



1ST SEM. 2011/2012 (M)

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UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

**PROGRAMMES: BACHELOR OF SCIENCE YEAR III IN AGRICULTURAL
EDUCATION, AGRONOMY AND HORTICULTURE**

COURSE CODE: CP 302

TITLE OF PAPER: CROP NUTRITION

TIME ALLOWED: TWO AND A HALF (2.5) HOURS

INSTRUCTIONS: ANSWER ANY FOUR (4) QUESTIONS

**DO NOT OPEN THIS PAPER UNTIL PERMISSION HAS BEEN GRANTED BY
THE CHIEF INVIGILATOR**

SECTION 1: SOIL CHEMISTRY

QUESTION 1

- (a) Outline the importance of soil minerals in plant nutrition [5]
- (b) Discuss the factors which influence the persistence of feldspar minerals in soil and comment on how these factors affect plant nutrition. [20]
[25]

QUESTION 2

- (a) Distinguish between total cation exchange capacity and effective cation exchange capacity. [3]
- (c) Outline the sources of charge in tropical and subtropical soils [8]
- (c) Discuss the implications of these charges on plant nutrition [14]
[25]

QUESTION 3

Discuss the effects of soil organic matter which are important when soils are used for crop production [25]

SECTION 2: SOIL FERTILITY

QUESTION 4

- (a) Outline the forms of potassium in soil and comment on their relative importance in potassium nutrition of plants. [6]
- (b) Discuss the factors which influence the availability of potassium to plants in soils and comment on strategies you would recommend to improve potassium availability in such soils [13]
- (c) Describe the following terms:
(i) Luxury consumption [2]
(ii) Chlorophobic plants [2]
(c) Natrophilic plants [2]
[25]

QUESTION 5

Discuss the essential role of kraal manure in crop production

[25]

QUESTION 6

(a) One of the most important aspects of fertilizer usage is to know when fertilizers should be applied and the method of application. Discuss the methods of fertilizer application you would recommend to farmers in your home area for maize production clearly highlighting the merits and demerits of each.

[14]

(b) A fertilizer recommendation to a farmer for maize production in the highveld of Swaziland was given as follows:

N – 80 kg/ha

P – 40 kg/ha

K – 35 kg/ha

(i) Calculate the amount of the compound fertilizer 2:3:2(37) that must be applied to supply all the N requirement. [4]

(ii) How much P and K would this quantity of fertilizer obtained in (i) above supply to the maize plants? [4]

(iii) Comment of the practice of using compound fertilizer in such recommendations. [3]

[25]

Selection differentials (k -values) at different selection intensities for plant species

Selection Intensity (%)	K-values
1	2.665
2	2.421
3	2.268
4	2.154
5	2.063
6	1.985
7	1.918
8	1.858
9	1.804
10	1.755
15	1.554
20	1.400
25	1.271
30	1.159
50	0.798