

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 01

Total No. of Questions : 08

PHD (Chemical)
ADVANCED ORGANIC CHEMISTRY

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

- Q1 i) What are electrocyclic reactions? Drawing correlation diagrams, discuss disrotatory and conrotatory interconversion of cyclobutene and butadiene.
ii) Discuss the Claisen and Cope rearrangements with mechanism.
- Q2 i) What are suprafacial and antarafacial processes in sigmatropic rearrangements? Illustrate these processes by examining a suprafacial 1, 5-sigmatropic shift of hydrogen in which homolytic cleavage results in the production of a hydrogen atom and pentadienyl radicals. Explain with energy level diagram.
ii) What are the products of concerted cycloaddition of ethylene, addition being suprafacial on both components? Is it symmetry allowed under thermal or photochemical condition? Explain.
- Q3 i) Discuss with mechanism for hydrosilylation and hydroboration reactions.
ii) How Suzuki reaction is different from Sonogashira reaction. Explain with mechanism.
- Q4 i) Explain how quaternary salts and crown ethers are helpful for organic reactions in phase transfer catalysts.
ii) How transition metals are used for the cleavage of C-H bonds? Explain with suitable examples. Draw the mechanism wherever applicable.
- Q5 i) Discuss the regiochemistry and stereochemistry in Diels Alder reaction.
ii) What do you understand by 1,3-dipolar cycloaddition reactions? Explain dipolar reaction with the help of molecular orbital diagrams.
- Q6 i) Show the mechanism of (a) Povarov and (b) aza-Diels-Alder reaction.
ii) Discuss hetero Diels-Alder reaction of 4 + 2 cycloaddition reaction.
- Q7 i) Discuss the multicomponent cycloaddition type of reaction of 5 + 2 + 1.
ii) Explain with suitable example for 5 + 2 type of cycloaddition multicomponent reaction.
- Q8 i) How transition metal salts are used for the multicomponent cycloaddition reaction? Support your answer with examples.
ii) Discuss with suitable example for 3 + 2 + 2 multicomponent cycloaddition reaction.