



UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

**FOURTH YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE
IN MICROBIOLOGY AND BIOTECHNOLOGY, BACHELOR OF SCIENCE,
BACHELOR OF SCIENCE IN BIOLOGY AND BACHELOR OF EDUCATION
(SCIENCE)**

SBT 402: MICROBIAL ECOLOGY

DATE: APRIL 3, 2018

TIME: 2:00 – 4:00 PM

INSTRUCTIONS: Answer ALL Questions from SECTIONS A and B, and ONE Question selected from Section C.

SECTION A: Multiple Choice Questions (1 Mark each)

Please tick in the box opposite the correct answer.

1. Autotrophic organisms use _____ for growth:

- Hydrogen
- Oxygen
- Carbon dioxide
- Nitrogen

2. In commensalism, _____.

- both species benefit
- only one species benefits
- none of the species benefits
- one of the species is harmed



3. Fungi are mainly _____.

- Saprophytes
- Parasites
- Primary producers
- Lithotrophs

4. Rates of microbial activities in an ecosystem are controlled by _____.

- Lithotrophy
- Organotrophy
- Photrophy
- Nutrients and growth conditions

5. In _____ two or more organisms cooperate in anaerobic degrading an organic compound.

- Methanogenesis
- Acetogenesis
- syntrophy
- Nitrification

6. _____ is the conversion of organic N to inorganic forms

- denitrification
- nitrification
- mineralization
- immobilization

7. Phosphorous is mainly absorbed into living systems as _____.

- organic phosphate
- inorganic phosphate
- dissolved phosphate
- none of the above

8. Methanogens require _____ for growth.

- sugars
- humus
- carbon dioxide
- oxygen

9. Chemotaxis in bacteria refers to _____.
- movement in response to a chemical stimuli
 - escape from predation
 - adaptation to changing conditions
 - preparation for cell division
10. The major role of heterotrophs in the ecosystem is _____.
- predation.
 - organic matter decomposition.
 - to cause plant diseases
 - none of the above
11. The major constituent of living cells is
- DNA
 - carbon
 - nitrogen
 - iron
12. *Agrobacterium tumefaciens* causes _____ in plants.
- leaf diseases
 - crown gall tumors
 - early flowering
 - nodule formation
13. Nitrogenase enzyme is sensitive to _____.
- Water
 - Oxygen
 - Hydrogen
 - Temperature
14. _____ Serves as a link between the carbon and nitrogen cycles.
- Glycolysis
 - Sulfur metabolism
 - TCA cycle
 - Methanogenesis

15. Rhizosphere microbes derive _____ from plants.

- enzymes
- sugars
- water
- oxygen

16. _____ is a term that refers to bacteria that attack insects.

- Predators
- Entomopathogens
- Bacillus
- Baculovirus

SECTION B: SHORT ANSWER QUESTIONS (5 Marks Each)

Your answers should be brief and to the point (Use the examination answer book provided)

17. Explain the nutritional types of microorganisms in an ecosystem.
18. Discuss briefly the role of chemical decomposers in soil.
19. Outline the importance of mycorrhiza in soil fertility.
20. Describe the mode of action of *Beauveria bassiana*.
21. Explain how sulfur transformation occurs in nature.
22. Outline the steps in root nodule formation.

SECTION C: ESSAY QUESTIONS (25 Marks Each)

Write an essay on any ONE of the following topics (Use the examination answer book provided)

23. Nitrogenase enzyme is at the core of Biological Nitrogen fixation. Discuss this statement.
24. Give an account of microbial interactions in an ecosystem.
25. A Research laboratory has given you the role of the Laboratory manager in charge of microbiological quality testing. Explain how you would help control microbial growth in the laboratory setting.

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