

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur  
End Semester Examination (ODD Semester) Winter-2022  
Shri Shivaji Education Society Amravati's  
Science College Congress Nagar Nagpur  
Bachelor of Science (B.Sc.) Semester-I Examination

**MICROBIOLOGY PAPER-II: BASIC TECHNIQUES IN MICROBIOLOGY**

**Time: Three Hours**

**(Maximum Marks: 50)**

Note: (1) All questions are compulsory and carry equal marks.  
(2) Draw diagram wherever necessary.

- 1. Describe various component of Bright field Microscopy with its function and ray diagram. 10
- OR**
- Describe construction, working and limitation of TEM and SEM 10
- 2. Discuss in detail about various theories of staining 10
- OR**
- (a) Describe principle and procedure involved in endospore staining. 5
- (b) Explain the mechanism of acid fast staining. 5
- 3. (a) Write a note on culture collection centres. 2½
- (b) Describe short term preservation method. 2½
- (c) Explain Breed's method. 2½
- (d) Discuss enrichment culture technique 2½
- OR**
- (e) Describe replica plate technique. 5
- (f) Explain how pure culture can be obtained by serial dilution method. 5
- 4. Describe various methods of sterilization using Moist heat. 10
- OR**
- (a) Describe Tyndallization. 2½
- (b) Explain the action of alcohols in controlling microbial population. 2½
- (c) Describe mode of action of chlorine and chlorine compounds as antimicrobial agents. 2½
- (d) Explain the process of incineration and its application. 2½
- 5. Solve any **ten** of the following (1x10)= 10
- (I) Define resolving power of a microscope.
- (II) What is stigmator?
- (III) What is the use of diaphragm?
- (IV) Define mordant and give example.
- (V) Give two examples of acid stains
- (VI) Name any two Gram negative bacteria.
- (VII) What is CFU?
- (VIII) Name any two types of short term preservation methods.
- (IX) What is viable count?
- (X) Define sterilization.
- (XI) What are HEPA filters?
- (XII) What is pasteurization

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**Bachelor of Science (B.Sc.) Semester-III Examination**  
**MICROBIOLOGY PAPER-II: INDUSTRIAL MICROBIOLOGY**

**Time: Three Hours**

**(Maximum Marks: 50)**

**Note:** (1) All questions are compulsory and carry equal marks.  
(2) Draw diagram wherever necessary.

- |    |   |         |
|----|---|---------|
| 1. | Describe in detail isolation of primary screening and secondary screening | 10      |
|    | <b>OR</b>   |         |
|    | Write note on types and parts of fermenter                                | 10      |
| 2. | Describe the Scale up processing in fermenter process.                    | 10      |
|    | <b>OR</b>   |         |
|    | (a) Write note on raw material used for media preparation                 | 5       |
|    | (b) Describe the factors affecting in fermentation process.               | 5       |
| 3. | Describe the harvesting of biomass –method and principle                  | 10      |
|    | <b>OR</b>   |         |
|    | (a) Describe the outline of downstream process.                           | 5       |
|    | (b) Write short note on quality checking.                                 | 5       |
| 4. | Describe in detail the of ethanol production                              | 10      |
|    | <b>OR</b>   |         |
|    | Write short notes on  |         |
|    | a) Spirulina production   | 5       |
|    | b) Penicillin production  | 5       |
| 5. | Solve any <b>ten</b> of the following:                                    | 1×10=10 |
|    | (I) Define industrial microbiology  |         |
|    | (II) Define type of fermenter?  |         |
|    | (III) Write any two industrially important micro organisms.               |         |
|    | (IV) Define scale up process.   |         |
|    | (V) Write note on agitation.  |         |
|    | (VI) Define strain development  |         |
|    | (VII) Write any two raw material use in fermentation process.             |         |
|    | (VIII) What is meant by product recovery?                                 |         |
|    | (IX) Define the biomass.  |         |
|    | (X) What are different raw materials used for ethanol production.         |         |
|    | (XI) Write name of micro-organism use on baker's yeast                    |         |
|    | (XII) Write use of penicillin.  |         |

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**MICROBIOLOGY PAPER-II: BASIC TECHNIQUES IN MICROBIOLOGY**

**Time: Three Hours**

**(Maximum Marks: 50)**

Note: (1) All questions are compulsory and carry equal marks.  
(2) Draw diagram wherever necessary.

