

FACULTY OF SCIENCE

M.Sc. III – Semester Examination, December 2016

Subject: Chemistry (Organic Chemistry)

Paper – I

Conformational Analysis, Pericyclic Reactions and Enzymes

Time: 3 Hours

Max.Marks: 80

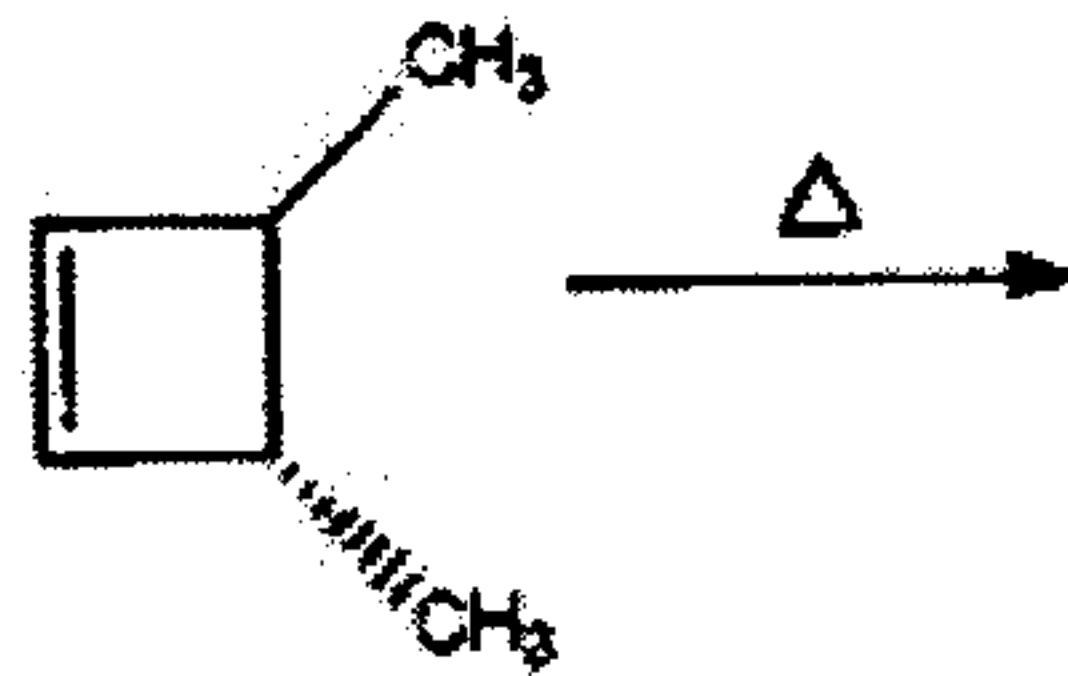
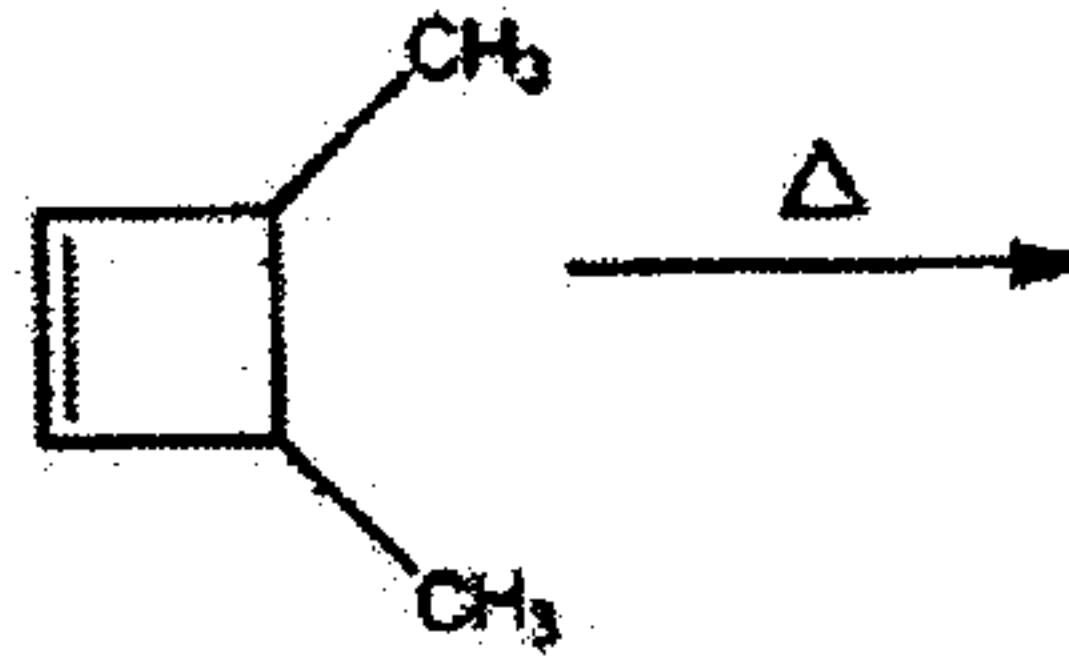
Note: Answer all questions from Part-A and Part-B.**Each question carries 8 marks in Part-A and 12 marks in Part-B.****PART – A (4x8 = 32 Marks)****[Short Answer Type]**

- 1 a) Describe the conformations of tropane, tropine and pseudotropine.
b) Write a note on octane rule.
- 2 a) Discuss about classification of pericyclic reactions.
b) Draw the molecular orbitals and explain the nodes and symmetry properties of allyl cation.
- 3 a) $\pi_s^4 + \pi_s^2$ cycloaddition is thermally allowed and forbidden photochemically. Explain by FMO method.
b) What are aromatic and anti-aromatic compounds? Explain.
- 4 a) Explain lock and key and induced fit model of enzyme action.
b) Write a note on transcription and translation.

