



Seat No. : _____

XX-135

M. Sc. (Sem. IV)

April-2013

507 – Chemistry

(Advanced Organic Chemistry)

Time : 3 Hours]

[Max. Marks : 70

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

1. (a) Construct the correlation diagram for cyclo-addition and reverse reaction of ethylene-cyclobutane system and show that they are thermally forbidden and photochemically allowed process. 7

OR

Define sigmatropic rearrangement. Explain using FMO method the (1, 5) suprafacial sigmatropic reaction is thermally allowed while the antrafacial sigmatropic reaction is photochemically allowed process. Derive selection rules.

- (b) Construct the correlation diagram for interconversion of cyclobutene-butadiene and show that in conrotatory mode it is thermally allowed while in disrotatory mode it is thermally forbidden process. Discuss selection rules. 7

OR

Discuss the application of PMO method to predict cycloaddition and sigmatropic reaction.

2. (a) Draw projections and discuss various conformations of decalines and decalones. 7

OR

Give a brief account of the factors that affect the stability of conformations. Discuss various conformations of perhydrophenanthrene.

- (b) Discuss stability and optical activity of various conformations of 1, 3-dimethyl cyclohexane. Give a brief account on Bayer's strain theory for cyclic aliphatic hydrocarbons. 7

OR

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

3. (a) Giving mechanism of the reaction, discuss the reactivity and specificity of chromic acid as an oxidizing agent. 7

OR

Discuss the application of Osmium tetroxide and Manganese dioxide as oxidizing agent in organic synthesis.

- (b) What is epoxidation ? Giving mechanism discuss the application of Peroxy Carboxylic acid in epoxidation of various alkenes. 7

OR

- (i) Explain giving mechanism the use of periodate ion in the oxidation of glycols. 4
(ii) Giving mechanism discuss oxidation of alkenes to carbonyl compounds. 3

4. (a) Giving evidences discuss the mechanism for the reduction of alkyenes. 7

OR

Giving evidences discuss the mechanism for the reduction of esters to alcohols and amides to amines. 7

- (b) Giving reagent and condition discuss mechanism for the reduction of various aromatic nitro compounds. 7

OR

Giving mechanism discuss the reduction of epoxy compounds and its stereochemistry.

5. Answer the following in brief : 14

- (i) Give symmetry properties of 1, 3, 5-hexatriene.
(ii) What is homogeneous and heterogeneous catalytic hydrogenation reaction ?

Give the name and structure of the following :

- (iii) Cis-2-butene(s) + cis-2-butene (a) \longrightarrow
(iv) Ethylene(s) + cis-2-butene (a) \longrightarrow
(v) Define con-rotatory and disrotatory system.
(vi) Define Brendt rule.
(vii) Draw various isomers of dichlorocyclopropane.
(viii) Differentiate configuration and conformation.
(ix) Give application of m-chloro perbenzoic acid as oxidizing agent.
(x) What is sharpless epoxidation ?
(xi) How alcohols are converted to ketones with dimethyl chloro-sulphonium ion ?
(xii) How alcohols are reduced to hydrocarbons ?
(xiii) How alkenes are reduced to alkane ?
(xiv) Give sequential step for the conversion of anisole to 2-cyclohexenone.
