Program: BE Chemical Engineering

Curriculum Scheme: Revised 2012

Examination: Third Year Semester V
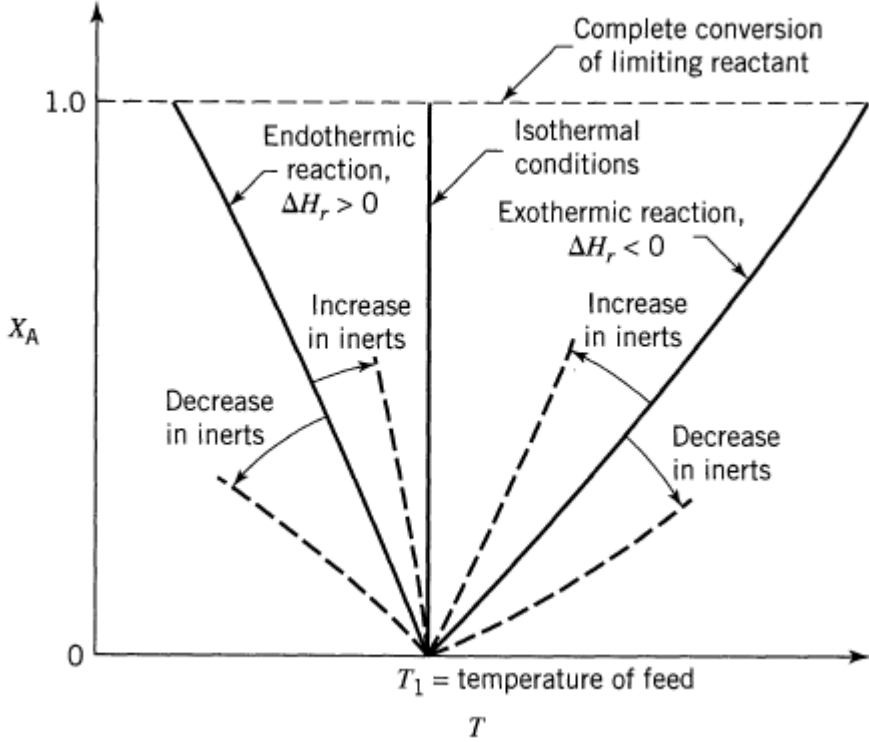
Course Code : CHC 504

Course Name: Chemical Reaction Engineering -I

Time: 1 hour   Max. Marks: 50

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Note to the students:- All Questions are compulsory and carry equal marks .

Q1.	Following figure represents, energy balance equation for …………
Option A:	Adiabatic operation
Option B:	Non-adiabatic operations
Option C:	For both type of operations
Option D:	Can't say
Q2.	For an increase in pressure in gas reactions, conversion drops when…………..
Option A:	Number of moles remains constant
Option B:	Number of moles increases
Option C:	Number of moles decreases

Option D:	Number of moles of inert remains constant
Q3.	The space time is equivalent to the holding time in a steady state mixed reactor for
Option A:	Non-isothermal gas reaction
Option B:	Variable fluid density systems
Option C:	Constant fluid density systems
Option D:	Gas reactions with changing number of moles
Q4.	For the same residence time, which one will give the maximum conversion?
Option A:	Single stirred tank (v = 5 litres)
Option B:	Two stirred tank (each of 2.5 litres) in series
Option C:	Stirred tank followed by tubular flow reactor (each of 2.5 litres)
Option D:	Single tubular flow reactor (v = 5 litres)
Q5.	An elementary liquid phase decomposition reaction $A \rightarrow 2B$ is to be carried out in a CSTR **.** The design equation is
Option A:	$$k\tau = \frac{x_A}{1 - x_A}$$
Option B:	$$k\tau = \frac{x_A\,(1 + x_A)}{1 - x_A}$$
Option C:	$$k\tau = \frac{x_A}{(1 - x_A)^2}$$
Option D:	$$k\tau = \frac{\dfrac{x_A}{(1 + x_A)}}{(1 - x_A)^2}$$
Q6.	The rate of a chemical reaction tells us about
Option A:	the reactants taking part in the reaction
Option B:	the products formed in the reaction
Option C:	how slow or fast the reaction is taking place
Option D:	none of the above
Q7.	The conversion for a first order liquid phase reaction in a CSTR is 50% . If another CSTR of the same volume is connected in series, then the percentage conversion at the exit of the second reactor will be
Option A:	60

