U.S.N.										

B. M. S. College of Engineering, Bengaluru - 560019

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E. **Semester: V**
Branch: Biotechnology **Duration: 3 hrs.**
Course Code: 19BT5DCREN **Max Marks: 100**
Course: Reaction Engineering **Date: 14.09.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1.	a)	Derive equations and give graphical representations for First order irreversible reaction for constant volume system.	**10**
	b)	How do you represent Rate of an Elementary Reaction?	**05**
	c)	Give the difference between Elementary and Non-elementary reactions with examples.	**05**

UNIT - II

2.	a)	Explain different types of ideal reactors with schematic representations.	**10**
	b)	Derive design equation for CSTR with graphical representations.	**10**

OR

3.	a)	Explain in detail size comparison of different reactors.	**10**
	b)	Derive design equations for tubular/plug flow reactors with suitable graphical illustrations.	**10**

UNIT - III

4.	a)	Explain in detail step input response of reactors.	**10**
	b)	Discuss and derive equation for Tank-in-series model.	**10**

UNIT -IV

5.	a)	Describe the effects of substrate inhibition, product inhibition and inhibition by toxic compounds on cell growth and product formation.	**10**
	b)	Explain in detail simple unstructured kinetic models for microbial growth.	**10**

UNIT - V

6.	a)	Explain in detail stability and analysis of bioreactors.	**10**
	b)	Describe the design and operation of Air lift bioreactors.	**10**

OR

7.	a)	Explain the various methods for scale-up in bioreactors.	**10**
	b)	Elaborate the design and operation of fluidized bed reactors.	**10**

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