



1st SEM. 2009/2010

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UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

**PROGRAMME: BACHELOR OF SCIENCE YEAR II IN AGRICULTURAL AND
BIOSYSTEMS ENGINEERING, AGRICULTURAL
EDUCATION, ANIMAL SCIENCE, AGRONOMY, AND
HORTICULTURE**

COURSE CODE: CP 201/203

TITLE OF PAPER: INTRODUCTORY SOIL SCIENCE

TIME ALLOWED: TWO HOURS

INSTRUCTIONS: ANSWER ANY FOUR (4) QUESTIONS

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THE CHIEF INVIGILATOR**

QUESTION 1

- (a) Define or give short descriptions of the following: (Each answer carries **2 marks**)
- (i) Mechanical analysis
 - (ii) Weathering
 - (iii) Illuviation
 - (iv) Buffering capacity
 - (v) Isomorphous substitution
- (b) Discuss the management techniques you would recommend to maintain or improve the structure of a soil for increased crop yields. **[15]**

QUESTION 2

- (a) Describe the types of acidity found in acid soils. **[6]**
- (b) Discuss the influence of soil acidity on plant growth. **[13]**
- (c) What strategies would you recommend to increase plant growth in acid soils? **[6]**

QUESTION 3

The following information was obtained in a chemical analysis of a soil:

| | |
|-----------------|-----------------------------|
| Exchangeable Ca | = 600 ppm |
| Exchangeable Mg | = 18 mg/100g |
| Exchangeable K | = 436.8 kg ha ⁻¹ |
| Exchangeable H | = 50 ppm |
| Exchangeable Al | = 315 ppm |

Eq Wts. Ca -20, Mg - 12, K -39, H -1, Al - 9

- (a) Calculate the cation exchange capacity of this soil, assuming that all the negative charges in this soil are occupied by these elements **[15]**
- (b) What is the percent base saturation for this soil? **[5]**
- (c) Comment on the suitability of this soil as a medium for plant growth **[5]**

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QUESTION 4

- (a) Define the term “factor of soil formation”. [3]
- (b) Discuss the factors of soil formation and indicate the significance of each in the formation of soils in your named country. [22]

QUESTION 5

- (a) Distinguish between “chemical weathering” and “physical weathering” of rocks and minerals to form soil. [5]
- (b) Discuss the chemical weathering processes of rocks and minerals to form soil. [20]