T.E.-I Sem-Chemical Chemical Reaction Engineering 01/12/15 TE/I/CBG3/CHEM/CRE-I Q.P. Code : 5665

(3 Kours)

[Total Marks: 80

- a Question no 1 is compulsory
- Attempt any three questions from remaining five questions .
- Assume suitable data if needed & justify

Q1 a. Q1 b.	What is Optimum Temperature progression? Explain with respect to different types of reactors.	0 10
Q1 c. Q1 d.	Differentiate Elementary vs Nonelementary Reaction? Write down the performance equation for recycle reactor? The activation energy of a biomoleecular reaction is about 9150	03 02 ≤ 05√
Q2 a.	cal/mol. How much faster is this reaction at 500K than at 400K.	02 05 55

The reaction between CO and NO2 at low temperatures proceeds with a rate $-r_{0} = k * |NO_2|^2$ Suggest mechanism.

In case of a first order reaction, show that the time required for 75% Q2 b. 08 conversion is double the time required for 50% conversion in a batch reactor.

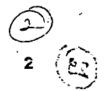
Q3 a Calculate the first order rate constant for the disappearance of A as 80 per the gas phase reaction A -> 1.6 R if the volume of reaction mixture, starting with pure A, increases by 50% in 4 minutes . The total pressure of the system ramains constant at 1.2 atm and the temperature is 25 deg C

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Q3 b. The initial rate of the reaction 2A + 2B - C + D is determined for different initial conditions, with the results listed in the following 12 table:

Run	· [A] ₀ , M	[B] ₀ , M	Initial rate, M/s
· 1	0.185	0.133	3.35 x 10 ⁴
2	0.185	0.268	1.35 X 10 ³
. 3	0.370	0.133	6.75 X 10 ⁴
4	0.370	0.266	2.70 X 10 ³

Find the rate law and rate constant for this reaction.

Q4 From steady state kinetic runs in a mixed flow reactor, we obtain the 20 following data on the reaction A R.

? sec	$C_{40} \text{mol/m}^3$	C _A mol/m ³
60	50	20
35	100	40
11	100	50
20	200 جي	80
11	200	100

Find the space time needed to treat a feed of $C_{AO} = 100 \text{ mol/m}^3$ to 80% conversion 1) in a plug flow reactor 2) in a mixed flow reactor.

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