

U.G. 5th Semester Examination-2020
Molecular Biology & Biotechnology

[HONOURS]

Course Code : MBBT-H-CCR-T-11
(Bioprocess Technology)

Full Marks : 40

Time : 2½ Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **five** questions: 2×5=10
 - a) Name two industrially important microorganisms and their fermentation products.
 - b) Why it is difficult to prevent oxygen from becoming a rate limiting factor?
 - c) What are the salient features of fed-batch culture technique?
 - d) What is Biomass yield coefficient (Y)? What is its use?
 - e) What is critical dilution rate (D)? State its unit.
 - f) What is packed tower bioreactor?
 - g) What is Decimal reduction time? State its importance.

- h) How sterilization can cause loss of nutrient quality of fermentation media?

2. Answer any **two** of the following: 5×2=10
 - a) What do you mean by idiophase and trophophase in microbial growth? What wavelength is used to measure microbial growth in turbidimetric measurement? Compare batch and continuous culture for biomass productivity in industrial processes. 2+1+2=5
 - b) What is Downstream processing (DSP)? Discuss briefly the stages involved in downstream processing. 1+4=5
 - c) Discuss the important nitrogen sources used in fermentation media. What are anti-foaming agents? Give one example. 3+1+1=5
 - d) Why an ideal fermenter must have “agitation” system in it? Describe Airlift fermenter with a schematic diagram. 2+3=5
3. Answer any **two** of the following: 10×2=20
 - a) What is kLa? Discuss the factors affecting kLa. Why seed fermentation step is important in inoculum development? Write importance of the following fermenter parts: Impeller, Baffle, Sparger. 2+3+2+3=10

[Turn Over]

- b) Discuss the role of chromatography in higher-valued product recovery. Discuss the role of membrane filtration in product purification. What do you mean by “Broth Conditioning”?

5+4+1=10

- c) What is BOD and COD? How trickling filters can be used to biologically degrade organic-waste materials? Give example of a microorganism used in anaerobic effluent treatment. What is “Gateway sensors”? Explain with an example. What are Direct Digital Control (DDC) and Supervisory Set-Point Control (SSC) approaches to computer control of fermenters?

2+3+1+2+2=10

- d) Write short notes on microbial production of:

5+5=10

- i) Ethanol
- ii) Amylase.
