



2ND SEM. 2005/2006

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UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

**PROGRAMME: DIPLOMA IN AGRICULTURE YEAR 1 AND
DIPLOMA IN AGRICULTURAL EDUCATION
YEAR 1**

COURSE CODE: CP 103

TITLE OF PAPER: INTRODUCTION TO 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 question carries **2 marks**)

- (i) Eluviation
- (ii) Cation exchange capacity
- (iii) Mineralization
- (iv) Buffering capacity
- (v) Weathering

(b) Discuss the management strategies you would recommend to maintain and improve the structure of a soil **[15]**

QUESTION 2

(a) Distinguish between “chemical” and “physical” weathering of rocks and minerals **[5]**

(b) Discuss the processes involved in the chemical weathering of rocks and minerals in the environment **[20]**

QUESTION 3

(a) What is a factor of soil formation? **[5]**

(b) Discuss the factors of soil formation and indicate how they may have influenced soil development in your country **[20]**

QUESTION 4

(a) Discuss the effect of soil acidity on plant growth **[20]**

(b) What management considerations would you recommend to improve crop yields in acid soils? **[5]**

QUESTION 5

(a) Outline the origin of charge in organic and inorganic colloids **[5]**

(b) Discuss the properties of clay minerals which are important when soils are used for crop production **[20]**

QUESTION 6

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

Exchangeable Ca	= 200 ppm
Exchangeable Mg	= 120 lbs per acre
Exchangeable K	= 195 ppm
Exchangeable Na	= 11.5 mg/100 g
Exchangeable H	= 60 lbs per acre
Exchangeable Al	= 450 ppm

Equivalent weights for the elements: Ca – 20, Mg – 12, K – 39, Na – 23, H – 1, Al – 9

- (i) Calculate the cation exchange capacity of this soil **[15]**
- (ii) What is the percent base saturation for this soil? **[5]**
- (iii) Evaluate this soil in terms of its suitability as a medium for plant growth **[5]**