

LAIKIPIA



UNIVERSITY

UNIVERSITY EXAMINATIONS

1ST SEMESTER 2022/2023 ACADEMIC YEAR

SECOND YEAR EXAMINATIONS FOR BACHELOR OF SCIENCE IN AGRICULTURAL EXTENSION AND EDUCATION

AGED 222: SOIL FERTILITY AND PLANT NUTRITION

STREAM: R

TIME: 2 HRS

DAY: TUESDAY (8.30-10.30PM)

DATE: 13/12/22

THIS QUESTION PAPER CONSISTS OF THREE (3 PAGES)

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INSTRUCTIONS: Answer question **ONE** and any other **TWO** questions

QUESTION ONE (30 MARKS)

- (a) Explain the meaning of following terms as used in plant nutrition **(10 Marks)**
- i) Soil fertility evaluation
 - ii) Buffering capacity
 - iii) Fertilizer
 - iv) Nutrient immobilization
 - v) ISFM
- (b) Nitrification is a two-step reaction in the transformation of nitrogen. Using relevant equations show how this process takes place indicating the microorganism responsible for each step. **(10 Marks)**
- (c) A farmer in Njoro is planning to plant his wheat using DAP fertilizer (18:46:0). The soil test results indicate that the soil requires 30 kg of phosphorous (P) per acre. Calculate how many bags of 50 kg DAP bags the farmer will need to buy for his five acres wheat farm in order to supply the required 30 kg of P per acre. **(10 Marks)**

QUESTION TWO (20 MARKS)

- (a) Discuss FIVE factors that affect the fertility of soils. **(10 Marks)**
- (b) Outline the factors a farmer will consider when choosing the method of fertilizer placement **(10 Marks)**

QUESTION THREE (20 MARKS)

- (a) A fertilizer has the following grade; 20:30:15. Calculate the amount of Nitrogen, Phosphorous and Potassium supplied by 250 kg of the fertilizer. **(8 Marks)**
- (b) Give the ionic form taken up by plants, one function and two deficiency symptoms of each of the following plant nutrients.
- (i) Phosphorous

(ii) Zinc

(iii)Potassium

(12 Marks)

QUESTION FOUR (20 MARKS)

(a) Describe five sources of soil acidification.

(10 Marks)

(b) Calculate the amount of N, P₂O₅ and K₂O nutrients supplied per hectare when a farmer applies 80 kg DAP (18:46:0), 100 kg of compound fertilizer 23:23:23 and 70 kg of Urea (46:0:0).

(10 Marks)

QUESTION FIVE (20 MARKS)

(a) Describe five ways through which nitrogen can be lost from the soil.

(10 Marks)

(b) Differentiate between

(i) Straight fertilizer vs compound fertilizer

(2 Marks)

(ii) Granular fertilizer vs powdered fertilizer

(2 Marks)

(iii)Blended fertilizer vs coated fertilizer

(2 Marks)

(iv)Fertilizer grade vs fertilizer rate

(2 Marks)

(v) Soil fertility vs soil productivity

(2 Marks)

