

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 examination:

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)
Factors of effect: 1. Dose, 2. Route, 3. Duration, 4. Susceptibility, 5. Genetic factors, 6. Age, 7. Nutrition, 8. Health status
- (b) Describe the following toxicokinetic 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; \rightarrow simple (2 marks)
 (ii) complex lipids; (2 marks)
 (iii) derived lipids; \rightarrow are formed from *hydrolysis or some of their lip* (2 marks)
- (b) Describe seven general functions of lipids. (14 marks)
lipid functions
15. (a) Describe six differences between glycolysis and Krebs cycle. (12 marks)
 (b) Explain the **four** classes of carbohydrates. (8 marks)

oligosaccharides
polysaccharides
Monosaccharides

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