

**M.Sc. BIOTECHNOLOGY**  
**First Semester (Repeat)**  
**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. Define microscopy. Write the major differences between optical and electron microscopy. Discuss the principle of image formation in fluorescent microscope. (1+3+6=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 do you mean by alteration of generation? Discuss the life cycle patterns in algae with suitable diagram for each type. (10)
6. 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)

7. What is a chemotherapeutic agent? Discuss the inhibitory mechanism different types of chemotherapeutic agents. (2+8=10)
8. What important purposes a preserved microbial culture serves? Discuss major long term techniques for preserving microbial cultures. (2+8=10)

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**Duration: 20 minutes**

**Marks – 20**

**(PART A - Objective Type)**

**I. Match Column A with Column B:**

**1×5=5**

<u>Column A</u>	<u>Column B</u>
i. <i>Sphaerotilus natans</i>	i. Chloramphenicol
ii. <i>Thiomargarita namibiensis</i>	ii. Transformation
iii. <i>Diplococcus pneumoniae</i>	iii. Superbug
iv. <i>Streptomyces venezuelae</i>	iv. Sewage fungi
v. <i>Pseudomonas putida</i>	v. Largest sized bacteria

**II. Choose the correct answer:**

**1×15=15**

- Tuberculosis in man is caused by \_\_\_\_\_.  
a) Koch's bacilli                      b) Hansen's bacilli  
c) Anthrax bacilli                      d) Mycobacterium bacilli
- 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
- Anammox is a biological process in which \_\_\_\_\_.  
a) nitrite and ammonia are converted directly into molecular N<sub>2</sub> gas  
b) nitrates are converted into molecular N<sub>2</sub> gas  
c) nitrate is reduced to nitrite  
d) organic N<sub>2</sub> is converted into ammonium ion
- The additional layer formed during the slow sand filtration is known as \_\_\_\_\_.  
a) flock                                      b) schmutzdecke  
c) sediment                                d) compost
- Pellicle is present in the algal family \_\_\_\_\_.  
a) Euglenophyceae                      b) Brachiariophyceae  
c) Rhodophyceae                         d) Phaeophyceae

- Penicillin inhibits bacterial growth as \_\_\_\_\_.  
a) cell-wall inhibitor  
b) protein synthesis inhibitor  
c) membrane transport inhibitor  
d) DNA inhibitor
- Treatment of municipal water supplies is based upon \_\_\_\_\_.  
a) coagulation, filtration, chlorination  
b) chlorination, filtration, coagulation  
c) filtration, coagulation, chlorination  
d) coagulation, chlorination, filtration
- Keratinophilic nature is characteristic of \_\_\_\_\_.  
a) Dermatophytes                      b) Mycobacteria  
c) Actinomycetes                      d) Bacteriophages
- Water testing relies on the detection of certain indicator organisms \_\_\_\_\_.  
a) acid-fast bacteria                      b) bacteroids  
c) coliforms                              d) dinoflagellates
- \_\_\_\_\_ is water borne disease.  
a) giardiasis                              b) aspergilosis  
c) Q fever                                 d) dermatophytosis
- 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.
- The fungal cell wall is made up of \_\_\_\_\_.  
a) chitin                                      b) glucan  
c) proteins                                 d) All of the above
- MPN count of fecal coliforms is done during \_\_\_\_\_ test.  
a) presumptive                              b) confirmed  
c) completed                                d) none of the above
- The arrangement, in which flagella are distributed all around the bacterial cell, is known as \_\_\_\_\_.  
a) lophotrichous                              b) amphitrichous  
c) peritrichous                                d) monotrichous
- \_\_\_\_\_ is a transitional form between eubacteria and actinomycetes.  
a) Mycobacteria                              b) Dermatophytes  
c) Rotavirus                                 d) All of the above

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