Reg. No. :

Question Paper Code: 95D02

B.E./B.Tech. DEGREE EXAMINATION, NOV 2022

Fifth Semester

Biotechnology

19UBT502- Bioprocess Engineering

(Regulations 2019)

Duration: Three hours   Maximum: 100 Marks

Answer All Questions

PART A - (10x 2 = 20 Marks)

1.	Classify different types of bioreactors	CO1- U
2.	List the ideal characteristics of Tracer molecules.	CO1- U
3.	What do you mean by Dissolved oxygen? Mention the maximum solubility of dissolved oxygen in pure water.	CO1- U
4.	List out the different criteria for scale up of bioreactor	CO1- U
5.	Define Structured model with example	CO1- U
6.	Mention the advantages and disadvantages of structured models	CO1- U
7.	List the factors that affect the immobilized enzyme kinetics	CO2- App
8.	Enlist the different methods of enzyme immobilization	CO2- App
9.	What is a vector in recombinant cell preparation?	CO1- U
10.	Define recombinant cells.	CO1- U

PART – B (5 x 16= 80Marks)

11. (a) When a tubular reactor system is constructed, which type of one   CO2- App   (16)
parameter model can be applied in order to study the non-ideal
behavior?

Or

(b) In order to study the ideal behavior of the stirred tank reactor, which   CO2- App   (16)
type of one parameter model will you be adopting? Explain it with
necessary derivation.

12. (a) In an aerobic reactor, if the aeration is given through the selected sparger type, illustrate with neat diagram about the oxygen mass transfer from the gas bubbles to the active site of the cells. Validate each steps with proper reasons.   CO3- Ana   (16)

Or

(b) Derive the necessary equation to scale up the bioreactor using constant power input to volume, constant mass transfer coefficient and impeller tip speed.   CO3- Ana   (16)

13. (a) Derive necessary equation to calculate batch process time in Batch cultivation of microorganism.   CO3- Ana   (16)

Or

(b) With neat block diagram illustrate the Williamson model of compartment.   CO3- Ana   (16)

14. (a) Derive the relationship between the Thiele modulus and effectiveness factor of immobilized enzyme system   CO2- App   (16)

Or

(b) Illustrate with neat diagram and operational procedures of packed bed reactor system.   CO2- App   (16)

15. (a) Demonstrate with neat sketch about the cultivation of animal cells in Airlift Bioreactor.   CO3- Ana   (16)

Or

(b) In order to increase the biomass concentration in the reactor, Fed batch cultivation strategy can be adopted" – Justify this statement with necessary block diagram and design equations   CO3- Ana   (16)