CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

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

BIOC 314: ENVIRONMENTAL BIOCHEMISTRY

STREAMS: BSC (BIOC) **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 15/04/2020 **2.30 P.M. – 4.30 P.M.**

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE (COMPULSORY) – 30 MARKS

(a) Explain the drawbacks and benefits associated with the use of extracellular enzymes in bioremediation. [5 marks]

(b) Describe the health complications associated with dioxin pollution. [5 marks]

(c) Define freons and give their major sources. [5 marks]

(d) (i) List any 6 sources of heavy metal pollutants. [3 marks]

(ii) Distinguish between bioaccumulation and biomagnification. [2 marks]

(e) Describe the process of production of methane from bicarbonate by Methanosarcina barkeri and its link with ATP production. [5 marks]

(f) Explain any five advantages of anaerobic waste treatment process. [5 marks]

QUESTION 2 (20 MARKS)

(a) Explain the different forms of bioremediation. [8 marks]

(b) Explain entrophication of water. [2 marks]

(c) Using the sulphur cycle, illustrate how different bacteria utilize sulphur compounds. [10 marks]

QUESTION 3 (30 MARKS)

(a) Describe microbial transformation of nitrogen. [10 marks]

(b) List the main aquatic environment pollutants. [5 marks]

(c) Describe the five steps of in situ bioremediation. [5 marks]

QUESTION 4 (20 MARKS)

(a) List the routes of exposure of persistent organic pollutants. [4 marks]

(b) Explain bioremediation of heavy metals by physio-biochemical mechanism. [8 marks]

(c) Describe anaerobic microbial catabolism of toluene to benzyl-CoA. [8 marks]
