

1st SEM. 2007/2008



PAGE 1 OF 3

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

**PROGRAMME: BACHELOR OF SCIENCE IN AGRONOMY YEAR 2,
BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION
YEAR 2, BACHELOR OF SCIENCE IN HORTICULTURE,
AND BACHELOR OF SCIENCE IN LAND AND WATER
MANAGEMENT YEAR 2**

COURSE CODE : CP 203

TITLE OF PAPER : INTRODUCTORY SOIL SCIENCE

TIME ALLOWED : TWO (2) HOURS

INSTRUCTIONS : ANSWER ANY FOUR (4) QUESTIONS

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

QUESTION 1

- (a) Define or give short descriptions of the following terms: (Each question carries two marks).
- (i) Isomorphous substitution
 - (ii) Buffering capacity
 - (iii) Weathering
 - (iv) Eluviation
 - (v) Mineralization
- (b) Discuss the properties of clay minerals you consider important when soils are used for crop production or as a medium for the disposal of Municipal Waste. [15]
(25 MARKS)

QUESTION 2

- (a) What is a factor of soil formation? [3]
- (b) Discuss the factors of soil formation and indicate how each has influenced soil development in your country [22]
(25 MARKS)

QUESTION 3

- (a) Discuss the acid-infertility of soils [18]
- (b) Highlight the management strategies you would recommend to improve crop yields in acid soils [7]
(25 MARKS)

QUESTION 4

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

Exchangeable Ca	= 600 ppm
Exchangeable Mg	= 403.2 kg/ha
Exchangeable K	= 117 ppm
Exchangeable Na	= 4.6 mg
Exchangeable H	= 60 ppm
Exchangeable Al	= 360 ppm

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

- (a) Calculate the cation exchange capacity for this soil and express your answer in cmolc kg^{-1} [15]
- (b) What is the percent base saturation for this soil? [4]
- (c) Evaluate this soil in terms of its suitability as a medium for plant growth [6]
(25 MARKS)

QUESTION 5

- (a) Highlight the importance of soil structure in crop production [5]
- (b) Discuss the management strategies you would recommend to improve or maintain good soil structure [20]
(25 MARKS)