

GWANDA STATE UNIVERSITY



FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE

DEPARTMENT OF HORTICULTURE AND CROP PRODUCTION

BACHELOR OF SCIENCE HONOURS DEGREE IN CROP SCIENCE

LCS 2201 SOIL FERTILITY MANAGEMENT

Second Semester Examination Paper

APRIL 2024

This examination paper consists of 3 pages.

Time Allowed: 3 hours.

Total Marks: 100

Special Requirements: None

Examiner's Name: Mathema N

INSTRUCTIONS

1. Answer **all** questions in Section A
2. Answer **two** questions in Section B

MARK ALLOCATION

QUESTION	MARKS
SECTION A	60
SECTION B	40
TOTAL ATTAINABLE MARKS	100

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SECTION A: ANSWER ALL QUESTIONS IN SECTION A

Question 1

- a) Predict the possible consequences of failing to apply adequate fertilizers and soil amendments in crop fields by Zimbabwean farmers on the future of crop production in the country. [10]
- b) Estimate the possible effects of not liming by resettled farmers in Zimbabwe [10]

Question 2

- a) Describe the three methods that are used to inoculate soya beans [6]
- b) Elucidate the conditions that are required for successful nodulation and N-fixation after inoculation with Rhizobia. [14]

Question 3

Elaborate on the causes and solutions to the problem of salinity in:

- a) Irrigated lands [10]
- b) Non irrigated lands [10]

SECTION B: ANSWER TWO QUESTIONS FROM SECTION B

Question 4

- a) Provide two constituent macro nutrients and one constituent micronutrient of the chlorophyll molecule. State the forms in which they are absorbed by plant roots. [6]
- b) Describe the active uptake mechanism of nutrients by plant roots. [4]
- c) Outline FIVE factors that affect the uptake of nutrient by plant roots. [10]

Question 5

Citing relevant examples of known fertilizers, discuss nitrogenous, phosphatic and potash (potassium) fertilizers under the following sub-headings;

- a) timing of application and placement [6]
- b) available forms of mineral nutrients, uptake in the soil and factors that affect uptake of these mineral nutrients. [14]

Question 6

- a) Lay down the attributes that are important in selecting a crop to use as green manure crop. [10]
- b) Elaborate on the efficacy of the following methods of phosphate fertilizer application in promoting its availability to crops in soils of the humid tropics:
- i. Banding [2]
 - ii. Broadcasting [2]
 - iii. Application of high phosphate doses [2]
- c) In semi- arid regions phosphorous availability is a problem to crops. Explain. [2]
- d) Explain one management strategy that can be used to enhance phosphorous availability in semi-arid soils. [2]

Question 7

- a) Compare and contrast Nitrogen fixation from Phosphorous fixation. [10]
- b) Outline how farmers may determine the nutrient status of the soil. [10]

End of Examination