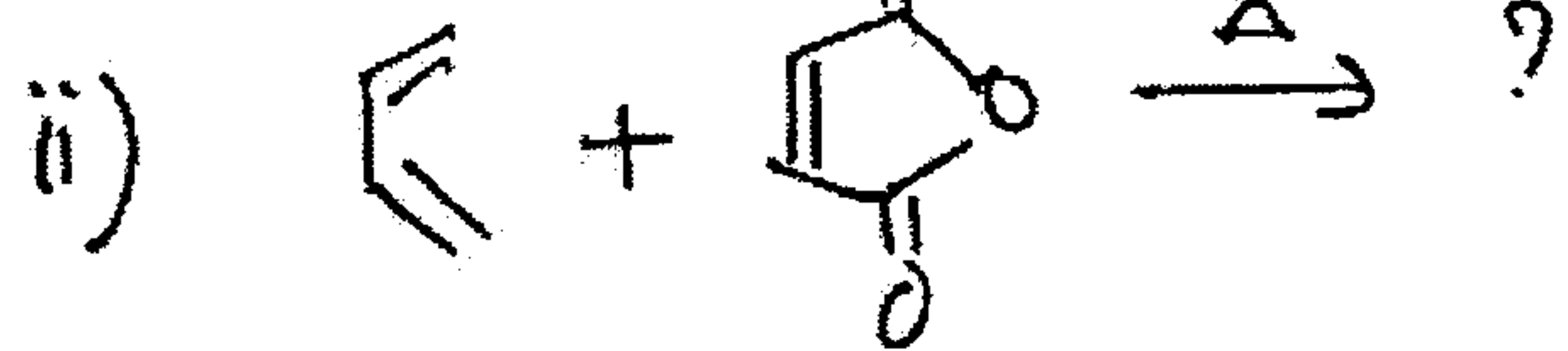
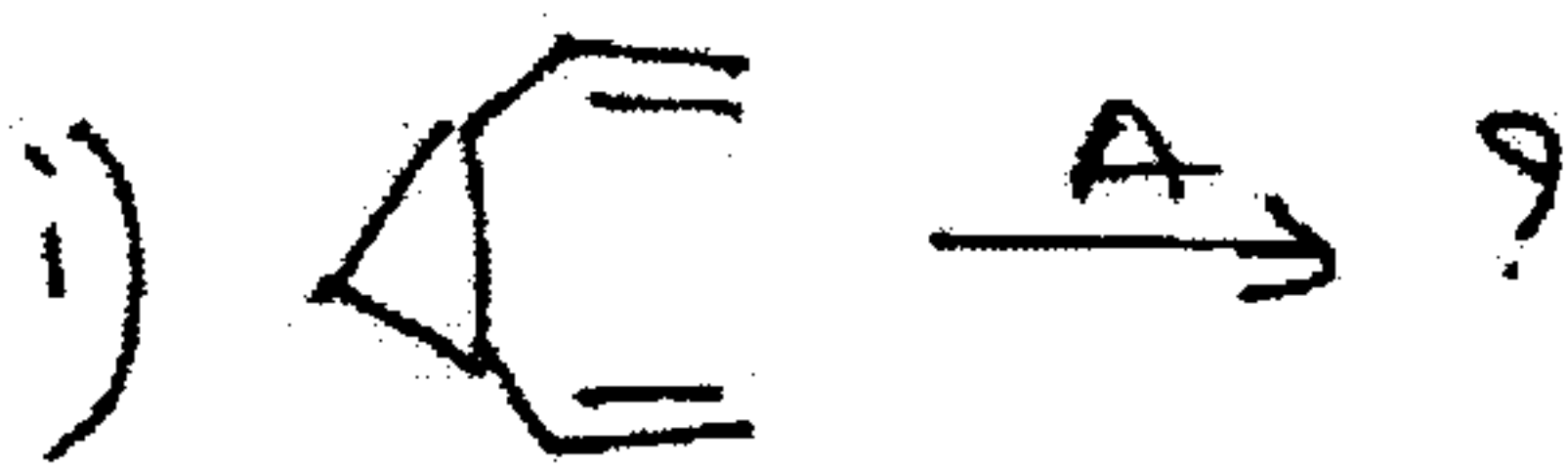
PART – B (4x12 = 48 Marks)**[Essay Answer Type]**

- 5 a) Explain the conformational stability of 1,2 and 1,3-dimethyl cyclohexanes?
b) Explain how plain and anomalous curves are used in the study of conformational analysis.
- OR**
- c) Explain the conformational stability and stereochemistry of decalins.
d) Among cis and trans 4-t-butyl cyclohexyl carboxylates which one undergoes faster saponification and why?
- 6 a) Draw the molecular orbitals of pentadienyl cation and pentadienyl radical and indicate their nodes and symmetry properties.
b) Construct orbital symmetry correlation diagram for CON rotatory ring closure of 1,3-butadiene and explain.
- OR**
- c) Frame the Woodward – Hofmann selection rules for electrocyclic reactions based on FMO approach.

d) Complete the following reactions and explain by Huckel-Mobius approach.



