2922/103
ENVIRONMENTAL BIOLOGY
Oct./Nov. 2022
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 the pages are printed as indicated and that no questions are missing.

SECTION A (40 marks)

Answer ALL questions in this section.

1. Draw a labelled diagram describing mitochondrion organelle. (4 marks)

2. Distinguish between rough endoplasmic reticulum (RER) and smooth endoplasmic reticulum (SER). (4 marks)

3. State **four** functions of Golgi apparatus in human cells. (4 marks)

4. Name the **four** organic bases which constitute the ribonucleic acid. (4 marks)

5. (a) Define the term 'homeostasis'. (2 marks)

   (b) Describe the importance of maintaining a constant body temperature in the human body. (2 marks)

6. State **four** ways through which animals lose heat from their bodies. (4 marks)

7. Describe the binomial nomenclature of organisms according to Linnaeus. (4 marks)

8. Differentiate between abiotic and biotic factors in ecology. (4 marks)

9. State characteristics of hormones secreted by the endocrine glands used in nervous coordination. (4 marks)

10. Construct a food chain of the organisms; frog, cricket, grass and raccoon in the ecosystem. (4 marks)

SECTION B (60 marks)

Answer any THREE questions from this section.

11. (a) State **six** differences between prokaryotic cells and eukaryotic cells. (12 marks)

    (b) Explain **four** ways by which human body loses heat in a hot environment. (8 marks)

12. (a) Explain **five** reasons for assigning scientific names to organisms. (10 marks)

    (b) State **five** advantages and **five** disadvantages of artificial system of classification. (10 marks)

13. (a) Explain six proposals on Charles Darwin's theory that evolution occurred as a result of natural selection. (12 marks)

(b) Explain the weakness of Charles Darwin's theory of evolution. (2 marks)

(c) State six applications of fossil records as evidence of evolution. (6 marks)

14. (a) Outline the process of regulating blood glucose levels in humans. (12 marks)

(b) State **four** factors which lead to depletion of glucose in the human blood. (4 marks)

(c) Describe the conditions in humans which result from:

(i) elevated blood sugar level; (2 marks)
(ii) decreased blood sugar level. (2 marks)

15. (a) (i) Define 'aquatic ecosystem'. (2 marks)
(ii) Describe the three fresh water ecosystems. (6 marks)
rivers

(b) (i) Define 'food web'. (2 marks)
(ii) Construct a food web of the organisms; wheat plants, earthworms, mice, hawks and song birds in an ecosystem. (6 marks)
(iii) State **four** characteristics of the food web constructed in (ii) above. (4 marks)

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