

**INSTRUCTIONS:**

- 1 Answer any three (3) questions out of 8 (eight) questions.
2. Question No. 9 is compulsory.
3. Illustrate your answers with neat diagrams wherever necessary.

- Q.1 (i) How successful scale up of fermentation can be achieved? (07)  
(ii) What is containment? Explain different levels of containment. (07)
- Q.2 (i) Explain solid substrate fermentation in detail. (07)  
(ii) Describe mass transfer of oxygen. (07)
- Q.3 (i) Describe removal of microbial cells and suspended solids by foam separation and precipitation. (07)  
(ii) Write a note on product purification by membrane process. (07)
- Q.4 (i) Write a note on: Effluent treatment. (07)  
(ii) Describe physico-mechanical methods for cell disruption. (07)
- Q.5 (i) What is the need of positive and negative control in sterility testing? Describe the process in brief. (07)  
(ii) Describe fermentation economics in detail. (07)
- Q.6 (i) Explain microbial assay for fermentation product. (07)  
(ii) Explain chromatography for detection of fermentation product. (07)
- Q.7 (i) Explain fermentative production of starch degrading enzyme. (07)  
(ii) Explain fermentative production of citric acid. (07)
- Q.8 (i) How lysine can be produced in fermentation industry? (07)  
(ii) Write a note on fermentative production of biofuel by *Zymomonas mobilis*. (07)
- Q.9 **Give short and specific answers in 1-2 lines only (any eight).** (08)
- A Define clean room environment.
  - B Give two names of antifoam agents.
  - C Define continuous fermentation.
  - D What is GILSP?
  - E Give two precipitants used for product recovery.
  - F What is HPLC? Give its application.
  - G Define crystallization.

E503-2

- H** Give the use of sonicator.
- I** Define down stream processes.
- J** What is LAL test?
- K** Why bioassay is superior to chemical assay?
- L** Give Beer and Lambert law.
- M** Give two examples of penicillin producing organisms.
- N** Give mode of action of penicillin.
- O** Which precursor is used for the production of benzyl penicillin?
- P** Name the fungi used for production of citric acid.

— X —