Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (NEW).EXAMINATION – WINTER 2016

Subject Code: 2162304 **Date: 26/10/2016**

Subject Name: Polymer reaction engineering and 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)**	With neat sketch explain Batch Reactor.	**07**
	(b)	What is Rheology? Explain Polymer Rheology in detail.	**07**
Q.2	**(a)**	Define : Homogenous reaction; bingham plastic; activation energy; chemical kinetics; die swell; non elementary reaction; thixotropic.	**07**
	(b)	Discuss in detail Non-Newtonian fluids.	**07**
		OR	
	(b)	What is Arrhenius Law? Discuss it significance.	**07**
Q.3	**(a)**	What is Free volume or Molecular Hole concept? Discuss.	**07**
	(b)	Discuss Capillary Rheometer & its importance in Rheological studies.	**07**
		OR	
Q.3	**(a)**	Answer the following:- (i) Explain creep & Relaxation of typical plastics The rate constants of a certain reaction are $1.6x10^{-3}$ & $1.625x10^{-2}$ $(s)^{-1}$ at 10˚C & 30˚C. Calculate the activation energy	**07**
	(b)	Derive Power Law & WLF equation.	**07**
Q.4	**(a)**	Discuss Maxwell model in detail?	**07**
	(b)	What is Tank Reactor? Explain Continuous Stirred Tank Reactor (CSTR).	**07**
		OR	
Q.4	**(a)**	Explain MFI & Die swell in detail with neat sketch.	**07**
	(b)	Explain the correlation between Boltzmann Principle with Time Temperature Superposition.	**07**
Q.5	**(a)**	Discuss Weissenberg effects.	**07**
	(b)	Discuss how crystanillity & Tg effect molecular orientation of polymer	**07**
		OR	
Q.5	**(a)**	Explain Optical Birefringence method.	**07**
	(b)	Explain Cone & Plate viscometer.	**07**

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