CHUKA UNIVERSITY

**UNIVERSITY EXAMINATIONS.**

**THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN BIOCHEMISTRY**

**BIOC 314: ENVIRONMENTAL BIOCHEMISTRY**

**STREAMS: BS.c (BIOCHEMISTRY)** **TIME: 2 HOURS**

**DAY/DATE: WEDNESDAY 10/04/2019** **8.30 A.M - 10.30 A.M.**

**INSTRUCTIONS:**
Answer Question ONE and any other TWO Questions
Do not write anything on the question paper

**QUESTION ONE: [30 MARKS]**

a) Name two coenzymes involved in biotransformation through alkylation of metals and metalloids. [2 Marks]

b) Define the following terms [9 Marks]
   i. Environmental contaminants
   ii. Environmental contamination
   iii. Bioconcentration
   iv. Biomagnification
   v. Nitrification
   vi. Denitrification

c) State four categories of methanogens and two characteristics that distinguish them from each other and other classes. [6 Marks]

d) Name one bacteria that utilize hydrocarbon as a source of energy, why it is unique, and what are the three intermediates in the microbial oxidation of methane to carbon dioxide. [5 Marks]

e) Differentiate between dissimilatory nitrate reduction and assimilatory nitrogen reduction processes. Why are the two processes important? [8 Marks]

**QUESTION TWO: [20 MARKS]**

Discuss in details the key steps considered in the determination of the potential environmental contaminants. [20 Marks]

**QUESTION THREE: [20 MARKS]**

Describe in details the criteria for determining if a site is a source or a sink of Nitrogen in the landscape outlining the major determinants as per Groffman, 2000. [20 Marks]

**QUESTION FOUR: [20 MARKS]**

Phosphorus is only second to nitrogen as an inorganic nutrient required by both plants and microorganisms. Phosphate constitutes nearly 0.1% of the earth's crust. Describe the following microbial transformation processes of organic Phosphorus

a. Mineralization [8 Marks]
b. Immobilization [3 Marks]
c. Oxidation-reductions [9 Marks]

**……...……...……...**