



**SUPPLEMENTARY 2007/2008**

**PAGE 1 OF 3**

**UNIVERSITY OF SWAZILAND**

**SUPPLEMENTARY EXAMINATION PAPER**

**PROGRAMME: BACHELOR OF SCIENCE IN AGRICULTURE YEAR 5  
(CROP PRODUCTION AND HORTICULTURE OPTIONS)  
AND BACHELOR OF SCIENCE IN AGRICULTURAL  
EDUCATION YEAR 5**

**COURSE CODE: CP 502**

**TITLE OF PAPER: SOIL CHEMISTRY AND FERTILITY**

**TIME ALLOWED: TWO AND A HALF (2.5) HOURS**

**INSTRUCTIONS: ANSWER FOUR QUESTIONS WITH AT LEAST ONE  
QUESTION FROM EACH SECTION**

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THE CHIEF INVIGILATOR**

**SECTION 1: SOIL CHEMISTRY**

**QUESTION 1**

Discuss the chemical, physical and biological effects of organic matter which are of significance when soils are used for crop production [25 MARKS]

**QUESTION 2**

(a) Discuss the reactions of iron oxides with anions in soils and indicate the implications of these reactions in the mineral nutrition of plants [19]

(b) Suggest practical ways to improve nutrient availability to plants in such soils [6]  
[25 MARKS]

**QUESTION 3**

(a) Discuss the acid-infertility of soils in crop production [15]

(b) What remedial actions would you recommend to improve plant growth in acid soils? [4]

(c) An acid soil was found to contain 3 m.e. exch. Al /100g soil. Calculate the amount of lime in t/ha required to neutralize the exchangeable Al to a depth of 15 cm. The soil had a bulk density of  $1.2 \text{ Mg/m}^3$  and the lime had a neutralizing value of 90%. [6]  
[25 MARKS]

**SECTION 2: SOIL FERTILITY**

**QUESTION 4**

Discuss two major soil fertility problems in soils of your named country and suggest strategies to address such problems [25 MARKS]

**QUESTION 5**

(a) Describe the transformations of phosphorus in soils and highlight the implications of these reactions on the phosphorus nutrition of plants [7]

(b) Discuss the factors which influence the availability of phosphorus to plants in soils and indicate the strategies you would recommend to improve phosphorus availability to plants [18]

**[25 MARKS]**

**QUESTION 6**

(a) What is a micronutrient?

**[5]**

(b) Discuss the roles of zinc, boron, and molybdenum in crop production [20]

**[25 MARKS]**