VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

School of Advanced Sciences
Department of Chemistry
Fall Semester 2022-23
Continuous Assessment Test - II

Course Code : BCHY101L **Duration:** 90 Minutes **Max. Marks:** 50

Course Name : Engineering Chemistry **Slot** : D1+TD1

Note: Students are allowed to carry one hand-written notebook and one textbook to the examination.

Q. No.	Answer ALL the questions (5 X 10 = 50 Marks)	Marks
1	Why heat engine efficiency is impossible to have 100%? Illustrate the process with suitable state functions.	10
2	a) Calculate the maximum work done when 1 mol of gas expands isothermally and reversibly from a volume of 5L to 10L at 27 °C. What is the internal energy change if 5000 Joule of heat is absorbed? b) Ethyl acetate is present in nail polish remover. During the hydrolysis, ethyl acetate is converted into acetic acid and ethanol. It was identified that the conversion does not depend on the quantity of the water. Reason out based on chemical kinetics with suitable rate law and equation.	(5 + 5)
3	a) Enzyme catalase accelerates the hydrogen peroxide decomposition process 10^{15} times than the conventional catalysis process. Reason out. b) Propose a suitable environment-friendly energy device that produces electricity at low temperatures with water as a by-product. Discuss its chemical reactions and advantages.	(5 + 5)
4	A commonly used battery in the laptop and mobile phones has the highest energy among the secondary batteries. Explain the construction and chemistry involved with the appropriate equations and a diagram.	10
5	Elucidate the role of metal complexes in solar energy conversion. Discuss the construction, working principle and mechanism of the device.	10