Option B:	90
Option C:	75
Option D:	100
Q8.	Which of the following statements in incorrect?
Option A:	A rise in temperature usually tends to reduce the reaction Rate
Option B:	A rise in temperature usually increases reaction rates
Option C:	A rise in temperature does not affect photo-chemical reaction rates
Option D:	A rise in temperature has no effect on catalysed reaction
Q9.	The experimentally determined overall order for the reaction A + B → C + D is two. Then the
Option A:	reaction is elementary with a molecularity of 2
Option B:	molecularity of the reaction is 2 but the reaction may not be elementary
Option C:	reaction is elementary but the molecularity may not be 2
Option D:	Can't say
Q10.	From Arrhenius law a plot of In K versus 1/T give a straight line with a slope of (-E/R). The units of E/R are
Option A:	K
Option B:	cal
Option C:	cal/K
Option D:	K/cal
Q11.	In a zero-order reaction for every 10° rise of temperature, the rate is doubled. If the temperature is increased from 10°C to 100°C, the rate of the reaction will become
Option A:	64 times
Option B:	128 times
Option C:	256 times
Option D:	512 times
Q12.	For a _____ order reaction, the units of rate constant and rate of reaction are the same.
Option A:	zero
Option B:	one
Option C:	two
Option D:	three

Q13.	Arrhenius equation shows the variation of _____ with temperature.
Option A:	Reaction rate
Option B:	Rate constant
Option C:	Energy of activation
Option D:	Frequency factor
Q14.	The reaction in which the rate equation corresponds to a stoichiometric equation, is called a/an _____ reaction.
Option A:	Autokinetic
Option B:	Parallel
Option C:	Elementary
Option D:	Non-elementary
Q15.	The rate constant of a first order reaction depends on the_____
Option A:	Concentration of the reactant.
Option B:	Concentration of the product.
Option C:	Temperature.
Option D:	Time
Q16.	Half life for a second order reaction is inversely proportional to the _____ power of initial concentration.
Option A:	Zero
Option B:	First
Option C:	Second
Option D:	Third
Q17.	A reaction is zero order when the rate of reaction is independent of the _____ of the reactant.
Option A:	Concentration
Option B:	Temperature
Option C:	Time
Option D:	None of above
Q18.	_____is useful for testing more complicated rate expression.
Option A:	Differential method
Option B:	Integral Method
Option C:	Half life Method
Option D:	None of the above
Q19.	A first order irreversible reaction, $A \rightarrow B$ is carried out separately in a constant volume as well as in a variable volume reactor for a particular period. It signifies

	that _____ in the two reactors.
Option A:	both conversion as well as concentration are same
Option B:	conversion in both will be the same but concentrations will be different
Option C:	both the conversion as well as concentrations will be different
Option D:	Only conversion is same
Q20.	Half life period of decomposition of a liquid 'A' by irreversible first order reaction is 12 minutes. The time required for 75% conversion of 'A' is _____ minutes.
Option A:	18
Option B:	24
Option C:	6
Option D:	12
Q21.	For certain reaction, the rate of reaction at concentration 0.12 mol/lit is 2.16×10^{-3} mo/(lit.min), while the rate of reaction at concentration 0.04 mol/lit is 0.24×10^{-3} mo/(lit.min), what will be the order of reaction
Option A:	0
Option B:	1
Option C:	2
Option D:	3
Q22.	The first order gas phase reaction $A \xrightarrow{k_1} 2B$ is conducted isothermally in batch mode. The rate of change of conversion with time is given by
Option A:	$\frac{dX_A}{dt} = k_1(1 - X_A)^2 (1 + 2X_A)$
Option B:	$\frac{dX_A}{dt} = k_1(1 - X_A) (1 + 0.5X_A)$
Option C:	$\frac{dX_A}{dt} = k_1(1 - X_A)$
Option D:	$\frac{dX_A}{dt} = \frac{k_1(1 - X_A)}{(1 + X_A)}$
Q23.	Reaction rate of a first order reaction, which is half completed in 23 minutes will be

Option A:	0.03 sec^{-1}
Option B:	0.03 min^{-1}
Option C:	0.03 hr^{-1}
Option D:	0.05 min^{-1}
Q24.	For a reaction $2A + B \xrightarrow{k} C$, the rate equation is given as $-r_A = kC_A^2 . C_B$, the order of reaction will be
Option A:	zero
Option B:	one
Option C:	two
Option D:	three
Q25.	At equilibrium
Option A:	the rate of forward reaction is equal to the rate of backward reaction
Option B:	the rate of forward reaction is less than the rate of backward reaction
Option C:	the rate of forward reaction is more than the rate of backward reaction
Option D:	rate of forward reaction and the rate of backward reaction are independent of each other

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Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D'
Q1.	A
Q2.	B
Q3.	C
Q4	D
Q5	A
Q6	C
Q7	C
Q8.	A
Q9.	B
Q10.	A
Q11.	D
Q12.	A
Q13.	B
Q14.	C
Q15.	C
Q16.	B

Q17.	A
Q18.	A
Q19.	B
Q20.	B
Q21.	C
Q22.	C
Q23.	B
Q24.	D
Q25.	A