

LAIKIPIA



UNIVERSITY

UNIVERSITY EXAMINATIONS

2ND SEMESTER 2023/2024 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: WEDNESDAY (8.30-10.30AM) DATE: 10/4/24

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) Differentiate between
 - i. Soil productivity vs soil fertility **(4 Marks)**
 - ii. Essential elements vs beneficial elements **(4 Marks)**
 - iii. Fertilizer grade vs fertilizer rate **(4 Marks)**
- (b) Explain the meaning of integrated soil fertility management (ISFM)? **(3 Marks)**
- (c) Discuss two methods responsible for ion movement across the semi permeable membrane of plant root cells. **(6 Marks)**
- (d) The recommended fertilizer dose for lowland rice is 120, 60, 40 kg N, P₂O₅ and K₂O per hectare, respectively. Calculate the amount of fertilizer required in the form of urea (46%, superphosphate (16%) and muriate of potash (58%). **(9 Marks)**

QUESTION TWO (20 MARKS)

- (a) Discuss five objectives of carrying out soil testing in soil fertility evaluation. **(10 Marks)**
- (b) Explore five external factors affecting ion absorption **(10 Marks)**

QUESTION THREE (20 MARKS)

- (a) A fertilizer has the following ratio; 18:30:10. Calculate the amount of Nitrogen, Phosphorous and potassium present in 50 kg bag of the fertilizer **(6 Marks)**
- (b) Give the ionic forms in which the following elements are taken up by the plant.
 - (i) Nitrogen **(1 mark)**
 - (ii) Boron **(1 mark)**
 - (iii) Nickel **(1 mark)**
 - iv) Chlorine **(1 mark)**

- (c) Discuss five limitations of using visual deficiency symptoms in the evaluation of soil fertility. **(10 Marks)**

QUESTION FOUR (20 MARKS)

- (a) Explain how lime neutralizes acidity in soils. Use equations to show your answer. **(5 Marks)**
- (b) List five types of organic manures used in ISFM **(5 Marks)**
- (c) Discuss five advantages of manure fertilizers **(10 Marks)**

QUESTION FIVE (20 MARKS)

- a) Illustrate the nitrogen cycle **(10 marks)**
- b) Identify the THREE ways in which Nitrogen is lost from the soils **(6 marks)**
- c) Describe two characteristics of NO_3^- that makes it prone to loss by leaching **(4 marks)**

