Reg. No.



Manipal Institute of Technology, Manipal

(A Constituent Institute of MAHE)

V SEMESTER B.TECH (CHEMICAL ENGINEERING)

END SEMESTER MAKE UP EXAMINATIONS, DEC 2018

SUBJECT: CHEMICAL REACTION ENGINEERING 1 [CHE 3102]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

✤ Answer ALL the questions and any missing data may be suitably assumed.

1A.	Come up with (guess and then verify) a mechanism that is consistent with the experimentally found rate equation for the following reaction $2A + B \rightarrow A_2B$, with $+\Gamma A_2B = k[A][B]$	05				
1B.	Compare the different theories of temperature dependency of a rate equation to obtain the most suitable one.					
2A.	The natural abundance of 235 U in uranium is 0.79 atom %. If a sample of uranium is enriched to 3 atom % and then is stored in salt mines under the ground, how long will it take the sample to reach the natural abundance level of 235 U (assuming no other processes form 235 U; this is not the case if 238 U is present since it can decay to form 235 U)? The half- life of 235 U is 7.13 X 10 ⁸ years.					
2B.	What are shifting order reactions? Explain the behavior with an example.	05				
3A.	The rate of the following reaction has been found to be first-order with respect to hydroxyl ions and ethyl acetate: $A + B \rightarrow C + D$ In a stirred-flow reactor of volume $V = 0.602$ L, the following data have been obtained at 298 K flow rate of barium hydroxide solution: 1.16 L/h flow rate of ethyl acetate solution: 1.20 L/h inlet concentration of OH ⁻ : 0.00587 mol/L inlet concentration of ethyl acetate: 0.0389 mol/L outlet concentration of OH ⁻ : 0.001094 mol/L Calculate the rate constant. Changes in volume accompanying the reaction are negligible.	05				
3B.	Derive the performance equation for a Recycle reactor.	05				

4A.	Pure A ($C_{AO} =$ concentrations assumptions an Run 1 2	100) is fed to a n are recorded. Fin d clarify. C _A 75 25	nixed reactor, R ad a kinetic sche	and S are forme eme to fit this dat	d, and the following out a. Make necessary C _S 10 30	let 05		
4B.	Discuss about the graphical procedure to find the conversion when unequal sized MFR's are connected in series.							
5A.	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$							
5B.	Explain – Insta Selectivity?	antaneous (平) a	nd over all fra	ctional yields (¢). How is it different f	řrom 05		