

Seat No. : \_\_\_\_\_

**JK-108**

January-2021

B.Sc., Sem.-V

**305 : Microbiology  
(Environmental Microbiology)  
(New Syllabus)**

**Time : 2 Hours]**

**[Max. Marks : 50**

- Instructions :**
- (1) Students should write the answers from the question paper applicable to them; either "NEW COURSE" or "OLD COURSE" and it must be mentioned at the beginning of the answer paper.
  - (2) Answer any **three (3)** questions out of **eight (8)** questions. Question No. 9 is compulsory.
  - (3) Draw figures wherever necessary.
  - (4) Figures to the right indicate marks.

1. List the different microbial habitats and describe the environment of soil and water as microbial habitats. 14
2. (A) What are biofilms ? How biofilms are formed capsules ? Explain the role of capsules in biofilm formation. 7  
(B) Describe movement of microorganisms between ecosystems and discuss its significance. 7
3. Describe the process of symbiotic and non-symbiotic nitrogen fixation and differentiate between both the processes. 14
4. (A) Rumen is a complex microbial ecosystem. Justify 7  
(B) Describe methane based mutualism. 7
5. Define xenobiotic and recalcitrant compounds. Explain the role of microorganisms in degradation of environmental pollutants. 14
6. (A) How microorganisms play role in reduction of BOD and recycling of waste water ? 7  
(B) How the waste can be treated anaerobically ? Describe the mechanism and the types of organisms involved in anaerobic sludge digestion. 7

7. Describe pesticides and polymers as microbial products. 14
8. (A) List out the products produced by microorganisms and their role in enhanced oil recovery. 7  
(B) Define acidophiles and describe their role in leaching of copper. 7
9. Give short and specific answers in 1-2 lines only : (any eight) 8
- (1) Define ecological niche.
  - (2) What is consortia ?
  - (3) Give two examples of halophiles.
  - (4) Define barophiles.
  - (5) Which product is produced from degradation cellulose by microbes.
  - (6) Give two examples of soil microorganisms which can utilize carbon dioxide.
  - (7) Give examples of two organisms used in geochemical process.
  - (8) Give two examples of lignin degrading bacteria.
  - (9) Define lichen.
  - (10) Give full form of waste treatment method RBC.
  - (11) What is eutrophication ?
  - (12) Why coliforms are use as indicators of water pollution ?
  - (13) What is bioremediation ?
  - (14) Name two ethanol producing bacteria.
  - (15) Give two examples of biogas producing microorganisms.
  - (16) Give two limitations of *in situ* bioremediation.
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1. Discuss conditions of soil responsible for establishment of diverse microbial flora in detail. 14
2. (A) Describe the structure and composition of soil. 7  
(B) Explain the role of microorganisms in degradation of animals and plants components in soil. 7
3. Explain microbial interactions with suitable examples of beneficial and harmful co-existence of microbes in soil. 14
4. (A) Describe the occurrence of VAM fungi and AM fungi and their importance. 7  
(B) Discuss the significance of microorganisms associated with rhizosphere and root surfaces. 7
5. Discuss types and mode of action of biofertilizers with merits and demerits in detail. 14
6. (A) Write a note on Entomopathogenic fungi. 7  
(B) Describe the factors affecting soil fertility. 7
7. Discuss types of plant pathogens. 14

8. (A) Explain the importance of disease resistant plants with examples. 7  
(B) Write a short note on transmission of microbial plant diseases. 7
9. Give short and specific answers in 1-2 lines only : (any eight) 8
- (1) What is soil aggregation ?
  - (2) Name two microorganisms that degrade lignin.
  - (3) Give two examples of proteolytic fungi.
  - (4) Define actinomycetes.
  - (5) What is phylloplane ?
  - (6) What is neutral interaction ?
  - (7) Define rhizosphere.
  - (8) Name one bacteria which produce plant hormone.
  - (9) Define mineralization.
  - (10) Give two disadvantages of biological control of plant pathogens.
  - (11) Give two examples of nitrogen fixers.
  - (12) Give full form of PGPR.
  - (13) Give one example of insect pathogenic virus.
  - (14) Which bacteria is responsible for citrus canker in lemon ?
  - (15) Name any fungal pesticide.
  - (16) Name any plant disease caused by fungi.
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