

2404/301

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

Oct./Nov. 2017

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**DIPLOMA IN APPLIED BIOLOGY**

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

3 hours

**INSTRUCTIONS TO CANDIDATES**

*You should have the following for this examination:*

*Answer booklet;*

*Scientific calculator.*

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

*Answer ALL 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 parts for each part of the question are indicated.*

*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.**

Dahisen

SECTION A (40 marks)

Answer ALL the questions in this section.

1. Name any four aquarium plants. *Succulent, Moss, Dory, Parrot fish* (4 marks)
2. (a) Why is pressing of plants necessary? (2 marks)
- (b) Give one use for each of the following:
- (i) vasculum;
- (ii) secateur. (2 marks)
3. Name the class of organisms that show each of the following characteristics:
- (a) unicellular, contains single nucleus, forms pseudopodia. *Protozoa* (1 mark)
- (b) numerous chaetae, borne on parapodia. *Class Polychaeta* (1 mark)
- (c) large flat foot, visceral hump rotates during development resulting in coiling of shell. *Gastropods* (1 mark)
- (d) segmented body elongated with numerous legs, segments not separated by septa. *Insecta* (1 mark)
4. An organism was found to have the following characteristics: *Microscopic, 2 chambers, 18 tentacles*
- (i) tentacles;
- (ii) radial symmetry;
- (iii) predominant medusa form. *Tentacles*
- (a) Identify this organism up to class level. (1 mark)
- (b) Classify this organism up to class level. (3 marks)
5. Identify four parasitic adaptations to their hosts. (4 marks)
6. Distinguish between:
- (a) fundamental niche; (2 marks)
- (b) realised niche. (2 marks)
7. Name any four museum equipment. (4 marks)

8. Compare sandy soil and clay soil with respect to:

- (a) water retention;
- (b) porosity;
- (c) permeability;
- (d) nutrient composition.

(4 marks)

9. State two advantages of each of the following soil management strategies:

- (i) liming;
- (ii) manuring.

(2 marks)

(2 marks)

10. (a) Name one common disease in vivarium animals.

(1 mark)

(b) What are the symptoms of the disease in (a) above?

(1 mark)

(c) How can the disease in (a) above be prevented or treated?

(2 marks)

### SECTION B (60 marks)

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

11. (a) Define the term ecosystem.

(2 marks)

(b) Explain the relevance of the first and second law of thermodynamics in an ecosystem.

(8 marks)

(c) Outline the effects of the solar energy not utilised in primary production.

(10 marks)

12. (a) Outline the oxygen production method (Winkler) of measuring primary production in aquatic ecosystems.

(10 marks)

(b) (i) What is upwelling?

(1 mark)

(ii) With the aid of diagrams, illustrate how upwelling occurs.

(8 marks)

(iii) State the significance of upwelling.

(1 mark)

13. Describe the process of preparing, preserving, mounting and displaying a chicken kidney in a museum. (20 marks)

14. Describe each of the following:

- (a) an all glass aquarium; (5 marks)
- (b) a porcelain aquarium; (5 marks)
- (c) the feeding of aquarium inmates. (10 marks)

15. Discuss the importance of the following aspects of soil science:

- (a) soil mapping; (7 marks)
- (b) soil water; (7 marks)
- (c) soil temperature. (6 marks)

*Explain the process of preparing, preserving, mounting and displaying a chicken kidney in a museum.*

*Van*

*1- size  
2- shape  
3- the soil*

*Anchorage*

*Soil type  
with  
depth*

*field water*

*H<sub>2</sub>O damage*

*damage*

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*4/11/17*

*moshira*

*Competition*

*Soil profile*

*Thuyesa*