



CBCS SCHEME

17BT51

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Biokinetics and Bioreaction Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define Elementary and Non Elementary reactions? Explain about its differences? (08 Marks)
- b. Define the following with examples : (08 Marks)
 - i) Order and Molecularity
 - ii) Rate constant and Rate Mechanism
- c. The pyrolysis of Ethane proceeds with an Activated Energy of about 75000 cal. How much fast is the decomposition at 650°C than at 500°C. (04 Marks)

OR

- 2 a. Explain Integral and differential method of Analyzing the kinetic for constant value system. (10 Marks)
- b. Explain Arrhenius law and Temperature dependency of rate Expression given by collision theory. (10 Marks)

Module-2

- 3 a. Derive the performance Equation of PER? (10 Marks)
- b. Define space velocity and space time? In an isothermal batch reactor the conversion of a liquid reactant 'A' is 70% in 13 min. Find the space time and space velocity necessary to effect this conversion in a plug flow reactor and in a mixed flow reactor consider first order kinetics? (10 Marks)

OR

- 4 a. Derive the performance Equation of Equal size CSTR are connected in parallel. (10 Marks)
- b. Define recycle ratio. Derive performance Equations for recycle reactors applicable for any kinetics, Any value of ϵ_A and for $x_{AO} = 0$ (10 Marks)

Module-3

- 5 a. Sketch F, C, and E curves. Explain the relation between E, F and C curve. (08 Marks)
- b. Explain the RTD's in a plug flow reactor. (08 Marks)
- c. Define tracer. List out the properties of tracer. (04 Marks)

OR

- 6 a. Explain about the residence time distribution studies for Pulse Input Experiment. (08 Marks)
- b. What is Micro fluid and Macro fluid? Discuss about the conversion in non ideal flow reactors. (12 Marks)

Module-4

- 7 a. Define Michaelis – Menten constant (K_m) and V_{max} . Derive the Michaelis – Menten equation, strating with all assumption. (12 Marks)
- b. Define Enzyme Activity? Explain about the types of specificity. (08 Marks)

OR

- 8 a. Define Enzyme Activity and specific activity weaver Burk plot and Eadie – Hofstee plot of estimating K_m and V_{max} . (12 Marks)
- b. Explain competitive inhibition and Non competitive inhibition. (08 Marks)

Module-5

- 9 a. Derive Monod Model of growth kinetics with ideal reactor kinetics. (08 Marks)
- b. How do you classify microbial products? Explain. (08 Marks)
- c. Write a note on growth of filamentous organisms. (04 Marks)

OR

- 10 a. What is thermal death time? Explain the thermal death kinetics of microorganism? (10 Marks)
- b. What is Chelators? Write critical notes on medium requirements for fermentation process. (10 Marks)
