

AG-144

April-2017

M.Sc., Sem.-IV

**507 : Organic Chemistry
(Advanced Organic Chemistry)**

Time : 3 Hours]

[Max. Marks : 70

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

1. Answer the following :

- (A) What are pericyclic reactions? Classify them. Derive selective rules for $4n\pi$ and $(4n + 2)\pi$ electron system with the help of FMO method for cycloaddition reaction.

OR

What is Dewar's rule of aromaticity? Discuss its application to predict electrocyclic and sigmatropic reactions. Derive selection rules.

- (B) Construct co-relation diagram for $(4s+2s)$ cycloaddition and reverse reaction and show that they are thermally allowed and photo chemically forbidden process. Derive selection rules

OR

Construct the correlation diagram for interconversion of cyclohexadiene-hexatriene and show that in the disrotatory mode, it is thermally allowed while in the conrotatory mode it is thermally forbidden process. Derive selection rules.

2. Answer the following :

- (A) Define anomeric effect. Give an account on the factors that affect stability of conformations.

OR

Draw projections and discuss various conformational analysis of heterocyclic compounds with carbocyclic compounds.

- (B) Draw projections and discuss various conformations of decalines and decalones. 7

OR

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

3. Answer the following :

- (A) Giving mechanism of reaction discuss oxidation of alkenes to corresponding diols and carbonyl compounds. 7

OR

Enlist oxidizing agents for the oxidation of alkene. Giving mechanism discuss the application of peroxy carboxylic acid in epoxidation of various alkenes.

- (B) Giving mechanism of the reaction, discuss the reactivity and specificity of chromic acid as an oxidizing agent for the oxidation of alcohols. 7

OR

Giving mechanism discuss the application of Osmium tetroxide and Periodic acid as oxidizing agent in organic synthesis. GujaratStudy.com

4. Answer the following :

- (A) Giving evidences, discuss the mechanism for the reduction of alkenes. 7

OR

Giving evidences, discuss the mechanism for the reduction of alkynes.

- (B) Discuss mechanism for the following reactions with one application each : 7

- (i) Staudinger reduction
 (ii) Corey-Bakshi-Shibata reduction

OR

Discuss mechanism for the following reactions with one application each :

- (i) Luche reduction
 (ii) Wolf-Kishner reduction

Answer the following :

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- (a) Write symmetry properties of 1, 3, 5 hexatriene.
- (b) Trans-cis 1, 3, 5-octatriene $\xrightarrow{h\nu}$?
- (c) Norbornadiene + Tetra cyano ethylene $\xrightarrow{\Delta}$?
- (d) Differentiate Configuration and Conformation.
- (e) Define Bredt's rule.
- (f) Draw Newmann projection of the most **stable conformation** of cis-1-ethyl-4-isopropyl cyclohexane.
- (g) Giving reaction show one application of **DMSO** as oxidizing agent.
- (h) Show per iodate oxidation of **primary alcohol**.
- (i) Give one reaction for oxidation of **ketone** to corresponding ester.
- (j) Show oxidation of **methine** group adjacent to **carbonyl** group.
- (k) Give sequential steps for the conversion of **anisole** to 2-cyclohexenone.
- (l) Show reduction of ester with lithium aluminum hydride.
- (m) What is the advantage of Wilkinson's catalyst in reduction reactions ?
- (n) What is **homogenous** and **heterogeneous catalytic hydrogenation** ?