Progressive Education Society's
Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16
End Semester Examination: Oct. 2023
Faculty: Science and Technology

Program: BScGen03 **Semester: V** **SET: A**
Program (Specific): BSc. Microbiology **Course Type: DSEC**
Class: T.Y. B.Sc. **Max.Marks: 35**
Name of the Course: Marine Microbiology
Course Code: 24-MB-3510 **Time: 2Hr**
Paper: X

Instructions to the candidate:

1) ***There are 4 sections in the question paper. Write each section on separate page.***
2) ***All Sections are compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw a well labelled diagram wherever necessary.***

SECTION: A

Q1) Multiple Choice Questions (MCQs) **5X1 = 5 Marks**

I. Which of the following is a characteristic feature of estuaries?
A) High salinity and pressure B) High biodiversity and nutrient-rich waters
C) Extreme cold temperatures D) Low nutrient availability and high salinity

II. Which habitat is characterized by high biodiversity and complex structures created by marine organisms?
A) Mangroves B) Coral reefs
C) Salt marshes D) Deep sea

III. What does VBNC stand for in microbial ecology?
A) Viable but Not Cultured B) Very Big Number of Cells
C) Variable but Not Controllable D) Viable but Non-Culturable

IV. Which of the following environments is typically inhabited by thermophilic microorganisms?
A) Desert sands B) Hot springs
C) Deep-sea trenches D) Coral reefs

V. How do extremophiles adapt to extreme temperatures?
A) By producing heat-shock proteins and stabilizing cellular structures.
B) By lowering their metabolic rate and energy consumption.
C) By altering their membrane lipids to be less flexible and fragile.
D) By increasing their water content and salt concentrations.

Q2) Answer any FOUR of the following **4X1 = 4 Marks**

I. Explain the main characteristic of mangroves.
II. Name one role of salt marshes in coastal ecosystems.
III. Identify the type of marine habitat associated with high temperatures and volcanic activity.
IV. Define marine snow?
V. Enlist primary characteristic of psychrophiles.
VI. Explain the features that characterize the Southern Ocean.

SECTION: B

Q3) Answer any FOUR of the following **4X2 = 8 Marks**

I. Explain the significance of estuaries in marine ecosystems.
II. State the primary function of a box corer in sediment sampling.
III. How does the concept of VBNC affect our understanding of microbial diversity?
IV. Describe the adaptations of extremophiles to high-pressure environments.
V. How do Archaea differ from Bacteria in their ecological niches?
VI. List the advantages of using microorganisms for the bioremediation of heavy metals?

SECTION: C

Q4) Answer any FOUR of the following **4X2 = 8 Marks**

I. Describe the role of microorganisms in hydrocarbon degradation.
II. Discuss the impact of marine snow on deep-sea ecosystems.
III. Explain the main differences between mangroves and salt marshes?
IV. Identify and summarize the adaptations that halophilic microorganisms use to survive in high-salinity environments.
V. Give an example and explain briefly about the heavy metal that can be bioremediated?
VI. Discuss the role of extremophiles in understanding early life on Earth.

SECTION: D

Q5) Answer any TWO of the following **5X2 = 10 Marks**

I. Discuss the ecological importance of mangroves and how they contribute to coastal protection and biodiversity.
II. Describe the methods used for sediment sampling in marine environments and their advantages and limitations.
III. Explain the concept of ecological niches for extremophiles and provide examples of their roles in extreme environments.
IV. Discuss the ecological importance of marine fungi and their contribution to the marine food web.

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