

**VIT**Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)**SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - II
WINTER SEMESTER 2025-2026**

REG. NO.: 25BVD0128

SLOT: E2+ TE2

Programme Name & Branch : B. Tech. Electronics Engineering
Course Code and Course Name : BACHY107 and Applied Chemistry for Electronics Engineering
Faculty Name(s) : Dr. Napoleon A; Dr. Ashok Kumar; Dr. Satish Kumar;
Dr. Gopi and Dr. Dipankar
Class Number(s) : VL2025260506313; 6315; 6317; 6321; and 6319
Date of Examination : 20.03.2026 (9.30 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 Outcomes:
CO-2: Apply the concepts of thermodynamics, chemical kinetics, diffraction and microscopic techniques.
CO-3: Explain the concepts of functional materials and deposition techniques.
CO-4: Apply electrochemical approaches in sensors and energy storage devices.

QN	Question	M	CO	BL
1.	Consider a reversible heat engine that operates on four-stroke cycle between a high-temperature reservoir (T_h) and a low-temperature reservoir (T_c). Provide a detailed explanation of each stage, clearly specifying the work done and the corresponding change in entropy.	10	CO-2	BL3
2.	The isomerization reaction of $\text{CH}_3\text{NC} \rightarrow \text{CH}_3\text{CN}$, where the rate constant (k) doubles about every 10°C rise. (a) Explain why this occurs using collision theory, including reactant concentration, molecular speeds, and the fraction of effective collisions. (b) Draw and explain a graph that depicts the relationship between the rate constant (k) and temperature (T).	10	CO-2	BL3
3.	(a) For a chemical reaction with $\Delta H^\circ = 50 \text{ kJ/mol}$ and $\Delta S^\circ = 0.150 \text{ kJ/molK}$, calculate the equilibrium temperature where $\Delta G^\circ (\text{kJ/mol}) = 0$ and predict whether the reaction is spontaneous or non-spontaneous at 200 K and 500 K. (b) A first-order reaction takes 12 hours for its 80% completion. Calculate the time required for its 95% completion.	5	CO-2	BL3
4.	The intensity of color in specific materials is influenced by the application of electric potential. Identify such materials and explain the principle and mechanism of anodically and cathodically colouring intensity behaviour and describe the advantages and applications of such materials in our society.	10	CO-3	BL2
5.	"Energy devices are used for supplying drinking water to astronauts in addition to providing electricity." Elaborate on the construction, working principle and applications of any one of such devices with a suitable diagram.	10	CO-4	BL3