



**B. Sc. MICROBIOLOGY
FOURTH SEMESTER
ENVIRONMENTAL MICROBIOLOGY
BMB – 402**

(Use Separate Answer Scripts for Objective & Descriptive)

Duration : 3 hrs.

Full Marks : 70

[PART-A: Objective]

Time : 20 min.

Marks : 20

Choose the correct answer from the following:

1X20=20

- The natural place where the organism or communities live is known as
 - Niche
 - Habit
 - Habitat
 - Biome
- Any features of an organism or its part which enable or adapt it to exist under conditions of its environmental zone is known as:
 - Adaptive variation
 - Adjustment
 - Acclimatization
 - Adaptation
- The quorum sensing signal molecule in gram negative bacteria is
 - Ethyl methyl ketone
 - Acyl homoserine lactone
 - Methyl guanosine
 - Propyl cortisone
- A microbe growing in a functioning refrigerator is probably a
 - Thermophile
 - Hyperthermophile
 - Psychrophile
 - Mesophile
- Siderophores are
 - Organic molecules that help pathogens take up iron
 - Inorganic molecules that help in active transport
 - Toxins that affect gastrointestinal tract
 - Molecules that aid directly in attachment to host cells
- The association which involves the exchange of nutrients between two species is referred to as
 - Mutualism
 - Parasitism
 - Commensalism
 - Antagonism
- Where is ozone concentration highest?
 - Troposphere
 - Stratosphere
 - Biosphere
 - Mesosphere
- Which of the following indicates the correct order of the principal layers of the Earth's atmosphere from top to bottom?
 - Troposphere-Stratosphere-Mesosphere-Thermosphere-Exosphere
 - Exosphere- Thermosphere- Mesosphere- Stratosphere- Troposphere
 - Thermosphere- Stratosphere- Troposphere- Mesosphere- Exosphere
 - Exosphere- Mesosphere- Thermosphere- Stratosphere-

Troposphere

9. Which among the following are included in xenobiotics
- Fertilizers
 - Food additives
 - Environmental pollutants
 - All of the above
10. Xenobiotics are.....
- Another form of antibiotics
 - A form of nutrient
 - Nutrient which kill the gut harmful microbes
 - Anything that is a foreign particle and enter the body through different routes
11. The heme part of Leghemoglobin is synthesized by
- Host plant
 - Bacterium
 - Decomposers
 - Both (a) & (b)
12. Which is the most productive zone in a lake?
- Littoral zone
 - Limnetic zone
 - Profundal zone
 - Benthic zone
13. Which of the test is based on the assumption that no coliform should be present in 100 mL of drinking water?
- Multiple Tube Fermentation Test
 - Presence-Absence Test
 - Colilert Defined Substrate Test
 - Membrane Filter Technique
14. The aromatic chlorinated compounds possessing biphenyl ring are known as
- Organo-nitro compounds
 - PCBs
 - Halogenated aromatic compounds
 - None of the above
15. The most common microbe that degrades parathion is
- Pseudomonas diminuta*
 - Acinetobacter spp.*
 - Pseudomonas oleovorans*
 - Pseudomonas putida*
16. High strength wastewater means waste water having a
- 30-day average concentration of BOD > 300 mgL⁻¹
 - 40-day average concentration of BOD > 300 mgL⁻¹
 - 10-day average concentration of BOD > 800 mgL⁻¹
 - 100-day average concentration of BOD > 500 mgL⁻¹
17. The BOD value for good quality water is
- 5-10 ppm
 - 10-20 ppm
 - 1-2 ppm
 - 30-40 ppm
18. The sequence for biodegradation of organic materials in anaerobic digestion is
- Methanogenesis-Hydrolysis-Acidogenesis
 - Hydrolysis-Acidogenesis-Methanogenesis
 - Methanogenesis-Acidogenesis-Hydrolysis
 - Acidogenesis-Hydrolysis-Methanogenesis
19. Aerobic ponds involve the symbiotic relationship between
- Fungi and yeasts
 - Protozoa and algae
 - Algae and bacteria
 - Bacteria and fungi

20. Which of the following is employed to remove suspended solids in tertiary treatment?
- a. GAC
 - b. Trickling filter
 - c. Activated sludge
 - d. Anaerobic digester

(PART-B : Descriptive)

Time : 2 hrs. 40 min.

Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. Explain the term Quorum sensing in relevance to Biofilm formation. 10
2. Which type of microbes is mostly found in hot spring region or any hydrothermal spring? Discuss briefly the molecular adaptations they exhibit. 2+8=10
3. Briefly define the terminology with a suitable example 2×5=10
(a) Octopine (b) Ammensalism (c) Rhizosphere
(d) Commensalism (e) Antibiosis
4. Explain the terminology droplet nuclei. Discuss briefly the tuberculosis and how is TB disease treated. 2+8=10
5. Explain the types of bioremediation. Mention the names of 5 xenobiotic and their plasmid containing genes in *Pseudomonas* for biodegradation. 5+5=10
6. Describe the distinct zones in lakes with a diagram. Explain the significance of index organisms. 5+5=10
7. Describe the methods to detect the presence of coliforms in water. 10
8. Explain anaerobic digester with a diagram. Describe an aerobic attached growth treatment process with a diagram. 5+5=10

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