



**R-304001**

Seat No. \_\_\_\_\_

**M. Sc. (Sem. IV) Examination**

**April - 2022**

**MSC1C401 : Organic Chemistry**

*(Advanced Organic Chemistry)*

*(New Course)*

Time : 3 Hours]

[Total Marks : 70

- Instructions :** (1) All questions are compulsory.  
(2) Figures to the right indicates full marks.

- 1 (a) Explain sigmatropic rearrangement with suitable example. Discuss the application of PMO method to predict the course of sigmatropic reaction. 7

**OR**

What is FMO method ? Discuss the application of FMO method to predict the course of electro-cyclic and cycloaddition reaction. Derive selection rules.

- (b) Define the term : Suprafacial and antarafacial cycloaddition. Construct co-relation diagram for (4S+2S) cycloaddition and reverse reaction and show that they are thermally allowed and photochemically forbidden process. 7

**OR**

Define the term : Conrotatory and disrotatory system. With co-relation diagram of conrotatory system explain cyclization of 1,3,5-hexatriene to cyclohexadiene.

- 2 (a) (1) 1,2-dimethyl cyclohexane exists as two isomers : cis and trans. Why cis is more stable ? 7  
(2) Why cis-4-tert butyl cyclohexanol undergoes elimination reactions faster than trans ?

**OR**

Draw projections and discuss various conformations of Decalines and decalones.

- (b) Compare the conformational analysis of heterocyclic compounds with carbocyclic compounds giving suitable example. 7

OR

What are conformational isomers ? Discuss Bayer's strain theory for cyclic aliphatic hydrocarbons.

- 3 (a) (1) Discuss the application of  $\text{PdCl}_2$  as an oxidizing agent. 7  
(2) Discuss the oxidation of aromatic ring of phenol.

OR

Discuss the oxidation of alcohols with suitable example.

- (b) Enlist oxidizing agents for the oxidation of alkenes. 7  
Give mechanism and application of peroxy carboxylic acid in epoxidation of various alkenes.

OR

Give mechanism and application of Osmium tetroxide and Manganese dioxide as oxidizing agent in organic synthesis.

- 4 (a) Discuss mechanism for the following reaction. 7  
(i) Wolff Kishner reduction  
(ii) Rosenmund reduction  
(iii) Staudinger reduction

OR

Discuss reagent, condition and mechanism for the reduction of various aromatic nitro compounds.

- (b) Discuss the mechanism for the reduction of alkynes with evidences. 7

OR

Enlist methods for the reduction of carbonyl compounds. Discuss at least two methods for reduction of carbonyl compounds with relevant mechanism.

- (1) Give symmetry properties of 1,3-butadiene.
  - (2) Cyclopentadiene + Maleic anhydride  $\xrightarrow{\Delta}$
  - (3) Cis 3,4-dimethyl cyclobutene  $\xrightarrow{h\nu}$
  - (4) Trans-cis-cis 1,3,5-octatriene  $\xrightarrow{h\nu}$
  - (5) Draw structure of decalin.
  - (6) What is angle strain ?
  - (7) What is Collin's reagent ?
  - (8) Discuss one application of DMSO as an oxidizing agent.
  - (9) Give one example of stereoselective oxidation of C-H bond.
  - (10) Name the reagent which oxidises primary, secondary and tertiary amines.
  - (11) What is the advantage of Wilkinson's catalyst in reduction reaction ?
  - (12) What is homogeneous and heterogeneous catalytic hydrogenation ?
  - (13) Give the configuration of the product when alkyne is reduced to alkene.
  - (14) How esters are reduced under different conditions ?
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