Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2014

Subject code: 711602N Date: 17-06-2014

Subject Name: Advanced Kinetics & Reaction Engineering

Time: 02:30 pm - 05:00 pm Total Marks: 70

Instructions:

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

Q.1	**(a)**	Discuss in detail formulation of chemical reactor optimization problem	**07**
	(b)	For an unreacted core model for spherical particles of unchanging size, derive relation between time, radius and conversion for ash layer control.	**07**
Q.2	**(a)**	Derive performance equation for Fluidized Bed reactor	**07**
	(b)	Derive rate equation for instantaneous fluid-fluid reaction	**07**
		OR	
	(b)	Derive rate equation for slow fluid-fluid reaction	**07**
Q.3	**(a)**	Discuss about mass balances and rate laws for Bio reactors	**07**
	(b)	Describe slurry reaction kinetics. Give industrial applications of slurry reactors	**07**
		OR	
Q.3	**(a)**	Derive performance equation for a Moving bed reactor	**07**
	(b)	Describe advantages and disadvantages for bubble column reactor.	**07**
Q.4	**(a)**	For a trickle bed reactor write about liquid solid mass transfer	**07**
	(b)	Describe design criteria for Bubble column reactor	**07**
		OR	
Q.4	**(a)**	Discuss heat transfer phenomena in a trickle bed reactor.	**07**
	(b)	Distinguish between bubble column reactor and agitated vessel type reactor	**07**
Q.5	**(a)**	Write a brief note on different types of loop reactors used in chemical industry.	**07**
	(b)	Derive Dispersion model for Non ideal flow.	**07**
		OR	
Q.5	**(a)**	For a trickle bed reactor discuss flow regimes in detail	**07**
	(b)	Discuss determination of rate controlling step for fluid particle reactions in detail.	**07**

****