SLOT: C1+TC1

VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF CHEMICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST (CAT) -I
FALL SEMESTER 2026-2027

Programme Name & Branch	: B. Tech., & Chemical Engineering
Course Code	: BACHE203
Course Name	: Chemical Reaction Engineering
Faculty Name(s)	: Dr. I. Ganesh Moorthy
Class Number(s)	: VL2026270101029
Date of Examination	: 11-08-2026
Exam Duration	: 90 minutes **Maximum Marks: 50**

General instruction(s):

- Answer All Questions
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- Course Outcomes Statements:

CO. 1: Classify various reaction types and their applications
CO. 2: Apply the principles of reaction kinetics, formulate rate equations and analyse the batch reactor data

Q. No	Question	M	CO	BL
1.	Explain in detail about the temperature dependency term from transition state theory.	10	CO1	BL1
2.	A reaction $2HI_{(g)} \longrightarrow H_{2(g)}+I_{2(g)}$ is studied over a range of temperatures. The results obtained are tabulated below.	10	CO1	BL3

Temperature K	633	666	697	715	781
Rate constant k, (l/mol.s)	1.7×10^{-5}	1.07×10^{-4}	5.01×10^{-4}	1.05×10^{-3}	1.51×10^{-3}

i. Find out the value of activation energy graphically using the given data.
ii. Determine by what factor the rate increases when temperature rises from 300 K to 310 K.

3.	Derive the governing equations for finding the concentrations of C_A, C_R and C_S at any time t, for the following irreversible unimolecular type first-order reaction. $A \overset{k_1}{\rightarrow} R \overset{k_2}{\rightarrow} S$	10	CO2	BL2
4.	The concentrations (mol/l) of a compound undergoing chemical change were 5.72, 3.23 and 1.96 at the times 0, 20 and 50 min from the commencement of reaction. Ascertain the order of reaction.	10	CO2	BL3
5.	Raju likes to play the gambling tables just to get relaxed. He never expects to win and he doesn't, so he selects games in which losses are a given small fraction of the money bet. He plays steadily without a break, and the sizes of his bets are proportional to the money he has. If at gambling table-1 it takes him four hours to lose half of his money and at gambling table-2 it takes two hours to lose half of his money, how long can he play at both the tables simultaneously if he starts with Rs. 1000 and quits when he has Rs. 10 left?	10	CO2	BL3

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