

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 224

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Unique Paper Code : 2163012004

Name of the Paper : Industrial and Environmental Microbiology

Name of the Course : **B.Sc. (Hons.) Botany - DSE**

Semester : IV

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **four** questions in all.
3. Question No. **1** is compulsory.
4. **All** parts of a question must be answered together.
5. Draw well-labelled diagrams wherever necessary.

Q1. (a) Expand the following (**Any five**)

1 × 5 = 5 marks

- i. IMTECH
- ii. GRAS
- iii. 6-APA
- iv. PDA
- v. NCIM
- vi. HFCS
- vii. EMB

(b) Define the following (**Any five**)

1 × 5 = 5 marks

- i. Penicillin acylase
- ii. Cell disruption
- iii. Bioreactor
- iv. Microbial enzymes
- v. Sparger
- vi. Selective medium
- viii. Air lift fermenter

P.T.O.

(c) Read the following sentence carefully and write True or False (**Any five**)

1 × 5 = 5 marks

- i. Elevated moisture levels in solid-state fermentation enhance microbial growth conditions.
- ii. Chemical agents such as detergents are employed for cell disruption during intracellular product recovery.
- iii. Chemical Oxygen Demand (COD) values generally exceed Biochemical Oxygen Demand (BOD) in water analysis
- iv. Fermentation involves the complete oxidation of carbohydrates to carbon dioxide and water.
- v. Milk pasteurization is carried out at temperatures exceeding 100°C.
- vi. Secondary metabolites predominantly accumulate during the idiophase of microbial growth.
- vii. Enterobacter aerogenes are classified under faecal coliforms.

Q2. Differentiate between (**Any three**)

5 × 3 = 15 marks

- i. Batch fermentation and Continuous fermentation
- ii. Concentration and purification stages in downstream processing
- iii. Batch and Fed batch reactor
- iv. Lyophilization and spray drying
- v. Centrifugation and Filtration

Q3. Write short notes on (**Any three**)

5 × 3 = 15 marks

- i. Components of a bioreactor
- ii. Industrial production of citric acid
- iii. Scope of industrial microbiology
- iv. Penicillin acylases
- v. Water pollution control measures

Q4.

(a) Explain the role and stages of downstream processing of product recovery. 8 marks

(b) Explain the advantages of enzyme immobilization in industrial applications, emphasizing its effects on enzyme efficiency and stability. 7 marks

Q5.

(a) What are coliforms? Discuss methods for detecting coliforms in drinking water.

8 marks

(b) Outline the sequential stages involved in wastewater treatment, highlighting the functional role of microorganisms at each stage. 7 marks