

SEAT No. _____

[75/A4]

SARDAR PATEL UNIVERSITY

B.SC. SEMESTER-V EXAMINATION

MICROBIOLOGY-US05CMIC54
FERMENTATION TECHNOLOGY-I

No. of Printed Pages: 2



Date: 8/10/2025

Wednesday

Time: 10:00 AM to 01:00 PM

Total marks: 70

Q:1 Answer ALL the following multiple choice questions.

10

- 1 Microbial biomass production is mainly used for:
 - a. Antibiotic production
 - b. Single-cell protein production
 - c. Recombinant DNA technology
 - d. Biotransformation
- 2 Inoculum development for bacterial fermentation typically involves:
 - a. Providing the carbon source
 - b. Maintaining sterility
 - c. Optimizing oxygen transfer
 - d. All of the above
- 3 Maillard reaction results in damage of fermentation media due to,
 - a. High sugar content
 - b. Low pH
 - c. High temperature
 - d. All of these
- 4 Which of the following is an example of a primary metabolite?
 - a. Penicillin
 - b. Ethanol
 - c. Streptomycin
 - d. Tetracycline
- 5 Which industrial process commonly uses yeast inocula?
 - a. Antibiotic production
 - b. Ethanol production
 - c. Citric acid production
 - d. Amylase production
- 6 In liquid-liquid extraction during downstream processing, what is used to separate the product from the fermentation broth?
 - a. Aqueous and organic phases
 - b. Gas and liquid phases
 - c. Solid and liquid phases
 - d. Liquid and solid phases
- 7 In which method of fermentation is the substrate continuously fed while the product is removed?
 - a. Fed-batch fermentation
 - b. Batch fermentation
 - c. Continuous fermentation
 - d. Solid state fermentation
- 8 In a bioreactor, temperature is typically maintained using
 - a. Stirrer
 - b. Baffles
 - c. Jacketed wall
 - d. Sparger
- 9 Which one of this list is a part of downstream processing?
 - a. Concentration of the product
 - b. Scale up
 - c. pH adjustment
 - d. Heat sterilization



[P.T.O.]

10. Which method is commonly used for the purification of proteins in downstream processing?

- a. Crystallization
- c. Chromatography

- b. Lyophilization
- d. Distillation

Q:2 Answer any ten of the following questions in very brief. [20]

- 1 What are biotransformation products? Give one example.
- 2 Draw fermentation process outline.
- 3 What is scale-down?
- 4 Write the role of inhibitors in the fermentation media.
- 5 Name any two fermenters used for large scale production.
- 6 Enlist the raw materials used as nitrogen source in industrial media.
- 7 What are baffles?
- 8 Name any two types of spargers.
- 9 What are the advantages of HPLC?
- 10 Write the principle of reverse osmosis.
- 11 Why foaming needs to be controlled during fermentation?
- 12 Enlist the steps of downstream processing.

Q: 3 Write major differences between primary and secondary screening. Describe secondary screening and its significance in the fermentation technology. [10]

OR

Q: 3 Enlist the range of fermentation processes and describe the production of microbial enzymes giving examples. [10]

Q: 4 Describe continuous sterilization of media and its advantages over the other method. [10]

OR

Q: 4 Write a note on: a) scale up b) Development of fungal inocula. [10]

Q:5 a) Describe construction of a stirred tank bioreactor. [5]

b) Describe solid state fermentation in brief. [5]

OR

Q: 5 Describe the mass transfer of oxygen and discuss factors affecting $K_L a$. [10]

Q: 6 a) Describe the criteria for the selection of a recovery process. [5]

b) Describe physical methods of cell disruption. [5]

OR

Q: 6 Give a brief account of the methods used for product concentration in fermentation technology. [10]



————— X —————