


VIT

 Vellore Institute of Technology
(Approved as a University under the UGC Act 1956)
Final Assessment Test – November 2025

Course: BACHY102 - Organic Chemistry for Biotechnologists

Class NBR(s): 6406 / 6411 / 6434

Time: Three Hours

Slot: F1+TF1

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

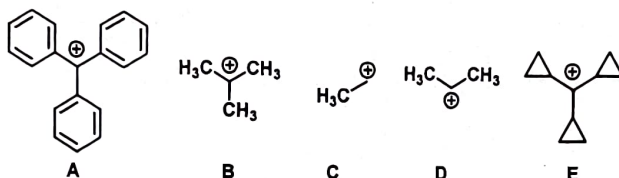
COs	CO Statements
CO1	Describe electronic effects in organic molecules and its role in biological reactions.
CO2	Apply stereochemistry in biological systems.
CO3	Discuss phase transfer catalysis and molecular recognition.
CO4	Utilize the knowledge of enzyme mimic activity in drug synthesis and the importance of metal ions in biological systems.
CO5	Analyze organic molecules using instrumental, wet-chemical, and computational methods.

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

 Answer ALL Questions

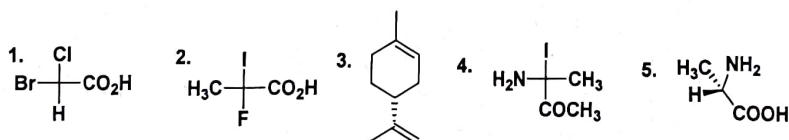
(10 X 10 = 100 Marks)

1. a) Arrange the given carbocations (A-E) in ascending order of their stability, with proper justification. CO1 BL2



- b) Arrange the following acids in increasing order of acidic strength and justify your answer: i) Benzoic acid, ii) 4-Methylbenzoic acid, iii) 4-Nitrobenzoic acid, iv) 4-Bromobenzoic acid, v) 4-Methoxybenzoic acid

2. a) Determine the absolute configuration (R or S) of the given compounds. CO2 BL3



- b) Explain how biological stereoselectivity is maintained in the action of enzyme dehydrogenase?

3. Define a phase transfer catalyst (PTC) and discuss its advantages. Explain its role in enhancing nucleophilic substitution and alkylation reactions with suitable examples. CO3 BL2
4. Define enzyme model and explain the various types of enzyme models with detailed mechanisms. CO4 BL3
5. Describe how zinc functions as a catalytic cofactor in carboxypeptidase and carbonic anhydrase, highlighting its mechanistic role in each enzyme. CO4 BL3

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| 6. | Explain the concept of resonance in organic molecules with suitable examples, and depict the resonating structures of aniline and benzylic carbocations. | CO1 | BL2 |
| 7. | Differentiate between stereospecific and stereoselective reactions, and illustrate each with suitable examples. | CO2 | BL3 |
| 8. | Describe homogeneous and heterogeneous catalysis with appropriate chemical reactions. | CO3 | BL2 |
| 9.a) | Explain the functions and applications of crown ethers and cryptands in different chemical contexts. | CO4 | BL3 |

[OR]

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| 9.b) | Explain how iron plays a crucial role in the oxygen-binding and transport mechanism of hemoglobin. | | |
| 10.a) | Describe the detailed mechanism and biological importance of the Krebs cycle. | CO2 | BL3 |

[OR]

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| 10.b) | Describe Cram's rule with suitable examples, highlighting its use in predicting the outcome of nucleophilic addition. | | |
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