

2404/301  
TAXONOMY, ECOLOGY, SOIL STUDY,  
HERBARIUM, AQUARIUM AND VIVARIUM  
Oct./Nov. 2022  
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**DIPLOMA IN APPLIED BIOLOGY**

TAXONOMY, ECOLOGY, SOIL STUDY, HERBARIUM, AQUARIUM AND VIVARIUM

**3 hours**

**INSTRUCTIONS TO CANDIDATES**

*You should have the following for this examination:*

*Answer booklet;*

*Battery operated scientific calculator.*

*This paper consists of TWO sections; A and B.*

*Answer ALL the questions in section A and any THREE questions from section B.*

*Each question in section A carries 4 marks while each question in section B carries 20 marks.*

*Maximum marks for each part of a question are indicated.*

*Do NOT remove any pages from this question paper.*

*Candidates should answer the questions in English.*

**This paper consists of 4 printed pages**

**Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing**

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SECTION A (40 marks)

Answer ALL the questions in this section.

1. Define the following ecological terms:
  - (a) carrying capacity; (2 marks)
  - (b) biomass. (2 marks)
2. Highlight four disadvantages of ecological pyramids. (4 marks)
3. Describe four classes of plant based on their habitats. (4 marks)
4. State four general characteristics of kingdom fungi. (4 marks)
5. State importance of the following physical properties:
  - (a) soil texture; (2 marks)
  - (b) soil structure. (2 marks)
6. Explain two types of soil survey based on purpose. (4 marks)
7. Define the following terms:
  - (a) flurinals; (2 marks)
  - (b) arenosols. (2 marks)
8. Name any four chemicals used to process mammalian bone for museum preservation. (4 marks)
9. Explain two forms in which plants materials are stored in herbarium. (4 marks)
10. State four differences between monocotyledonae and dicotyledanae. (4 marks)

SECTION B (60 marks)

Answer any **THREE** questions from this section.

11. (a) With the use of a labelled diagram, describe the sigmoid population growth curve. (15 marks) ✓
- (b) State five ways through which man has contributed to extinction of wild species. (5 marks) ✓
12. (a) Outline five physical properties used to differentiate types of soil. (10 marks) ✓
- (b) Give five reasons for soil classification. (5 marks) ✓
- (c) State five factors that influence soil formation. (5 marks) ✓
13. (a) State five features of division Bryophyta. (5 marks) ✓
- (b) Outline the importance of taxonomic classification. (5 marks) ✓
- (c) (i) Classify a honey bee into the following:
- kingdom; (1 mark) ✓
- phylum; (1 mark) ✓
- class; (1 mark) ✓
- order. (1 mark) ✓
- (ii) State two economic importance of honey bee. (2 marks) ✓
- (d) Name four divisions in the plant kingdom. (4 marks)
14. (a) Outline the guidelines for handling and filling herbarium specimens. (6 marks)
- (b) State six roles of plants in an aquarium. (6 marks)
- (c) Explain four factors to consider during collection of herbarium specimen. (8 marks)

(a) Define the term soil catena. (2 marks)

(b) Explain how the following factors influence soil catena: (2 marks)

- (i) time; (3 marks)
- (ii) living organisms; (3 marks)
- (iii) climate. (3 marks)

(c) Describe the following fresh water organisms: (2 marks)

- (i) benthos; (2 marks)
- (ii) periphytons; (2 marks)
- (iii) planktons; (2 marks)
- (iv) nektons; (2 marks)
- (v) neustons. (2 marks)

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