

NATIONAL UNIVERSITY OF LESOTHO

BSC SUPPLEMENTARY EXAMINATIONS

ESC 1312: ADVANCED PHYSICAL ENVIRONMENTAL SYSTEMS

AUGUST 2023

MARKS: 100

DURATION: 3 HOURS

This question paper consists of **TWO** pages; please see that you have **BOTH**

Answer any **FOUR** questions only. Each question carries 25 marks. Use **CLEAR** sketches and diagrams where appropriate.

Question 1

- a) Define the following terms as used in Ecology (12):
- i. Biotic factors
 - ii. Community
 - iii. Ecosystem
 - iv. Mutualism
 - v. Producer
 - vi. Biosphere
- b) Differentiate between the following terms used in Ecology:
- i. Interspecific competition and Intraspecific competition (4)
 - ii. Parasitism and Commensalism (4)
 - iii. Primary producers and Primary Consumers (4)
- c) Give 1 example of an abiotic factor within an ecosystem.

Question 2

Name and **fully** describe the 5 factors affecting the process of soil formation.

Question 3

- a) Define 3 forces that drive horizontal air movement, and state 1 way how each of the forces affects air movement. (9)
- b) Give two examples of local winds. (2)
- c) With the aid of diagrams, describe how the two local winds in (b) above occur. (14)

Question 4:

Using the provided soil texture triangle (Figure 1) to answer the following questions:

- a) Determine the soil texture types of the soil samples given in Table 1 below. (21)

Table 1: Soil texture type for different soil samples

| | Clay (%) | Silt (%) | Sand (%) |
|----------|----------|----------|----------|
| Sample A | 80 | 8 | 12 |
| Sample B | 19 | 73 | 8 |
| Sample C | 4 | 6 | 90 |
| Sample D | 10 | 30 | 60 |
| Sample E | 5 | 90 | 5 |
| Sample F | 40 | 10 | 50 |
| Sample G | 35 | 55 | 10 |

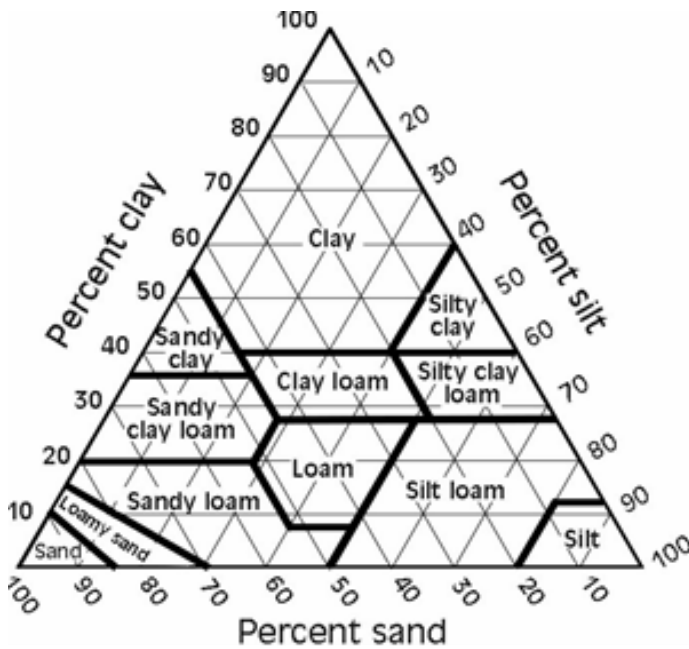


Figure 1: Soil texture triangle

- b) What is the maximum % amount of Clay in:

- i. Clay Loam (2)
- ii. Sandy Loam (2)

Question 5

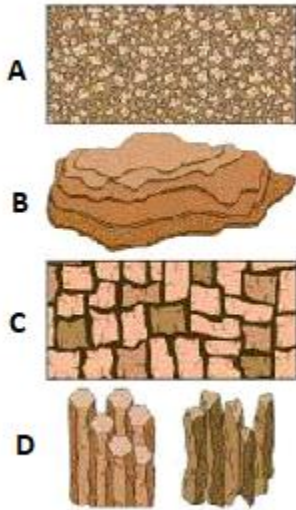
- a) Define the following terms as used in Soil Science

- i. Soil

(8)

- ii. Weathering
- iii. Parent Material
- iv. Pedogenesis

- b) What is soil structure? (1)
- c) Name the structures for the soil samples (A to D) below. (4)



- d) Name the three types of weathering and give 1 example of the processes in each type (6)
- e) Give a brief description of how each of the 3 processes named above occurs and leads to the formation of soil. (6)

Question 6

Draw a sketch showing all the components of an ecosystem, and give **brief notes** describing each component.