

GWANDA STATE UNIVERSITY



FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE

DEPARTMENT OF HORTICULTURE AND CROP PRODUCTION

PROGRAMME: BSc HONOURS HORTICULTURE & CROP PRODUCTION

NHC1102: PRINCIPLES OF SOIL SCIENCE

FINAL EXAMINATION

December 2024

This examination paper consists of 4 pages

Time Allowed: 3 Hours

Total Marks: 100

Special Requirements: None

Examiners Name: Mr Musabayana

Instructions

1. Answer **ALL** questions in Section A
2. Answer any **THREE (3)** questions in Section B

Mark allocation

Question	Marks
Section A	40
Section B	60
Total attainable marks	100

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SECTION A: Answer ALL questions in SECTION A

Question 1

- a) Explain the meaning of the term soil taxonomy [4 Marks]
- b) Name soil orders that are formed as influenced by on the following factors:
- i. Time [3 Marks]
 - ii. Climate [3 Marks]
 - iii. Biota [3 Marks]
 - iv. Parent materials [2 Marks]

Question 2

Discuss the following ecosystem services provided by the soil with respect to the following:

- 1. Plant growth [5 Marks]
- 2. Regulation of water supply [5 Marks]
- 3. Natures recycling system [5 Marks]
- 4. Habitat for living organisms [5 Marks]
- 5. Engineering medium [5 Marks]

SECTION B: Answer **THREE** questions in SECTION B

Question 3

a) Compare and contrast kaolinite and montmorillonite clay minerals. [10 Marks]

b) Discuss the origin of clay minerals. [10 Marks]

Question 4

a) Copy and complete the table below: [10 Marks]

Group	Major taxonomic group	Examples
Macro-organisms	Mollusks	-
	-	Rodents, snakes
Meso-organisms	-	Mites
	Annelids	-
Microorganisms	-	Nematodes
	Protozoa	-
	-	Root hairs
	Algae	-
	Fungi	-
	Bacteria	-

b) Discuss how soil living organisms improve the soil for crop production [10 Marks]

Question 4

Explain the significance of soil texture and describe its effects on water-holding capacity in the unsaturated zone and nutrient availability in agricultural soils. [20 Marks]

Question 5

Discuss factors that affect growth and activity of microorganisms in the soil [20 Marks]

END OF QUESTION PAPER!!!