



**SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - I
FALL SEMESTER 2025-2026**

SLOT: D1+TD1

Programme Name & Branch : B. Tech. Computer Science and Engineering
Course Code and Course Name : BACHY105 and Applied Chemistry
Faculty Name(s) : Dr. Sasikumar S., Dr. Sumathi S., Dr. Thenmozhi K.,
Dr. Mausumi Goswami, Dr. Vipin Mishra, Dr. Gopi R.
Class Number(s) : VL2025260106581, 6585, 6589, 6593, 6597, 6601
Date of Examination : 20/08/2025, 09:30 AM - 11:00 AM
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 Outcome:
 - CO1: Understand the fundamental concepts in physical, analytical and materials chemistry.

Q N	Question	M	CO	BL
1.	Explain the isothermal and adiabatic thermodynamic processes. For each process, determine the work done, heat exchanged, and change in internal energy, and support your explanation with appropriate diagram.	10	1	2
2.	Describe the Carnot cycle, listing its four reversible processes. Include a P-V diagram and explain its significance in assessing the efficiency of heat engine.	10	1	3
3.	(a) Given that the enthalpy change (ΔH) is +40 kJ/mol and the entropy change (ΔS) is +100 J/mol·K at 298 K, determine if the reaction is thermodynamically spontaneous or not.	5	1	3
	(b) A Carnot engine operates between a high-temperature reservoir at 500 K and a low-temperature reservoir at 300 K. Calculate the maximum efficiency and the work done if the engine absorbs 600 J of heat from the hot reservoir.	5		
4.	(a) Why can the order of a reaction be fractional or zero, while molecularity is always a whole number? Explain with suitable examples.	5	1	2
	(b) A first-order reaction takes 12 hours for its 70% completion. Calculate the time required for its 90% completion.	5		
5.	Using the Arrhenius equation, explain the temperature dependence of reaction rates and the determination of activation energy from an Arrhenius plot, with reference to the isomerization of methyl isonitrile (CH_3NC) to acetonitrile (CH_3CN).	10	1	1
