


VIT

 Vellore Institute of Technology
(Awarded as the University under section 3 of the UGC Act, 1956)
Final Assessment Test – November 2025

Course: IACHY102 - Engineering Chemistry

Class NBR(s): 6857 / 6863 / 6866 / 6870

Time: Three Hours

Slot: E2+TE2

Max. Marks: 100

- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

COs	CO Statements
CO1	Understand the fundamental concepts in physical, analytical and materials chemistry.
CO2	Apply chemical concepts for the advancement of materials in electrical, magnetic, and energy domains.
CO3	Demonstrate instrumental techniques in chemistry.
CO4	Solve chemical problems by applying computational chemistry.
CO5	Experiment to quantify the metal ions, to visualize molecules using computational tools, to prepare ZnO semiconductor.

BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

Answer ALL Questions
(10 X 10 = 100 Marks)

- Describe Carnot cycle. Obtain an expression for the efficiency of heat engine working between the temperatures T_1 and T_2 . CO1 BL1
- Explain the working principle of a dye-sensitized solar cell, including the role of the dye, TiO_2 , and electrolyte. CO2 BL2
- List out the differences between diamagnetic, paramagnetic, and ferromagnetic substances. Provide examples and highlight their distinct magnetic properties. CO2 BL1
- Discuss the principle and applications of UV-Visible absorbance spectroscopy. CO3 BL3
- Discuss the fundamental principles of quantum mechanical calculations, and how are they used in understanding the theory of molecular orbitals and atomic orbitals. CO4 BL3
- Discuss how the collision theory accounts for the effects of concentration, temperature, orientation factor and catalysts on reaction rates. CO4 BL3
- Describe the construction and working principle of a Hydrogen–Oxygen fuel cell with a neat diagram. CO2 BL1
- What are the principles and applications of X-Ray Diffraction (XRD) in materials science, and how is it used to determine crystal structure and properties? CO3 BL1