



1ST SEM. 2012/2013

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UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

**PROGRAMMES: BACHELOR OF SCIENCE YEAR TWO IN
AGRICULTURAL BIOSYSTEMS ENGINEERING,
AGRICULTURAL EDUCATION, AGRONOMY, ANIMAL
SCIENCE, ANIMAL SCIENCE (DAIRY OPTION) AND
HORTICULTURE**

COURSE CODE: CP 201

TITLE OF PAPER: INTRODUCTORY SOIL SCIENCE

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER ANY FOUR (4) QUESTIONS

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GRANTED BY THE CHIEF INVIGILATOR**

QUESTION 1

(a) Define or give short descriptions of the following terms: (Each answer carries **2 marks**).

- (i) Eluviation
- (ii) Mechanical analysis
- (iii) Isomorphous substitution
- (iv) Biogeochemical weathering
- (v) Essential nutrient

(b) Outline the role of the following in soils:

(i) The solid phase of soil **[2.5]**

(ii) The pore space of soil **[2.5]**

(c) Discuss the biogeochemical weathering processes and show how they have influenced soil development in your country. **[10]**

QUESTION 2

(a) Discuss the role of soil pH in crop production **[19]**

(b) What strategies would you recommend to increase crop yields in acid soils? **[6]**

QUESTION 3

A chemical analysis of a soil revealed the following information:

Exchangeable Ca	- 800ppm
Exchangeable Mg	- 537.6 kg ha ⁻¹
Exchangeable K	- 19.5 mg
Exchangeable H	- 112 kg ha ⁻¹
Exchangeable Al	- 315 ppm

(a) Assuming that all the negative charges of this soil are occupied by these cations, calculate the cation exchange capacity of this soil **[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]**

QUESTION 4

Outline the role of organic matter when soils are used for crop production **[25]**

QUESTION 5

- (a) Outline the importance of soil structure in soil science. **[7]**
- (b) Discuss in detail the management techniques you would recommend to improve or maintain the structure of a soil. **[18]**

QUESTION 6

- (a) Outline the importance of water in soils **[7]**
- (b) Discuss the management of soil water in arable agriculture **[18]**