

(i) Printed Pages : 3

Roll No.

(ii) Questions : 9

Sub. Code :

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M.Sc. Biotechnology 1st Semester

(2125)

MICROBIAL DIVERSITY AND METABOLISM

Paper-MBIO-103

Time Allowed : Three Hours]

[Maximum Marks : 80

Note :— Attempt *five* questions in total. Question no 1 is compulsory.

Attempt *one* question from each Unit. All questions carry equal marks.

1. (a) Define microbial taxonomy. Explain the concept involved in classifying bacteria using 16S rRNA sequencing.
- (b) Explain the theory of spontaneous generation.
- (c) What is synchronous growth?
- (d) What are mycoplasmas and slime moulds?
- (e) Differentiate between lytic and lysogenic life cycles.
- (f) How do flagella play a role in the motility of bacteria?
- (g) Why do certain antibiotics target cell wall synthesis while others inhibit protein synthesis?
- (h) Explain the microflora of the oral cavity. 8×2

UNIT—I

2. (a) Explain the classification of microorganisms according to Bergey's Manual.
- (b) Write a short note on chemoheterotrophs. 12,4
3. (a) Write a short note on formulating a culture medium for bacterial growth.
- (b) Explain different methods of sterilization of culture medium.
- (c) Why does ribotyping provide more reliable bacterial identification compared to traditional phenotypic methods? 6,6,4

UNIT—II

4. (a) Explain various methods for measurement of bacterial growth.
- (b) Explain the effect of temperature and pH on microbial growth.
- (c) Discuss two methods of preservation of microbes. 5,5,6
5. (a) Discuss carbon fixation in the Calvin cycle.
- (b) Write short notes on :
 - (i) Hyperthermophiles
 - (ii) Acetogenic bacteria 8,8

UNIT—III

6. (a) Discuss the structural differences between Gram-positive and Gram-negative cell walls.
- (b) Describe the process of synthesis of bacterial cell wall. 8,8

7. (a) Classify viruses based on their nucleic acid content with suitable examples.
- (b) Explain the formation and function of endospores.
- (c) Write a short note on viroids and prions. 5,5,6

UNIT—IV

8. (a) Explain the mechanisms of pathogen entry and spread within the host.
- (b) Explain the mechanism of action of sulfa drugs. 12,4
9. (a) Describe how exotoxins and endotoxins differ not only in structure but also in immune response elicitation.
- (b) Discuss the difference between bactericidal and bacteriostatic antibiotics.
- (c) Why do broad-spectrum antibiotics pose a risk for developing resistance and disturbing the microbiome ? 8,4,4