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 2528/303  
 ENVIRONMENTAL  
 BIOCHEMISTRY AND  
 TOXICOLOGY  
 November 2012  
 Time: 3 hours



Index No. 15250110005 JAC 3  
 Candidate's Signature [Signature]  
 Date 21/11/2012

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

INSTRUCTIONS TO CANDIDATES

3 hours

Write your name and index number in the space provided above.  
 Write the date of the examination and sign 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 questions in section A and any THREE questions from section B in the spaces 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 indicated.



SECTION A

For Examiner's Use Only

Question	1	2	3	4	5	6	7	8	9	10	TOTAL
Marks											

SECTION B

Question	11	12	13	14	15	TOTAL
Marks						
GRAND TOTAL	[ ]					

This paper consists of 16 printed pages.

Cand. Jdcs 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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SECTION A1 (40 marks)

Answer ALL questions from this section.

1. Define the term Absorption as used in toxicology.

It is a process whereby the substance moves into the body.

(2 marks)

(b) Name any two routes of exposure to toxicants.

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(2 marks)

2. State four absorption mechanisms of toxicants into the body.

- Absorption through the mouth
- Absorption through skin (dermal)
- Inhalation
- Injection

(4 marks)

3. Name any four ways by which toxicants are removed by the human body.

- Urine
- Faeces
- Sweat
- Milk

4. Define the following terms:

(a) toxicology:

Study of various effects of chemicals on living things.

(2 marks)

(b) biochemistry:

It is the study of chemicals in the human body.

(2 marks)

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5. Name any four classes of pesticides.

(4 marks)

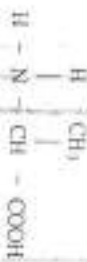
6. Distinguish between Epimers and isomers.

(4 marks)

Epimers (single bond) differ from one another in relation to their configuration around a single carbon atom. Isomers are of 2-dimolar compounds with the same molecular formula but with different structures.

Using the two amino acids below, illustrate the formation of a peptide bond.

(4 marks)



8. Define the following terms:

(a) decarboxylation:

Removal of an amino group from a compound.

(2 marks)

(b) denaturation:

Removal of an amino group from a compound.

(2 marks)

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9. Distinguish between a hazard and a risk. (4 marks)

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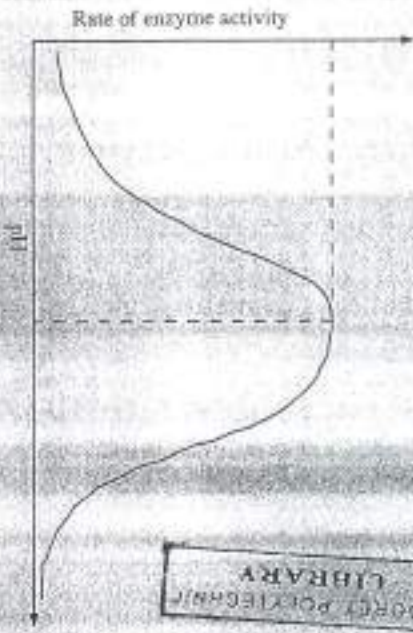
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(4 marks)

10. The figure below shows the effect of pH on the rate of enzyme activity.



From the figure, explain how pH affect the rate of enzyme activity. (4 marks)

enzyme function are most efficient at a narrow range of pH. Increase in pH increases acidity and vice versa.

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SECTION B: (60 marks)

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

11. (a) Identify any four characteristics of living organisms. (4 marks)  
 (b) Explain any four biological functions of Lipids. (8 marks)  
 (c) Explain any four effects of high cholesterol in human body. (8 marks)

12. (a) Explain Kjeldahl method of determining quantity of amino acid in a food sample. (12 marks)

(b) Explain the four criteria for classifying monosaccharides. (8 marks)  
 (c) Explain the mechanism of enzyme action. (8 marks)

(i) temperature; (4 marks)

(ii) substrate concentration; (4 marks)

(iii) enzyme concentration. (4 marks)

14. (a) Describe Electrophoresis technique of separation. (8 marks)

(b) Describe the movement of chemicals in the following environmental compartments: (4 marks)

(i) air; (4 marks)

(ii) soil; (4 marks)

(iii) water; (4 marks)

15. (a) Describe how to determine Biochemical Oxygen Demand (BOD). (8 marks)

(b) Explain any six effects of toxicants on organ systems. (12 marks)

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