2922/103
ENVIRONMENTAL BIOLOGY
June/July 2023
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY

MODULE I

ENVIRONMENTAL BIOLOGY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have an answer booklet for this examination.
*This paper consists of **TWO** sections; **A** and **B**.*
*Answer **ALL** the questions in section **A** and any **THREE** questions from section **B** in the answer booklet provided.*
*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 as shown.
Candidates should answer the questions in English.

This paper consists of 3 printed pages.

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

Turn over

SECTION A (40 marks)

*Answer **ALL** questions in this section.*

1. Define each of the following:

   (a) taxonomy; (2 marks)

   (b) binomial nomenclature. (2 marks)

2. Draw a labelled diagram of an oyster mushroom. (4 marks)

3. State **four** characteristics used to identify organism in the phylum arthropoda. (4 marks)

4. Draw a labelled diagram of a plant cell as observed under a light microscope. (4 marks)

5. State **four** reasons for studying environmental biology. (4 marks)

6. Describe ' homeostasis' as used in human ecology. (4 marks)

7. Explain the format of writing scientific names of organisms using binomial nomenclature. (4 marks)

8. Draw a labelled diagram of a mammalian chromosome. (4 marks)

9. Draw a labelled diagram of a typical nucleotide. (4 marks)

10. The organisms: herbivorous insects, birds, aquatic plants and fish are found in a water pond. Construct a food chain of the organisms in the pond. (4 marks)

SECTION B (60 marks)

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

11. (a) Explain **three** ways of differentiating smooth endoplasmic reticulum from rough endoplasmic reticulum. (6 marks)

    (b) (i) Draw a labelled diagram describing the cell wall of a maize plant. (4 marks)

    (ii) Describe the **three** components of the part of the cell drawn in (i). (6 marks)

    (iii) State **four** functions of the part of the cell drawn in (i). (4 marks)

12. (a) Explain how the human body responds on exposeure to cold temperatures. (12 marks)

(b) Explain **four** differences between negative feedback control and positive feedback control in homeostatic processes. (8 marks)

13. (a) Define environmental pollution. (2 marks)

(b) State **six** primary causes of water pollution. (6 marks)

(c) Explain **six** negative effects of environmental pollution on human health. (12 marks)

14. (a) Describe the process of ecological succession. (8 marks)

(b) Describe **six** abiotic factors that can affect the distribution of organisms in the ecosystem. (12 marks)

15. (a) Define the term 'evolution' as used in biology. (2 marks)

(b) Explain how each of the following evidence supports the theory of evolution:

(i) fossils; (8 marks)

(ii) embryology. (8 marks)

(c) Describe the mechanism of natural selection in the theory of evolution. (2 marks)

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