

U.G. 5th Semester Examination-2021
Molecular Biology & Biotechnology

[HONOURS]

Course Code : MBBT-H-CCR-T-11[501(T)]
(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) What are the desirable criteria of an ideal inoculum?
 - b) Define inducer with a suitable example.
 - c) Compare continuous and fed batch culture technique.
 - d) What are D and Z values?
 - e) How sterilization can cause loss of nutrient quality of fermentation media?
 - f) What are anti-foaming agents? Give one example.

- g) State the factors affecting KLa values in fermentation vessel.
 - h) State the functions of Impeller and Sparger?
2. Answer any **two** of the following: 5×2=10
- a) How dilution rate (D) and specific growth rate(μ) is related under steady state condition? Describe the microbial growth curve for batch culture. 2+3=5
 - b) What is Upstream processing (USP)? Give an outline of upstream processing. 1+4=5
 - c) What is specific growth rate? State its unit. How specific growth rate and concentration of a rate limiting nutrient is related in a batch fermentation? 2+1+2=5
 - d) Compare batch and continuous sterilization process. 5
3. Answer any **two** of the following: 10×2=20
- a) Name the methods available for cellular disintegration. Discuss how fusion proteins can aid the purification of recombinant proteins by chromatography. What is reverse osmosis? 3+6+1=10

b) Give one example of each aseptic and non-aseptic fermentations. Describe with schematic diagram and state the applications of:

i) Airlift bioreactor

ii) Packed Tower bioreactor $2+4+4=10$

c) Mention the steps involved in transfer of oxygen from air to the cellular site of respiration during a fermentation process. What is the rate-limiting step during such transfer process? What are the key physical and chemical parameters that need to be monitored during fermentation? What are "In line", "On line", and "Off line" sensors?

$4+1+2+3=10$

d) Write short notes on microbial production of:

$5 \times 2 = 10$

i) Ethanol

ii) Single cell protein
