

**AA-111**

April-2016

**M.Sc., Sem.-IV.**

**507 CHE (O) : Chemistry (Organic)**  
**(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 :

1 (a) Define the term : Conrotatory and disrotatory system. With co-relation diagram of conrotatory system explain cyclisation of 1,3,5-hexatriene to cyclohexadiene. 7

OR

2 (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

(b) What is FMO method ? Discuss the application of FMO method to predict the course of electrocyclic and cycloaddition reaction. Derive selection rules. 7

OR

14 Explain Sigmatropic rearrangement with suitable example. Discuss the application of PMO method to predict the course of sigmatropic reaction. 18

Answer the following :

(a) What are conformational isomers ? Discuss Bayer's strain theory for cyclic aliphatic hydrocarbons. 7

OR

○ Giving suitable example compare the conformational analysis of heterocyclic compounds with carbocyclic compounds. 7

(b) Draw projections and discuss various conformations of decalin and decalones.

OR

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(i) 1, 2-Dimethyl cyclobutane exists as two isomers: cis and trans. Why cis is more stable?

(ii) Why cis-4-tert butyl cyclohexanol undergoes elimination reactions faster than trans?

3. Answer the following:

(a) Giving mechanism discuss the application of Osmium tetroxide and Manganese dioxide as oxidizing agent in organic synthesis.

OR

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

(c) Giving examples explain oxidation reaction. Discuss the oxidation of alcohols with suitable mechanism.

OR

(i) Discuss the application of  $\text{PdCl}_2$  as an oxidizing agent.

(ii) Discuss the oxidation of aromatic ring of phenol.

4. Answer the following: GujaratStudy.com

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

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(b) Giving evidences discuss the mechanism for the reduction of alkynes.

(c) Giving reagent and condition discuss mechanism for the reduction of various aromatic-nitro-compounds.

OR

Discuss mechanism for the following reactions:

(i) Rosenmund reduction

(ii) Sandmeyer reduction

(iii) Wolff Kishner reduction

5. Answer the following :

- (a) Cyclooctadiene + Maleic anhydride  $\xrightarrow{\Delta}$  ?
- (b) Trans-cis-cis 1, 3, 5-octatriene  $\xrightarrow{h\nu}$  ?
- (c) Norbornadiene + Tetra cyano ethylene  $\xrightarrow{\Delta}$  ?
- (d) Give symmetry properties of 1, 3-butadiene.
- (e) Define Bredt's rule.
- (f) Draw various isomers of Dichlorocyclopropane.
- (g) Arrange following Cycloalkanes in ascending order based on heat of combustion and ring strain :
  - Cyclopentane, Cyclopentadecane, Cyclodecane and Cyclopropane
- (h) Draw newmann projection of the most stable conformation of cis-1-ethyl-4-isopropyl cyclohexane.
- (i) What is sharpless epoxidation ?
- (j) How PCC (Pyridinium Chlorochromate) is prepared ?
- (k) Give sequential steps for the conversion of anisole to 2-cyclohexanone.
- (l) How alcohols are reduced to hydrocarbon ?
- (m) What is the advantage of Wilkinson's catalyst in reduction reactions ?
- (n) What is homogenous and heterogeneous catalytic hydrogenation ?