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1. Describe in detail principle and advantages of fluorescent microscopy with well labelled ray diagram. 10
- OR**
- (a) Discuss principle and application of phase contrast microscopy. 5  
(b) Describe dark field microscopy. 5
2. Describe principle and procedure of Gram staining. 10
- OR**
- (a) Discuss chemical theory of staining. 5  
(b) Explain mechanism and procedure of negative staining. 5
3. Discuss various methods for isolation of pure culture 10
- OR**
- (a) Describe long term preservation method. 5  
(b) Explain membrane filtration technique for measurement of bacterial growth. 5
4. (a) Discuss various methods of sterilization using dry heat. 5  
(b) Give principle and working of autoclave. 5
- OR**
- (c) What is the mode of action of halogens on microorganism. 2½  
(d) Discuss oligodynamic action of heavy metal. 2½  
(e) Describe various mechanism of cell injury. 2½  
(f) Explain plasmolysis and plasmoptysis. 2½
5. Solve any **ten** of the following. (1x10)= 10
- (I) What is the use of condenser?  
(II) What is shadow casting?  
(III) Define resolving power of a microscope.  
(IV) Define chromophore  
(V) Define endospore.  
(VI) Name any two gram positive bacteria.  
(VII) Who proposed replica plate technique?  
(VIII) Name any two National Culture Collection Centres.  
(IX) What is coulter counter?  
(X) What are iodophores.  
(XI) Define thermal death time.  
(XII) What is sanitizer?

**Bachelor of Science (B.Sc.) Semester-I Examination**  
**MICROBIOLOGY (New)**  
**(Basic Techniques in Microbiology)**  
**Optional Paper—II**

Time : Three Hours]

[Maximum Marks : 50

- N.B. :**— (1) All questions are compulsory and carry equal marks.  
 (2) Draw well labelled diagram wherever necessary.

- |    |  |    |
|----|--|----|
| 1. | Describe the principle and working of TEM with suitable diagram.   | 10 |
|    | <b>OR</b>  |    |
|    | Describe the principle and working of Phase-contrast Microscopy with suitable diagram.                       | 10 |
| 2. | (a) Define stains. Explain types of stains with examples.  | 5  |
|    | (b) Explain the principle and procedure of Gram staining.  | 5  |
|    | <b>OR</b>  |    |
|    | (c) Explain various theories of staining.  | 5  |
|    | (d) Explain the principle and procedure of acid fast staining.   | 5  |
| 3. | (a) Describe pour plate techniques to obtain pure culture.   | 5  |
|    | (b) Explain the auxanographic technique to determine carbon requirements of bacteria with suitable diagrams. | 5  |
|    | <b>OR</b>  |    |
|    | (c) Write a note on Breed method of cell count.  | 5  |
|    | (d) Explain the Replica Plate Method to determine Nitrogen requirements of bacteria with suitable diagrams.  | 5  |
| 4. | (a) What is the concept of microbial death ?   | 2½ |
|    | (b) Discuss the ideal properties of anti-microbial agent.  | 2½ |
|    | (c) Give the mechanism of action of sulphamide.  | 2½ |
|    | (d) Explain the mode of action of Heavy metal with suitable example.   | 2½ |
|    | <b>OR</b>  |    |
|    | (e) Give the characteristics of an ideal disinfectant.   | 2½ |
|    | (f) How cell wall is damaged by antimicrobial agents.  | 2½ |
|    | (g) Give the mechanism of action of chlorine.  | 2½ |
|    | (h) Write a note on Quaternary Ammonium Compounds.   | 2½ |

Micro

5. Solve any ten :

- (i) Define resolving power.
- (ii) What is meant by refractive index ?
- (iii) Name any two oils used in the bright field microscopy while using oil immersion lens.
- (iv) What are chromophores and auxochrome groups ?
- (v) Give any two examples of endospore forming bacteria.
- (vi) Give any two examples of capsulated bacteria.
- (vii) What is pure culture ?
- (viii) Give the name of National Culture Collection Centre.
- (ix) What is multipoint inoculators ?
- (x) Define sanitizer.
- (xi) What are HEPA filters ?
- (xii) Define Cationic detergents.

1×10=10

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**Bachelor of Science (B.Sc.) Semester-I Examination**  
**MICROBIOLOGY (New)**  
**(Basic Techniques in Microbiology)**  
**Optional Paper—II**

Time : Three Hours]

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 (2) Draw well labelled diagram wherever necessary.

1. Describe the principle and working of TEM with suitable diagram. 10

OR

Describe the principle and working of Phase-contrast Microscopy with suitable diagram. 10

2. (a) Define stains. Explain types of stains with examples. 5

(b) Explain the principle and procedure of Gram staining. 5

OR

(c) Explain various theories of staining. 5

(d) Explain the principle and procedure of acid-fast staining. 5

3. (a) Describe pour plate techniques to obtain pure culture. 5

(b) Explain the auxanographic technique to determine carbon requirements of bacteria with suitable diagrams. 5

OR

(c) Write a note on Breed method of cell count. 5

(d) Explain the Replica Plate Method to determine Nitrogen requirements of bacteria with suitable diagrams. 5

4. (a) What is the concept of microbial death ? 2½

(b) Discuss the ideal properties of anti-microbial agent. 2½

(c) Give the mechanism of action of sulphonamide. 2½

(d) Explain the mode of action of Heavy metal with suitable example. 2½

OR

(e) Give the characteristics of an ideal disinfectant. 2½

(f) How cell wall is damaged by antimicrobial agents. 2½

(g) Give the mechanism of action of chlorine. 2½

(h) Write a note on Quaternary Ammonium Compounds. 2½

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**MICROBIOLOGY (New)**  
**(Basic Techniques in Microbiology)**  
**Optional Paper—II**

Time : Three Hours]

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