Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VI (New) EXAMINATION – WINTER 2019

Subject Code: 2162304 **Date: 11/12/2019**

Subject Name: Polymer reaction engineering and Rheology

Time: 02:30 PM TO 05:00 PM **Total Marks: 70**

Instructions:

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

			MARKS
Q.1	**(a)**	Differentiate between Elementary & Non Elementary reactions	**03**
	(b)	Discuss about Maxwell model.	**04**
	(c)	With a neat sketch explain the Batch type Reactor.	**07**
Q.2	**(a)**	Discuss about Weissenberg effect.	**03**
	(b)	Explain the cone & plate viscometer.	**04**
	(c)	Explain in detail about Non Newtonian fluids giving suitable examples.	**07**
		OR	
	(c)	Explain Boltzmann superposition principle.	**07**
Q.3	**(a)**	Discuss about creep curve of typical plastics.	**03**
	(b)	Write a short note in Power Law model.	**04**
	(c)	What is chemical kinetics? Give detailed classification of chemical reaction with suitable example.	**07**
		OR	
Q.3	**(a)**	What are stereo regular polymers?	**03**
	(b)	Explain Die swell & Melt fracture of plastics.	**04**
	(c)	What is Tg & what are the factors affecting Tg of polymers.	**07**
Q.4	**(a)**	Explain about kinetics of free radical polymerisation.	**03**
	(b)	Discuss about Kelvin & Voigt model.	**04**
	(c)	At 500 k the rate of bimolecular reaction is ten times then the rate at 400 k. Find the activation energy for this reaction a)From Arrhenius equation b) From Collision Theory.	**07**
		OR	
Q.4	**(a)**	What is molecularity & order of reaction.	**03**
	(b)	Derive Arrhenius equation. Give its significance.	**04**
	(c)	Explain Melt flow index test with a neat diagram.	**07**
Q.5	**(a)**	On doubling the concentration of a reactant, the rate of reaction triples. Find out the reaction order.	**03**
	(b)	Discuss about Continuous Stirred tank reactor.	**04**
	(c)	Explain the factors affecting crystallinity of a polymer.	**07**
		OR	
Q.5	**(a)**	Discuss about free volume concept.	**03**
	(b)	Explain the Florry Huggins theory.	**04**
	(c)	The pyrolysis of ethane proceeds with and activation energy of about 300kJ/m. How much faster is the decomposition at 650^{o}c than at 500^{o}c. Also discuss the rate constant.	**07**

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