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Name: _____
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ENVIRONMENTAL BIOCHEMISTRY
AND TOXICOLOGY
Oct./Nov. 2013
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY
MODULE III
ENVIRONMENTAL BIOCHEMISTRY AND TOXICOLOGY
3 hours

Index No: _____
Candidate's Signature: _____
Date: 3 MAY 2013

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 non-programmable scientific calculator for this examination.
This paper consist of TWO sections, A and B.
Answer ALL 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.

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SECTION A

Questions	1	2	3	4	5	6	7	8	9	10	TOTAL SCORE
Candidate's Score											

For Examiner's Use Only

SECTION B

Question	11	12	13	14	15	Total
Candidate's Score						
GRAND TOTAL						

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.

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Turn over

SECTION A (40 marks)

Answer ALL questions in this section in the spaces provided.

1. Define the following terms:

(a) toxicant

substance causing damage to poisoning

(2 marks)

(b) toxicity

degree to which a toxic substance will harm
a cell or organism

(2 marks)

2. List four absorption mechanisms of toxins across barriers.

(4 marks)

3. Distinguish between dose response and dose effect.

(4 marks)

4. Name any four organs of excretion of toxicants in the body.

(4 marks)

kidney
lungs
liver

5. (a) Define biotransformation in human body.

(2 marks)

(b) Identify any two effects of biotransformation.

(2 marks)

6. Describe the two main classes of monosaccharides.

(4 marks)

Allosar
ketosar

Define the following terms:

(a) reducing sugar

cause reduction

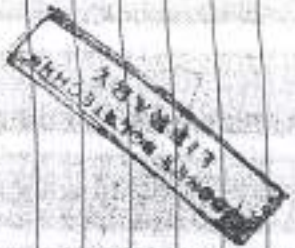
(2 marks)

(b) non-reducing sugar

(2 marks)

- (ii) Draw the dose response curve for the chemical. (4 marks)
 - (iii) Use the dose response curve to (i) determine the LD50 (2 marks)
 - (iv) Given a dose value of 1.25, determine the response value. (5 marks)
14. (a) Distinguish between anaerobic and aerobic processes. (4 marks)
- (b) Describe the process of glycolysis starting with glucose molecule. (8 marks)
- (c) Explain how sugar levels are regulated in human body. (8 marks)
15. (a) Describe the procedure for Jugular Vein blood sample collection. (8 marks)
- (b) Explain the trophic level transfer of pesticides using DDT and fish eagle as an example. (12 marks)

Insulator - Yucca
 Glutagon - lower
 Comprehension - Measure, Record and Evaluation.



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Draw the structures of the following molecules:

(a) glycine:



(2 marks)

(b) lysine:



(2 marks)

Differentiate between oils and fats

Oils are liquid at room temperature while fats are solid

(4 marks)

Oil are from vegetable source while fats are from animal

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10. State any four factors affecting enzyme activity.

(4 marks)

pH
 Substrate concentration
 Enzyme concentration
 Temperature

SECTION B (60 marks)

11. Answer any THREE questions from this section in the spaces provided after question 11.

(a) Table I shows some vitamins and their functions, but not matched. Identify the function of each of the vitamins. (8 marks)

Vitamin	Function
D	• Act as co-factor for specific carboxylation reactions • Offers resistance to infections
A	• Improve iron absorption • Blood clotting
K	• Keep normal calcium and phosphorus level in the body • New cell growth
C	• Aid in vision • Supports cell function

(b) Identify any six deficiency symptoms of vitamins in human beings. (6 marks)

Marasmus, Kwashiorkor, Pellagra, Beriberi, Rickets, Scurvy

(c) Describe a method of determining the presence of vitamin C in an orange fruit. (6 marks)

(i) Explain the transformation of amino acids. (8 marks)

(ii) cell fractionation; (6 marks)

(iii) membrane separation. (6 marks)

Differentiate between acute exposure and chronic exposure. (4 marks)

Table II shows dose response relationship of a chemical administered to 250 laboratory animals.

Group	Dose	Response	% Response
1	25	0	
2	50	100	
3	75	175	
4	100	225	
5	150	250	

(i) Complete the table above by determining the percentage response of the animals. (5 marks)