

B. Tech Third Year (Chemical Technology) Credit Examination 2020
Chemical Reaction Engineering -I (old syllabus)

Set I

Time: One Hour

Total Marks: 50

Instructions: 1) Attempt any twenty five questions.

2) Each question carries two marks.

Q.No.1	A pyrolysis reaction proceeds with an energy of activation 80,000 cal/mol. And R value is given as 1.987 cal/molK. Find how much faster is decomposition at 600 °C than at 400 °C a) 14302 b) 22026	c) 1001 d) None of these	02
Q.No.2	The extent of a reaction is a) Dimensionless c) Different for reactants and products	b) Depends on the stoichiometric co-efficient d) All of the above	02
Q.No.3	The half life period 't' of a zero order reaction, is equal to a) 1/K c) C_{A0}/K	b) $0.693/K$ d) $C_{A0}/2K$	02
Q.No.4	According to the steady state approximation, the rate of formation of transition complex a) Equals rate of decomposition b) Different rate of decomposition c) is always zero d) None of these		02
Q.No.5	For any reaction $A \xrightarrow{k_1} R \xrightarrow{k_2} S$ $C_{A0} = 10 \text{ mol/l}$, $k_1 = 10 \text{ min}^{-1}$, $k_2 = 0.01 \text{ min}^{-1}$. The value of C_{max} in mol/l and t_{max} in mins are a) 10, 1.44 c) 1, 2.35	b) 30, 0.44 d) 2, 0.35	02
Q.No.6	The integrated rate expression for an irreversible first order reaction is		

	a) $-\ln(1 - X_A) = kt$	b) $\ln(1 - X_A) = kt$	02
	c) $\ln C_A = kt$	d) $-\ln C_A = kt$	
Q.No.7	Reverse reaction in a chemical equilibrium is favoured by the		
	a) decrease in concentration of one of products		02
	b) increase in concentration of one of products		
	c) decrease in concentration of one of reactants		
	d) None of these		
Q.No.8	In a recycle reactor, the recycle ratio is zero. This means the reactor is basically a		
	a) PFR	b) CSTR	02
	c) PFR with zero radial mixing	d) PFR with axial dispersion	
Q.No.9	Calculate the first order rate constant in min^{-1} for disappearance of A in the gas phase reaction $2A \rightarrow R$, if the pressure is constant and the volume of the reaction mixture starting with 70 % A, decreases by 30 % in 5 minutes.		02
	a) 0.028	b) 0.618	
	c) 0.389	d) 0.708	
Q.No.10	When 'N' CSTR's are placed in series, the total residence time is _____, when the N \rightarrow infinity is _____		
	a) equal to sum of residence times in individual reaction		02
	b) equal to subtraction of residence times in individual reaction		
	c) equal to sum of residence times in individual reaction raise to power of N		
	d) None of above		

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Answer Key Set I

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Q.No.1	Answer: Option a
Q.No.2	Answer: Option d
Q.No.3	Answer: Option d
Q.No.4	Answer: Option a
Q.No.5	Answer: Option a
Q.No.6	Answer: Option a
Q.No.7	Answer: Option b
Q.No.8	Answer: Option a
Q.No.9	Answer: Option c
Q.No.10	Answer: Option a

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