

Name: \_\_\_\_\_ Index No: \_\_\_\_\_  
 25/28/303 Candidate's Signature: \_\_\_\_\_  
 29/22/303 ENVIRONMENTAL TOXICOLOGY AND BIOTECHNOLOGY  
 Oct/Nov 2014 Date: \_\_\_\_\_  
 Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL  
**DIPLOMA IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY**  
**MODULE III**

ENVIRONMENTAL TOXICOLOGY AND BIOTECHNOLOGY

3 hours

**INSTRUCTIONS TO CANDIDATES**

Write your name and index number in the spaces provided above.  
 Sign and write the date of the examination in the spaces provided above.  
 You should have a non-programmable scientific calculator for the 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 spaces provided in this question paper.  
 Each question in section A carries 4 marks, while each question in section B carries 20 marks.  
 Candidates should answer the questions in English.

For Examiner's Use Only

SECTION A										Total	
Question No	1	2	3	4	5	6	7	8	9		
Candidate's score											

SECTION B					Total	Grand Total
Question No	11	12	13	14		
Candidate's score						

This paper consists of 16 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 in the spaces provided

Define the following terms:

(a) a dose;

(1 mark)

(b) succinate

(1 mark)

(c) ...

(1 mark)

(d) enzymes

(1 mark)

2. Explain how biotransformation occurs in the liver.

(4 marks)

3. During routine urine analysis of some factory workers, protein was detected in some workers' urine. List 4 reasons for this result.

(4 marks)

4. Name any four factors affecting distribution of chemicals in the body.

(4 marks)

5. Explain the term 'threshold dose'.

(4 marks)

6. Write the general formulae for the following classes of monosaccharides:

(a) ketoses;

(1 mark)

(b) tetroses;

(1 mark)

(b) enzymes

7. Explain any two ways which metals can be used as a diagnostic reagent activity (4 marks)

8. Differentiate between equilibrium and shift from (4 marks)

Chemical equilibrium is a state of dynamic equilibrium where the forward and reverse reactions occur at equal rates.

Le Chatelier's principle states that if a system at equilibrium is subjected to a change in concentration, temperature, or pressure, the system will adjust itself to counteract the effect of the change.

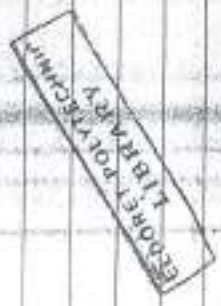
9. Health workers on a visit to a refugee camp find out that the children suffer from (4 marks)

Describe any two eye defects these children are suffering from.



2528/303  
2922/303

10. Explain how to identify non-reducing sugar in a food sample. (4 marks)



SECTION B (60 marks)

Answer any THREE questions from this section in the spaces provided after question 15.

11. (a) Describe how a change in primary protein structure can alter the quaternary protein structure in serpin. (8 marks)

(b) Explain transmission process. (12 marks)

12. (a) A laboratory sample is suspected to contain fat. Describe the Grease-spot test to determine the presence of fat in the sample. (6 marks)

(b) Describe the urea cycle. (14 marks)

13. (a) Explain why Dichlorodiphenyltrichloroethane (DDT) used in control mosquitoes in a carefully regulated manner so that it will not be washed by waters and kill fish and other wildlife in trophic level, but predatory birds were killed with time. (5 marks)

(b) Using a labelled diagram, describe paper electrophoresis. (15 marks)

14. (a) Explain the effects of toxicants on lungs. (8 marks)

(b) Describe four routes of exposure of toxicants to an industrial worker. (17 marks)

15. (a) Describe how the bark of a pine tree can be used as a biomarker to monitor pollutants in the environment. (10 marks)

(b) Explain the health effects of lead toxicant to humans. (10 marks)

2528/303  
2922/303