REG.NO.: 23BCN0052

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

SCHOOL OF CHEMICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST -I
FALL SEMESTER 2025-2026

SLOT: B1+TB1

Programme Name & Branch	**: B. Tech., & Chemical Engineering**
Course Code	**: BCHE303L**
Course Name	**: Chemical Reaction Engineering I**
Faculty Name(s)	**: Dr. I. Ganesh Moorthy**
Class Number(s)	**: VL2025260101240**
Date of Examination	**: 18-08-2025**
Exam Duration	**: 90 minutes** **Maximum Marks: 50**

General instruction(s):

- **Answer All Questions**
- **Use ordinary graph sheet wherever required.**

Q. No	Question	Marks	Course Outcome (CO)	Bloom's Taxonomy (BL)
1.	Explain in detail about the temperature dependency term from collision theory for the bimolecular collisions of both unlike and like molecules.	10	CO1	BL1
2.	A reaction $2HI_{(g)} \rightarrow H_{2(g)}+I_{2(g)}$ is studied over a range of temperatures. The results obtained are tabulated below. 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.	10	CO1	BL1
3.	Develop the rate expressions in terms of concentration and conversion for the following irreversible biomolecular type second-order reaction. a. 2A ⟶ Products b. A+B ⟶ Products (where $C_{A0} \neq C_{B0}$)	10	CO2	BL1
4.	In studying the kinetics of decomposition reaction, the concentration of reactants were determined analytically at different time. The following results were obtained. Time, min: 0, 10, 20, 40, 100, 125 Conc., mol/l: 0.10, 0.0714, 0.0556, 0.0385, 0.02, 0.0167 Determine the order and rate constant for the reaction.	10	CO2	BL3
5.	After 8 minutes in a batch reactor, reactant is 80% converted and after 18 minutes the conversion is 90%. Find a rate expression for this reaction if C_{A0} = 1 mol/l	10	CO2	BL3

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