



**SUPPLEMENTARY 2007/2008**

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**UNIVERSITY OF SWAZILAND**

**SUPPLEMENTARY 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 QUESTIONS**

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

**QUESTION 1**

(a) Define the term “soil horizon” and outline how horizons are identified and named in a soil profile. [8]

(b) Using an appropriate diagram, illustrate the major soil horizons in a representative mineral soil profile and describe the properties of each horizon [17]

**(25 MARKS)**

**QUESTION 2**

(a) Distinguish between “chemical weathering” and “physical weathering” of rocks and minerals in the environment. [5]

(b) Discuss the chemical weathering processes of rocks and minerals in the environment and indicate how they have influenced soil formation in soils of your country [20]

**(25 MARKS)**

**QUESTION 3**

(a) Describe the three types of acidity found in acid soils and indicate their significance in crop production [6]

(b) Discuss the influence of soil acidity on plant growth [12]

(c) What strategies would you recommend to increase crop yields in acid soils [5]

**(25 MARKS)**

**QUESTION 4**

(a) Define or give short descriptions of the following terms: (Each question carries **two marks**)

- (i) Illuviation
- (ii) Cation exchange capacity
- (iii) Mechanical analysis
- (v) Weathering

(b) Discuss the role of organic matter in crop production

[15]  
**(25 MARKS)**

**QUESTION 5**

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

Exchangeable Ca	= 1792 kg ha <sup>-1</sup>
Exchangeable Mg	= 240 ppm
Exchangeable K	= 390 ppm
Exchangeable Na	= 460 ppm
Exchangeable H	= 30 ppm
Exchangeable Al	= 806.4 kg ha <sup>-1</sup>

- (a) Calculate the cation exchange capacity for this soil and express your answer in  $\text{cmolc kg}^{-1}$  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]  
(25 MARKS)