Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI- EXAMINATION – SUMMER 2016

Subject Code:162304 **Date:17/05/2016**

Subject Name:Reaction Engineering & Rheology

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)**	Define: Chemical Kinetics , molecularity, elementary reaction, homogenous reaction, kinetics, activation energy, Intrinsic viscosity	**07**
	(b)	Discuss Arrhenius law and activation energy significance	**07**
Q.2	**(a)**	Discuss kinetics of free radical polymerization.	**07**
	(b)	The pyrolysis of Ethane proceeds with an activation energy of about 75000 cal. How much faster is the decomposition at 650 deg.C. than at 500 deg.C.	**07**
		OR	
	(b)	Differentiate between Elementary and Non Elementary reactions. Also highlight difference between homogenous and heterogenous reactions.	**07**
Q.3	**(a)**	At 500 Deg.K, the rate of a bimolecular reaction is ten times the rate at 400 deg.K. Find the activation energy of this reaction: (a) From Arrhenius law (b) From Collision theory © what is the percentage difference in rate of reaction at 600 Deg.K. predicted by these 2 methods?	**07**
	(b)	What is reaction rate and Rate constant? Discuss in detail	**07**
		OR	
Q.3	**(a)**	Discuss various types of fluids giving suitable examples.	**07**
	(b)	Discuss Maxwell Model in detail	**07**
Q.4	**(a)**	What is the phenomenon of DIE SWELL? Explain	**07**
	(b)	The rate constants of a certain reaction are $1.6x10^{-3}$ and $1.625x10^{-2}$ $(s)^{-1}$ at 10deg.C. and 30deg.C. Calculate the activation energy.	**07**
		OR	
Q.4	**(a)**	Differentiate between molecularity and order of reaction.	**07**
	(b)	Discuss kinetics of Anionic Polymerzation.	**07**
Q.5	**(a)**	On doubling the concentration of reactant, the rate of reaction triples. Find the reaction order.	**07**
	(b)	The activation energy of a chemical reaction is 17982 cal/mol in the absence of catalyst , and 11980 cal/mol with a catalyst. By how many times will the rate of reaction grow in presence of catalyst if the reaction proceeds at 25 deg.C?	**07**
		OR	

Q.5 **(a)** After8 minutes in a batch reactor, reactant [CAO=1 mol/liter] is 80% converted;after 18 minutes , conversion is 90%. Find a rate equation to represent this reaction. **07**

(b)In a homogenous isothermal liquid polymerization, 20% of the monomer disappears in 34 min for initial monomer concentration of 0.04, and also for 0.8 mol/liter. What is the rate of disappearance of the monomer? **07**