, calculate the amount of Triple Superphosphate (TSP) that needs to be applied together with the *Mucuna* above to satisfy the P requirement for the millet. (4 Marks)
- f. Give the equation of reaction when the following materials are mixed to form fertilizer mixtures and state whether or not it is advisable to mix them depending on the products formed.
- Urea + TSP. (3 Marks)
 - DAP + SSP. (3 Marks)
- g. Explain ANY Three (3) weaknesses of Visual Deficiency Symptoms. (3 Marks)

QUESTION TWO

- a) Codius, a large scale maize farmer in Trans-Nzoia County has ordered a fertilizer blend of NPK 23:23:10. Calculate the amount of each ingredient required to make the blend. (12 Marks)
- b) Discuss the factors influencing fertilizer placement method. (8 Marks)

QUESTION THREE

- a. Apoplasmic and Symplasmic are pathways involved in the mechanisms of nutrient uptake and transport in plants. With examples, explain how these processes take place. (10 Marks)
- b. Describe the mechanisms of nutrients movement from the soil to plant roots. (10 Marks)

QUESTION FOUR

- a. Discuss the photosynthesis stages in plants. (8 Marks)
- b. The exclusive use of organic manures as nutrient sources for plant growth has been advocated as a logical alternative to expensive inorganic fertilizers for small-holder farmers in sub-Saharan Africa. Explain the demerits of this alternative. (12 Marks)

QUESTION FIVE

Using equations, explain the following nitrogen transformation processes.

- a) Volatilization (5 Marks)
- b) Fixation (5 Marks)
- c) Immobilization (5 Marks)
- d) Denitrification (5 Marks)