SIR ARTHUR LEWIS COMMUNITY COLLEGE
DIVISION OF AGRICULTURE

ACADEMIC YEAR 2000/2001
ASSOCIATED DEGREE/DIPLOMA PROGRAMME
YEAR 1 SEMESTER 2 FINAL EXAMINATION

#52

TIME: 2 HOURS

COURSE: SOIL SCIENCE – SSC511
DATE : MAY 2001

Do Question 1 and any other four.

1. a) Total pore space is a measure of the of the soil volume that holds air and water. Calculate the porosity of a soil having the following :
   Wet weight - 450g
   Dry weight – 325g
   Soil volume – 250g

   b) Based on the information given in (a) calculate the bulk density of that soil on an oven dry basis.

   c) The results of a laboratory analysis showed that the above soil was very acidic. Based on the following information calculate CEC and PBS.

	Meq/100g					
PH	Al	K	Ca	Mg	Fe	H
4.1	5	3	9	16	8	4

2. a) Sketch labeled schematic diagrams to illustrate the layer silicate sheet structures of 1:1, 2:1, 2:2 clay and give named examples.
   Explain which of these structures is most responsible for the shrinking, swelling and cracking of soils.

   b) Negative charges, found on clay micelles are essential for the adsorption of exchangeable cations (nutrients) responsible for the optimum growth of plants. Give an account of the sources of those charges.

3. List and give a brief account of each of the eleven soil orders identified in soil taxonomy.

4. Outline and discuss the processes involved in soil development and the chemical weathering of soils (Equations Req.)

5. Explain soil reaction and give an account of the sources of hydrogen ions in acidic soils.

6.a) Identify the soil textural name and the exact composition of sand, silt and clay for each of the soil samples 1 to 3.

1. _____ _____ _____ _____
2. _____ _____ _____ _____
3. _____ _____ _____ _____

7.b) Mark the correct locations of each of the following on the textural triangle and give its correct textural name.

Sample	% Sand	%Silt	%Clay	Textural Name
A	10	55	35	_____
B	15	65	20	_____
C	30	10	60	_____

c) How might soil texture influence soil drainage and nutrient availability.

8. Write short notes on the following:
   - Strongly acid soils.
   - Neutral to alkaline soils
   - One diagnostic surface horizon
   - One macro nutrient

9. Outline and discuss the various types of soil structures.

DETERMINATION OF SOIL CLASS