



CBCS SCHEME

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18BT71

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024

Bioprocess Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Illustrate the process of submerged fermentation with a neat labelled diagram. (08 Marks)
- b. Distinguish the various modes of fermentation process and infer the microbial growth kinetics in each mode. (12 Marks)

OR

- 2 a. Sketch and outline the components of a fermentor and mention its applications during fermentation process. (10 Marks)
- b. (i) State the criterias to optimize the fermentation process. (06 Marks)
- (ii) Discuss the applications of solid state fermentation. (04 Marks)

Module-2

- 3 a. (i) Distinguish Primary and Secondary metabolites. (05 Marks)
- (ii) Discuss about the Industrial applications of secondary metabolites. (05 Marks)
- b. Elaborate on various techniques used for preserving microbial culture. (10 Marks)

OR

- 4 a. Illustrate the methods involved in strain improvement. (08 Marks)
- b. Justify the process in production of antibiotic with an example. (12 Marks)

Module-3

- 5 a. Illustrate the different types of cell disruption techniques. (10 Marks)
- b. Elaborate on : (05 Marks)
- (i) Aqueous two phase extraction (05 Marks)
- (ii) Supercritical fluid extraction. (05 Marks)

OR

- 6 a. List out the types of precipitation methods and explain about salt precipitation. (10 Marks)
- b. (i) Distinguish between differential centrifugation and density gradient centrifugation. (05 Marks)
- (ii) Justify the mechanism involved in flocculation. (05 Marks)

Module-4

- 7 a. Define the following : (12 Marks)
- (i) Membrane Permeability
- (ii) Membrane Modules
- (iii) Membrane fouling and its types
- (iv) Retention
- b. Illustrate the concept of concentration polarization. (08 Marks)

OR

- 8 a. With a neat labeled diagram, write a short note on :
(i) Solvent membrane (ii) Reverse osmosis (10 Marks)
- b. Elaborate on film theory with respect to three solute fluxes, ie., Convective flux towards the membrane ; diffusive flux and convective flux away from membrane. (10 Marks)

Module-5

- 9 a. Illustrate the principle and instrumentation of HPLC. (10 Marks)
- b. Briefly describe
(i) Size exclusion chromatography (05 Marks)
(ii) Affinity chromatography (05 Marks)

OR

- 10 a. Illustrate and explain the instrumentation process of gas chromatography. (10 Marks)
- b. Outline the principle and process involved in TLC. (06 Marks)
- c. State the applications of electrophoresis. (04 Marks)
