

**W1-2-60-1-6**

**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2019/2020**

**SECOND YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN SOIL, WATER AND ENVIRONMENTAL ENGINEERING**

**SBT 2312: APPLIED ENVIRONMENTAL MICROBIOLOGY**

**DATE: DECEMBER, 2019 TIME: 2 HOURS**

INSTRUCTIONS: ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

**QUESTION ONE: 30 MARKS**

a. Explain the importance of BOD in testing water quality. (3 marks)

b. Explain the concept of biofilm formation. (3 marks)

c. Illustrate the three groups of microbes based on temperature. (3 marks)

d. Explain the challenge of culturing psychrophiles in the laboratory. (3 marks)

e. Outline characteristics of biogeochemical cycles. (3 marks)

f. Distinguish between bioaccumulation and biomagnification. (3 marks)

g. Explain the role of *thiobacillis thiooxidans* in sulfur cycling. (3 marks)

h. Describe the three zones of an aquatic ecosystem (3 marks)

i. Describe the primary participants in the carbon cycle. (3 marks)

j. Briefly describe the role of microorganisms in soil. (3 marks)

**QUESTION TWO: 20 MARKS**

a. Discuss economically important microorganisms of extreme environments. (12 marks)

b. Describe the “Microbial loop” with respect to the aquatic ecosystem.(8 marks)

**QUESTION THREE: 20 MARKS**

Discuss the nitrogen cycle.

**QUESTION FOUR: 20 MARKS**

Discuss microbial interactions.