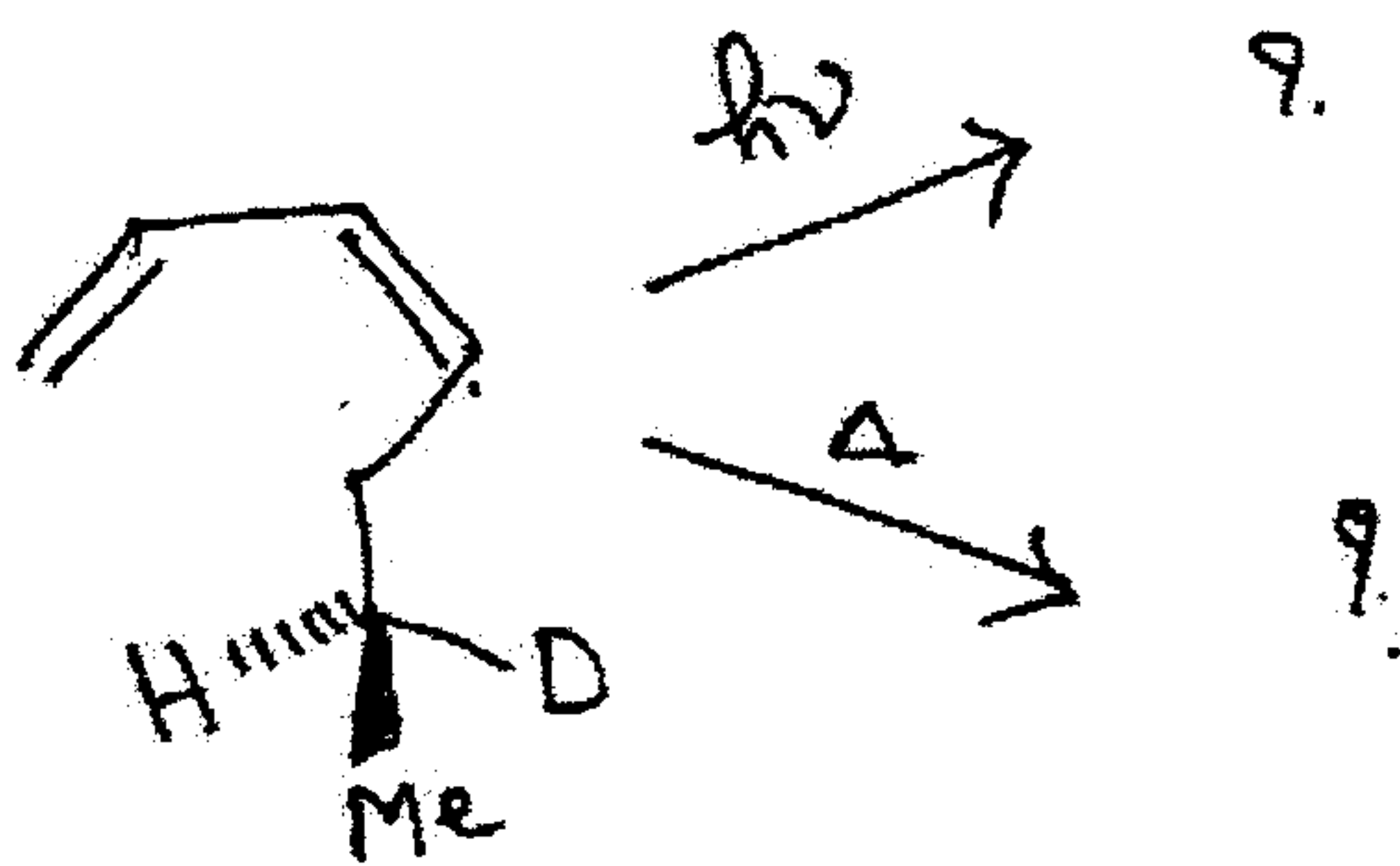
7 a) Predict the product and explain by Huckel - Mobius approach.



b) Explain the Huckel's $4n+2$ electron rules taking azulene and annulenes as examples.

OR

c) Predict the product of 1,5-sigmatropic group shift in the following and explain by FMO approach.



d) What are Cope and Claisen rearrangements? Explain their mechanism with suitable examples.

8 a) Explain the classification of enzymes based on their mode of action.

b) Formulate the synthesis of nucleotides and nucleosides.

OR

c) Define and explain the terms replication and genetic code.

d) Write a note on phosphoglycerides and sphingolipids.

