

**FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2017**

(CUCBCSS—UG)

Biotechnology

BTY 5B 09—BIOPROCESS TECHNOLOGY

Time : Three Hours

Maximum : 80 Marks

**Section A***Answer any two out of four questions in about 1500 words.**Each question carry 10 marks.*

1. Discuss the different methods of isolating and screening industrially important microorganisms. Comment on the merits and demerits of each method.
2. Explain the composition of a typical fermentation medium. Comment on the ingredients of special requirements like precursors, inducers, chelators and inhibitors with specific examples
3. Schematically represent a typical bioreactor. Comment on the utilities of different parts of the bioreactor.
4. Discuss the various methods of cell disruption .Comment on the merits and demerits of each method.

(2 × 10 = 20 marks)

**Section B***Answer any seven out of Fourteen questions in about 750 words.**Each question carry 5 marks.*

5. What are antifoam agents ? What are the essential characteristics of an ideal antifoam agent ? Give examples ?
6. Discuss the concept of low volume- high value products and high volume- low value products.
7. Comment on the various precautions that can be taken for improving the shelf life of fermentation products.
8. What is lyophilisation ? Discuss how Lyophilisation is useful in the preservation of industrially important cultures.
9. Discuss the application of protoplast technique in the improvement of industrially important microorganisms.
10. What are the methods of industrial sterilisation ? Comment on the application of each method.

**Turn over**

11. Discuss the importance of various ingredients in the medium for animal culturing.
12. What is a fed batch culture ? Discuss the advantages and disadvantages of fed batch culture.
13. Discuss the structure of a packed bed reactor and fluidised bed reactor.
14. Explain the online and offline instrumentation of a typical bioreactor.
15. What is ion exchange chromatography ? Discuss the principle involved in this technique. Comment on the applications.
16. Comment on the media composition and strategies of downstream processing in citric acid production.
17. Discuss the application of immobilised enzymes with specific examples.
18. What is single cell protein ? Comment on its production strategies.

(7 × 5 = 35 marks)

### Section C

*Answer all questions in about 300 words.*

*Each question carry 3 marks.*

19. Discuss the advantages and disadvantages of bioprocess.
20. What is crowded plate technique? Comment on its application.
21. Comment on the application of filter sterilisation in animal cell culturing.
22. Schematically represent an airlift fermentor.
23. Comment on the various steps in the fermentative production of Vitamin B<sub>12</sub>.

(5 × 3 = 15 marks)

### Section D

*Answer all questions in about 200 words.*

*Each question carry 2 marks.*

24. Give examples for a bi-functional and tri-functional reagent used in the method of enzyme immobilisation. Comment on its applications.
25. Sephadex, sephacryl and Bio gel P are extensively used in gel exclusion chromatography. Specify the composition of each of this matrix. Define exclusion limit in gel filtration.
26. What is a polarographic electrode ? Specify the parameter in bioprocess for which these types of electrodes are used ?
27. What is substrate saturation constant in batch kinetics ? Specify how it is linked to substrate affinity.
28. What is soil enrichment technique ? Specify its applications.

(5 × 2 = 10 marks)