

M.Sc. BIOTECHNOLOGY
First Semester
MICROBIOLOGY
(MBT - 103)

Duration: 3Hrs.

Full Marks: 70

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

Answer any four from Question no. 2 to 8
Question no. 1 is compulsory.

1. What do you mean by alteration of generation? Discuss the life cycle patterns in algae with suitable diagram for each type. (10)
2. Mention the three major steps involved in the bacteriological analysis of water for the determination of fecal coliforms. Discuss briefly the important water borne diseases in man mentioning the causative agents, major symptoms and curative measures for each type. (3+7=10)
3. Discuss the physico-chemical factors that affect microorganisms in soil. (10)
4. Define biofertilizer. Discuss the role of microorganisms in the ecological cycling of Sulphur. (2+8=10)
5. What important purposes a preserved microbial culture serves? Discuss major long term techniques for preserving microbial cultures. (2+8=10)
6. Define microscopy. Write the major differences between optical and electron microscopy. Discuss the principle of image formation in fluorescent microscope. (1+3+6=10)
7. Write the major characteristic features of fungi. Add an explanatory note on dermatological problems in man caused by fungi. (4+6=10)

Or

Define recombination in bacteria. Discuss the process of conjugation in bacteria with suitable diagram. (2+8=10)

8. What is a chemotherapeutic agent? Discuss the inhibitory mechanism different types of chemotherapeutic agents. (2+8=10)

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(PART A - Objective Type)

I. Choose the correct answer:

1×15=15

1. Anammox is a biological process in which _____.
 - a) nitrite and ammonia are converted directly into molecular N₂ gas
 - b) nitrates are converted into molecular N₂ gas
 - c) nitrate is reduced to nitrite
 - d) organic N₂ is converted into ammonium ion
2. Pellicle is present in the algal family _____.
 - a) Euglanophyceae
 - b) Bracillariophyceae
 - c) Rhodophyceae
 - d) Phaeophyceae
3. The fungal cell wall is made up of _____.
 - a) chitin
 - b) glucan
 - c) proteins
 - d) All of the above
4. Penicillin inhibits bacterial growth as _____.
 - a) cell-wall inhibitor
 - b) protein synthesis inhibitor
 - c) membrane transport inhibitor
 - d) DNA inhibitor
5. Keratinophilic nature is characteristic of _____.
 - a) Dermatophytes
 - b) Mycobacteria
 - c) Actinomycetes
 - d) Bacteriophages
6. *Desulfovibrio* is involved in the _____ phase of Sulphur cycle.
 - a) mineralization of organic sulphur
 - b) dissimilatory sulphate reduction
 - c) sulphur oxidation
 - d) assimilatory sulphate reduction
7. Treatment of municipal water supplies is based upon _____.
 - a) coagulation, filtration, chlorination
 - b) chlorination, filtration, coagulation
 - c) filtration, coagulation, chlorination
 - d) coagulation, chlorination, filtration

8. The arrangement, in which flagella are distributed all around the bacterial cell, is known as _____.
- a) lophotrichous b) amphitrichous
c) peritrichous d) monotrichous
9. Water testing relies on the detection of certain indicator organisms _____.
- a) acid-fast bacteria b) bacteroids
c) coliforms d) dinoflagellates
10. _____ is water borne disease.
- a) giardiasis b) aspergilosis
c) Q fever d) dermatophytosis
11. The additional layer formed during the slow sand filtration is known as _____.
- a) flock b) schmutzdecke
c) sediment d) compost
12. Gram positive bacterial cells have a _____
- a) second outer membrane that helps to retain the crystal violet stain
b) multiple layer of peptidoglycan that helps to retain the crystal violet stain
c) thick capsule that traps the crystal violet stain
d) periplasmic space that traps the crystal violet
13. Tuberculosis in man is caused by _____.
- a) Koch's bacilli b) Hansen's bacilli
c) Anthrax bacilli d) Mycobacterium bacilli
14. MPN count of fecal coliforms is done during _____ test.
- a) presumptive b) confirmed
c) completed d) none of the above
15. _____ is a transitional form between eubacteria and actinomycetes.
- a) Mycobacteria b) Dermatophytes
c) Rotavirus d) All of the above

II. Match Column A with Column B:

1×5=5

Column A

Column B

- i. *Sphaerotilus natans*
ii. *Thiomargarita namibiensis*
iii. *Diplococcus pneumoniae*
iv. *Streptomyces venezuelae*
v. *Pseudomonas putida*

- i. Chloramphenicol
ii. Transformation
iii. Superbug
iv. Sewage fungi
v. Largest sized bacteria
