



SUPPLEMENTARY 2008/2009

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UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION PAPER

**PROGRAMME: BSC II (AGRONOMY, AGRICULTURAL EDUCATION,
HORTICULTURE, AND LAND AND WATER MANAGEMENT)**

COURSE CODE: CP 203

TITLE OF PAPER: INTRODUCTORY SOIL SCIENCE

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER FOUR (4) QUESTIONS

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CHIEF INVIGILATOR**

QUESTION 1

- (a) Define or give short descriptions of the following terms: (Each question carries **two marks**).
- (i) A soil
 - (ii) Isomorphous substitution
 - (iii) Phosphorus fixation
 - (iv) Soil consistence
 - (v) Weathering
- (b) Define the term “soil horizon” and indicate how horizons are identified and named in a soil profile. **(5 marks)**
- (c) Using an appropriate diagram, illustrate the major soil horizons in a representative mineral soil profile and describe the properties of each. **(10 marks)**
- [25 MARKS]**

QUESTION 2

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

Exchangeable Ca	- 800 ppm
Exchangeable Mg	- 537.6 kg ha ⁻¹
Exchangeable K	-390 ppm
Exchangeable H	- 112 kg ha ⁻¹
Exchangeable Al	- 270 ppm

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

QUESTION 3

- (a) What is mechanical analysis of a soil? (5 marks)
- (b) Describe in detail a mechanical analysis of a soil and indicate the values of such a measurement. (20 marks)

[25 MARKS]

QUESTION 4

- (a) What is a clay mineral? (5 marks)
- (b) Discuss the properties of clay minerals which are important when soils are used for crop production. (20 marks)

[25 MARKS]

QUESTION 5

Discuss in detail the chemical and physical weathering processes of rocks and minerals in the environment to form soil. [25 MARKS]