



**NACP11 INTRODUCTION TO SOIL SCIENCE  
END OF SEMESTER EXAMINATION**

**MAY 2024**

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**DURATION: THREE (3) HOURS**

**INSTRUCTIONS**

1. Do not write your name on the answer sheers
2. Begin your answer for each question on a new page
3. Credit is given for neat presentation.
4. This paper is comprised in Section A and any two question in Section B

## **SECTION A (60 MARKS)**

### **Question 1**

- a) State the adaption mechanisms of microbes exposed to the following soil conditions
- i. High temperature [1]
  - ii. Low temperature [1]
  - iii. Water stress [1]
  - iv. Flooded soil [1]
- b) Define the following:
- i. Soil [2]
  - ii. Soil organic matter. [2]
  - iii. Pedogenesis. [2]
  - iv. Catena. [2]
- c) State the three pools of soil organic matter. [3]

### **Question 2**

- a) Outline four causes of soil acidity. [4]
- b) With an aid of a diagram, describe a typical well developed soil profile [8]
- c) With the aid of a diagram describe correction of soil acidity with lime. [3]

### **Question 3**

- a) Table 1.0 shows selected soil properties

Table 1.0: Analytical results for soil A and Soil B.

Soil property	Soil A	Soil B
pH(water)	4.1	7.7
Clay %	7	31
Sand %	77	43
Exch. Ca (cmolc/kg)	2.3	7.4
Exch. Mg (cmolc/kg)	1.9	3.4
Exch. K (cmolc/kg)	0.2	0.2
Exch. Na (cmolc/kg)	0.2	0.1
CEC	5.2	13.6

With reference to Table 1.0 calculate the following parameters for both soil A and B:

- i. Percentage of silt. [2]
  - ii. Percent base saturation. [2]
  - iii. Exchangeable sodium percent. [2]
  - iv. Using the textural triangle provided , state the soil texture of A and B [2]
- b) Describe three types of reactions caused by water during weathering processes. [6]
- c) State the implication of isomorphous substitution. [1]

### **Question 4**

Describe the relationship between soil organisms and crop production. [15]

[60]

**SECTION B (40 MARKS)**

Answer any two questions.

**Question 5**

Describe any five ways of studying soil biota.

[20]

**Question 6**

Explain the following soil forming processes:

- i. Gleying. [5]
- ii. Eluviation. [5]
- iii. Illuviation. [5]
- iv. Leaching [5]

[20]

**Question 7**

Describe the influence of the following on soil formation:

- i. Topography. [8]
- ii. Climate. [12]

[20]

**Question 8**

- a) Explain four factors affecting the CEC of a soil. [10]
- b) Discuss the process of adsorption of cations and anions in soils. [10]

[20]

**THE END**