GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VIII (OLD) EXAMINATION – WINTER 2018

Subject Code: 180501   **Date: 26/11/2018**
Subject Name: Chemical Reaction Engineering -II
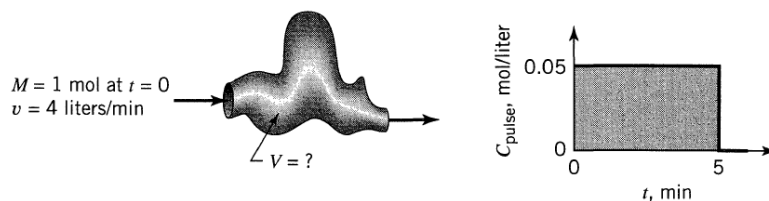**Time: 02:30 PM TO 05:00 PM**   **Total Marks: 70**

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

Q.1	**(a)**	Define E, F, & C curves and derive relation between them.	**07**
	(b)	Discuss with diagram various contacting pattern in two phase system.	**07**
Q.2	**(a)**	A pulse input to a vessel gives the results shown in below figure:	**07**

   (1) Check the material balance with the tracer curve to see whether the results are consistent.

(2) If the result is consistent, determine mean residence time, volume of reactor V and sketch the E curve.

	(b)	Derive and discuss dispersion model for non-ideal flow	**07**

OR

	(b)	Experimental response measurement on a continuous flow tubular reactor gives the following information for a pulse input.	**07**

Time (min)	1	3	5	7	9	11	13	15
Concentration	0	4	6	8	10	7	3	0

Find the variance and dispersion number.

Q.3	**(a)**	Explain linear and non- linear process with examples.	**07**
	(b)	Discuss various kinetic regimes for Mass transfer and reaction for fluid-fluid reactions.	**07**

OR

Q.3	**(a)**	Derive the rate equation for straight mass transfer (Absorption) of A in fluid-fluid reaction.	**07**
	(b)	Derive rate expression for fast fluid-fluid reactions.	**07**
Q.4	**(a)**	Discuss about Physical adsorption and Chemisorption.	**07**
	(b)	Write a short note on "Determination of Surface area for catalysts".	**07**

OR

Q.4	**(a)**	Define with suitable examples, 1) Promoter, 2) Inhibitor, 3) Carrier, 4) Accelerator, 5) Activity, 6) Coking/fouling	**07**
	(b)	Discuss different parameters which are useful for determining rate controlling step.	**07**
Q.5	**(a)**	Discuss in brief about slurry reaction kinetics.	**07**
	(b)	What is effectiveness factor? Derive a relationship between effectiveness factor and Thiele Modulus for first order reaction.	**07**

OR

Q.5	**(a)**	Discuss various Catalytic reactors used in Industry.	**07**
	(b)	Describe with neat sketch the fixed bed reactor and fluidized bed reactor.	**07**

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