

**CHUKA**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE**

**BIOC 314: ENVIRONMENTAL BIOCHEMISTRY**

**STREAMS: BSc BIOC**

**TIME: 2 HOURS**

**DAY/DATE: THURSDAY 13/04/2023**

**2.30 P.M. – 4.30 P.M.**

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**INSTRUCTIONS**

Answer all questions in section A and any **TWO** questions in section B.

Do not write anything on the question paper

**Section A (30 MARKS): ANSWER ALL QUESTIONS**

**QUESTION ONE (COMPULSORY) 30 MARKS**

- a) Differentiate between methanogenic and methanotrophic bacteria with their applications (4 marks)
- b) Explain the health complications associated with dioxin pollution (5 marks)
- c) Describe degradation process of cellulose (6 marks)
- d) i) List any six sources of organic pollutants (3 marks)  
ii) Distinguish between bio-stimulation and bio-attenuation (2 marks)
- e) Outline sources of chlorofluorocarbons (CFC) (3 marks)
- f) List any two methods used to evaluate the decomposition rate (2 marks)
- g) State six factors affecting decomposition/bio-degradation of organic matter (3 marks)
- h) Highlight effects of organic pollutants in the ecosystem (2 marks)

**SECTION B (40 MARKS): ANSWER TWO QUESTIONS**

**QUESTION 2 (20 MARKS)**

- a) Discuss microbial enzymes used in degradation of organic matter (6 marks)
- b) Explain pollution pathways in which chemicals from soil, water and air sources are transmitted into an organism (4 marks)
- c) Using the Sulphur cycle, illustrate how different bacteria utilize Sulphur compounds (10 marks)

**QUESTION 3 (20 MARKS)**

- a) With illustration, describe microbial transformation of nitrogen (10 marks)
- b) Explain the microbial transformations in phosphorus compounds (5 marks)

**QUESTION 4 (20 MARKS)**

- a) With illustration, describe microbial transformation of carbon (10 marks)
  - b) With illustration, describe microbial transformation of metals and metalloids (10 marks)
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