

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APR/MAY 2026****Seventh Semester****Chemical Engineering****CH3701- CHEMICAL REACTION ENGINEERING-II****Regulations – 2021****Duration : 3 Hrs****Maximum : 100 Marks****PART – A(ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BTL	CO	Marks
1.	Outline the industrial importance of Gas-Solid non-catalytic reactions.	L2	1	2
2.	What is progressive conversion model?	L1	1	2
3.	Distinguish between promoters and inhibitors.	L2	2	2
4.	Summarize any three applications of physical adsorption.	L2	2	2
5.	What is meant by rate controlling step?	L1	3	2
6.	Write the rate equation for Eley Rideal mechanism.	L1	3	2
7.	Define effective diffusivity.	L1	4	2
8.	Compare random pore model with parallel pore model.	L2	4	2
9.	What is liquid film enhancement factor?	L1	5	2
10.	Summarize the importance of Hatta number in reaction engineering.	L2	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11. a	Derive the rate equation for non-catalytic chemical reaction when diffusion through ash layer is controlling the rate of reaction.	L3	1	16
	Or			
b	Develop the models used for studying the kinetics of non-catalytic reactions.	L3	1	16
12. a i	Explain the methods for the determination of surface area of catalyst.	L2	2	8
ii	Explain the steps involved in the preparation of a catalyst.	L2	2	8
	Or			
b	Explain in detail about Langmuir and Freundlich isotherms.	L2	2	16
13. a	For a bimolecular reaction $A+B \rightarrow C+D$ when all the species are adsorbed onto the catalytic surface and if surface reaction is rate controlling. Derive the rate expression for the formation of the product C.	L2	3	16
	Or			
b i	State all necessary assumptions and develop the expressions for Langmuir Hinshelwood kinetics.	L2	3	8
ii	Discuss briefly on different reactors available for carrying out non-catalytic chemical reaction.	L2	3	8
14. a	Develop an expression for the effectiveness factor for a first order reaction of the type ' $A \rightarrow \text{Products}$ ' of a single cylindrical pore of length L with a neat sketch.	L3	4	16

Or

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| b | A first order reaction takes place in a solid catalyst. Considering a single spherical pore in the catalyst particle, develop an expression for concentration profile of the reactant in the pore and derive the expression for effectiveness factor for the same. State all assumptions made. | L3 | 4 | 16 |
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| 15. a | Discuss about fluid-fluid reactions and develop its kinetic expression for the case (i) Intermediate reaction with low C_B (ii) Fast reaction with high C_B . Also, sketch the concentration profile of the reactants for these reactions. | L2 | 5 | 16 |
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| <p style="text-align: center;">Or</p> | | | | |
| b | With a neat sketch, discuss various contacting pattern in packed tower for carrying out fluid-fluid reactions. | L2 | 5 | 16 |
