



PAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY
FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES SCIENCES

QUALIFICATION: BACHELOR OF SCIENCE IN AGRICULTURE & BACHELOR OF HORTICULTURE	
QUALIFICATION CODE	07BAGA, 07BHOR
COURSE CODE: SSA520S	COURSE NAME: Soil Science
NQF LEVEL: 5	NQF CREDITS: 12
SESSION:	January 2023
DURATION: 3 Hours	MARKS: 100

SUPPLEMENTARY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Mr Brian J. Mhango
MODERATOR:	Dr T. Nzuma

INSTRUCTIONS
<ol style="list-style-type: none">1. Answer ALL the questions.2. Write clearly and neatly.3. Number the answers clearly.

PERMISSIBLE MATERIALS

1. Examination question paper
2. Answering book
3. Scientific calculator

THIS QUESTION PAPER CONSISTS OF 4 PAGES (Excluding this front page)

ANSWER ALL THE QUESTIONS

QUESTION 1

- a) The _____ is a vertical section through soil mass
- A. Soil erosion
 - B. Soil profile
 - C. Both A and B
 - D. None of the above
- b) Wind erosion is common in
- A. Humid zones
 - B. Arid zones
 - C. Arid and semi-arid zones
 - D. Arid and Humid zones
- c) Wind erosion is more in
- A. Cohesive soil
 - B. Non-cohesive soil
 - C. Rocky soil
 - D. All of the above
- d) The reason for wanting to organize soil knowledge is the basis for:
- A. The principle of prioritization
 - B. The principle of classification
 - C. The principle of purpose
 - D. The principle of identity
- e) The mass of dry soil is 380 grams, if the particle density is 38g/cm^3 then:
- A. The soil bulk density is $> 39\text{g/cm}^3$
 - B. The soil bulk density is $< 38\text{g/cm}^3$
 - C. The soil bulk density is about 39g/cm^3
 - D. The soil bulk density is unknown

[10]

QUESTION 2

As may be applicable, determine the % sand, %silt, %clay or the soil texture name in the tables below:

% Clay	%Sand	% Silt	Soil Texture Name
30	10	60	Silt Clay loam
60	30	10	
	40	40	
10			Loamy Sand
45	10	45	
5	35		
40		10	

[20]

Question 3

The table below shows the Unified Soil Classification System (**USCS**), a soil classification system used in engineering and geology to describe the texture and grain size of a soil.

First and/or Second Letters		Second Letter	
<i>Letter</i>	<i>Definition</i>	<i>Letter</i>	<i>Definition</i>
G	Gravel	P	Poorly graded (uniform particle sizes)
S	Sand	W	Well-graded (diversified particles sizes)
M	Silt	H	High plasticity
C	Clay	L	Low plasticity
O	Organic		

Provide symbols for the following descriptions based on this classification system:

- Well-graded gravel with silt
- Poorly graded sand with silt
- Well-graded organic clay
- Organic clay with silt
- Well-graded sand with silt

(10)

[10]

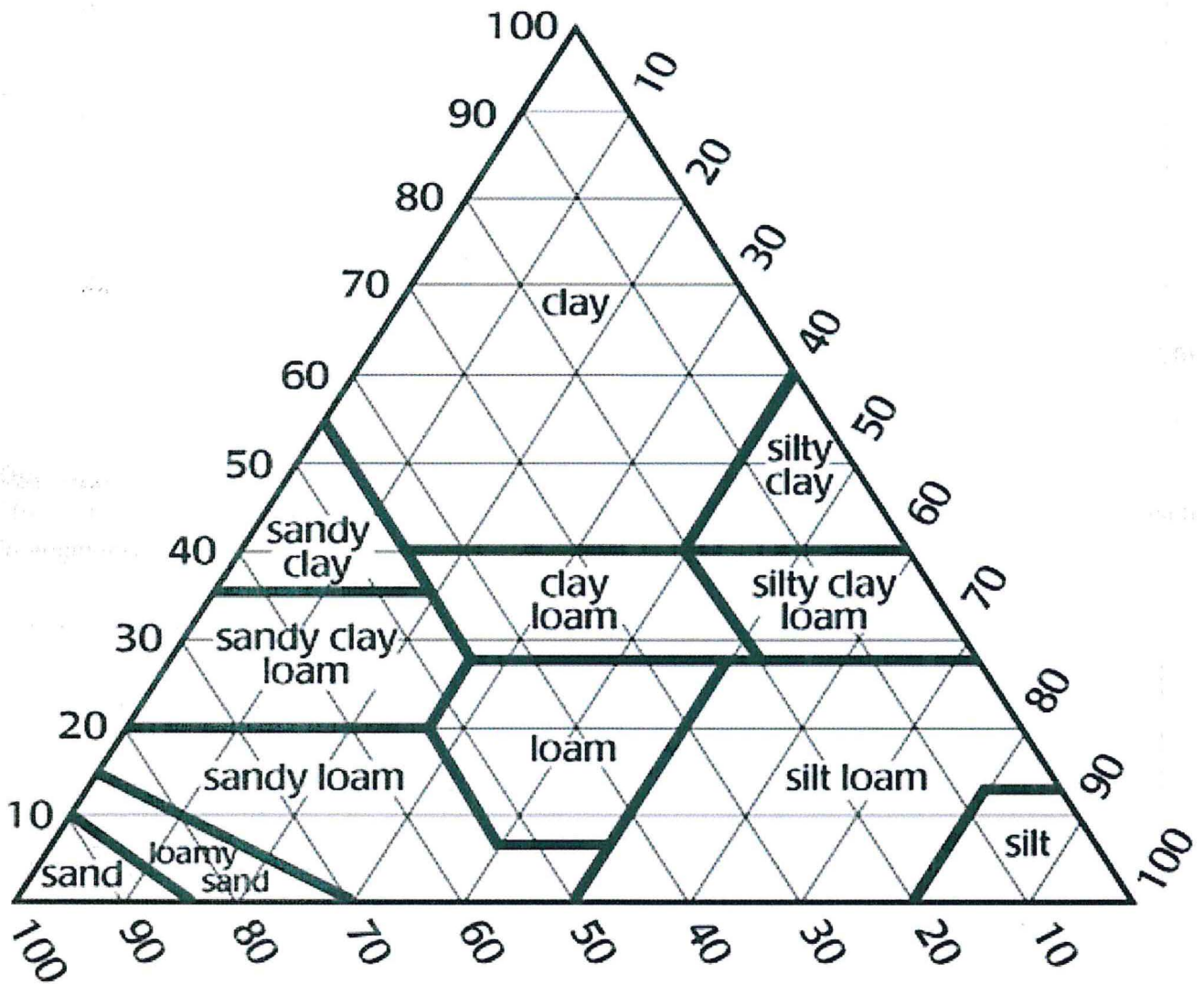
QUESTION 4

- 4.1 Excluding the human factor, name the five factors of soil formation (5)
- 4.2 What is nitrogen fixation and why is it important? (5)
- 4.3 According to the three principles of soil classification, explain what is meant by "Organization"? (20)
- [30]**
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QUESTION 5

- 5.1 Discuss in detail the erosion processes proposed by Hjulström between water speed (cm/sec) and particle diameter (mm). (15)
- 5.2 Draw a diagram showing how rainfall erosivity and soil erodibility factors contribute to soil's Susceptibility to water erosion (15)
- [30]**
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SOIL TEXTURE TRIANGLE



THE END

TOTAL MARKS: 100