Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (Old) EXAMINATION – WINTER 2019

Subject Code: 170501 **Date: 30/11/2019**

Subject Name: Chemical Reaction Engineering - I

Time: 10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Write a short note on recycle reactors.	**07**
	(b)	Write a short note on autocatalytic reactions.	**07**
Q.2	**(a)**	Discuss classification of reactions along with examples.	**07**
	(b)	Define along with suitable examples: Elementary reactions, order of reaction, molecularity and non-elementary reactions	**07**
		OR	
	(b)	Discuss the analysis of total pressure data obtained in a constant volume system and also establish the relation used to calculate the partial pressure of gaseous component in a reaction mixture.	**07**
Q.3	**(a)**	Discuss about reactions in series.	**07**
	(b)	Define: Space time, Space velocity, Activation energy, Rate constant. Enlist the applications of chemical reaction engineering.	**07**
		OR	
Q.3	**(a)**	Differentiate between constant volume and variable volume batch reactor.	**07**
	(b)	Discuss in brief: temperature dependency according Arrhenius theory and Collision theory.	**07**
Q.4	**(a)**	Write a short note on equilibrium constants obtained from thermodynamics.	**07**
	(b)	Explain various forms of rate equation.	**07**
		OR	
Q.4	**(a)**	Write a short note on Optimum temperature progression.	**07**
	(b)	Define steady state approximation. Explain the correlation between “steady state approximation” and suggested mechanism of reaction.	**07**
Q.5	**(a)**	Derive the design equation for plug flow reactor.	**07**
	(b)	Derive the performance equation for steady state mixed flow reactors.	**07**
		OR	
Q.5	**(a)**	State the equation for Half Life method. Differentiate between integral method of analysis and differential method of analysis.	**07**
	(b)	Discuss method to establish rate law, from batch rector data using differential method of analysis.	**07**

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