2528/303
2922/303
ENVIRONMENTAL BIOCHEMISTRY AND TOXICOLOGY
June/July 2018
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY

MODULE III

ENVIRONMENTAL BIOCHEMISTRY AND TOXICOLOGY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this exa
Answer booklet;
Non-programmable 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** 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** the questions in this section.*

1. Define the following terms as used in toxicology:

   (a) toxicity; (2 marks)

   (b) toxic effects. (2 marks)

2. State **four** physical forms of toxicants. (4 marks)

3. List any **four** effects of lead exposure to humans. (4 marks)

4. Name **four** malformations in children associate with Thalidomide used to manage morning sickness of expectant women. (4 marks)

5. State **four** processes that determine the amount of chemical reaching the target site in human beings. (4 marks)

6. List **four** classes of fatty acids . (4 marks)

7. Draw a labelled diagram of a setup used in paper electrophoresis. (4 marks)

8. Draw the structural formula of the following amino acids:

   (a) glycine; (2 marks)

   (b) alanine (2 marks)

9. Differentiate between essential and non-essential amino acids. (4 marks)

10. List **four** fat-soluble vitamins. (4 marks)

SECTION B (60 marks)

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

11. (a) Define the term 'selective toxicity' as used in toxicology. (2 marks)

    (b) Describe the **three** categories of repeated exposure to toxicants. (6 marks)

    (c) Describe **four** routes of toxicant exposure to animals. (12 marks)

12. (a) Explain **seven** factors that can affect severity of toxins in humans beings. (14 marks)

(b) Describe the following toxico-kinetic processes:

(i) distribution; (2 marks)

(ii) biotransformation; (2 marks)

(iii) excretion. (2 marks)

13. (a) Define the term risk as used in toxicology. (2 marks)

(b) Explain the **four** steps of assessing risks in toxicology. (12 marks)

(c) Explain the **three** processes that toxins undergo in an organism before it is released to the environment. (6 marks)

14. (a) Describe the following classes of lipids:

(i) simple lipids; (2 marks)

(ii) complex lipids; (2 marks)

(iii) derived lipids. (2 marks)

(b) Describe **seven** general functions of lipids. (14 marks)

15. (a) Describe **six** differences between glycolysis and Krebs cycle. (12 marks)

(b) Explain the **four** classes of carbohydrates. (8 marks)

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