Seat No. : _____

AE-136

April-2015

M.Sc., Sem.-IV

CHE (O) 507 : Chemistry

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) Giving classification, discuss the characteristics of pericyclic reactions. Construct the correlation diagram for (2S + 2S) cycloaddition reaction and show that they are thermally forbidden while photochemically allowed process. **7**

OR

Derive selective rules for $4n\Pi$ and $(4n + 2)\ \Pi$ electron system with the help of FMO method for cycloaddition and sigmatropic reactions.

(B) What is con-rotatory and dis-rotatory system ? With correlation diagram explain cyclisation of 1, 3, 5 – hexatriene to cyclohexadiene. Derive selection rules. **7**

OR

What is PMO method ? Using PMO method discuss the selection rules for cycloaddition and electrocyclic reactions.

2. Answer the following :

(A) What are conformational isomers ? Discuss stability and optical activity of various conformations of 1, 3 – dimethyl cyclohexane. **7**

OR

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

(B) Define anomeric effect. Give an account on the factors that affect stability of conformations. **7**

OR

(I) 1, 2 – Dimethyl cyclobutane exist as two isomers. Discuss their stability.

(II) Discuss elimination properties of cis & trans-4-tertiary butyl cyclohexanol.

3. Answer the following :

(A) Discuss the application of periodic acid and Mn(VII) as oxidixing agent in organic synthesis. 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 oxidising agent. **7**

OR

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

(ii) Discuss the oxidation of alkenes to carbonyl compounds.

4. Answer the following :

(A) Discuss the reduction of naphthalene and aromatic nitro compounds under different conditions. **7**

OR

Enlist methods for the reduction of carbonyl compounds. Discuss reduction of ester to alcohol and amide to amine.

(B) Giving mechanism discuss the reduction of epoxy compounds and its stereochemistry. **7**

OR

Giving evidences discuss the mechanism for the reduction of alkynes.

5. Answer the following : **14**

(a) Ethelene (s) + Cis -2- butcne (a) $\longrightarrow$?

(b) Trans-cis-trans 1, 3, 5 – octatriene $\xrightarrow{\Delta}$?

(c) Norbornadiene + Tetra cyano ethelene $\xrightarrow{\Delta}$?

(d) Define supraficial and antraficial addition.

(e) Define Bredt's rule.

(f) Draw structures for the cis and trans isomer of cyclobutane.

(g) Draw newmann projection of the most stable conformation of cis-1-ethyl-4-isopropyl cyclohexane.

(h) What is Collins reagent ?

(i) What is sharpless epoxidation ?

(j) Give name and structure of product when methelene group adjacent to carbonyl group is oxidised with SeO_2.

(k) How DMSO oxidise primary alcohol to corresponding carbonyl compounds in presence of p-toluene sulphone ?

(l) How esters are reduced under different conditions ?

(m) What is the advantage of Wilkinson's catalyst in reduction reactions ?

(n) Give sequential step for the conversion of anisole to 2-cyclohexanone.

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