

KJ-487
 December-2012
402 : CHEMISTRY
Paper – II
(Organic Chemistry)

Time : 3 Hours]

[Max. Marks : 70

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

1. (A) Answer the following : 7

- (i) Explain how meso (erythro) 1, 2-dibromo-1,2-diphenyl ethane yields cis product while its dl (threo) form gives trans product through E2 reaction.
 (ii) Explain Saytzeff and Hoffmann's rule of elimination with illustration.

(B) Answer the following : 7

- (i) 2-chloropropyl ethyl sulphide on hydrolysis gives 2-hydroxy propyl ethyl sulphide as a normal product and 1-hydroxy isopropyl ethyl sulphide as a rearranged product. Explain giving mechanism.
 (ii) 2-Methyl-3-butenol-2 under the influence of dilute aqueous acid forms 3-methyl-2-butenol-1 as the major product. Give mechanism of the reaction and explain why 3-methyl-2-butenol-1 as the major product.

OR

(A) Answer the following : 7

- (i) Compare E₁, E₂ and E₁CB pathways.
 (ii) Explain Pyrolytic Syn elimination involving E₁ mechanism with suitable examples.

(B) Answer the following : 7

- (i) β-(p-hydroxy phenyl) ethyl bromide undergoes ethanolysis about 10⁶ times faster than β-(p-methoxyphenyl) ethyl bromide. Explain.
 (ii) Compare SN¹ and SN² reaction with suitable examples.

2. (A) Answer the following : 7

- (i) Prepare HMO diagram for cyclopenta dienyl ions using Frost Circle method. Discuss their aromatic character.
 (ii) Explain why both electrophilic and nucleophilic substitution reactions occurring in azulene.

(B) Answer the following :

- (i) Describe various factors that affect the strength of acids.
- (ii) Give Hammett equation. Explain all the terms of the equation.

OR

(A) Answer the following :

- (i) Prepare HMO diagram for cyclo butadiene and cyclopropenyl cation using Frost circle method. Discuss their aromatic character.
- (ii) Discuss aromaticity in different annulenes.

(B) Answer the following :

- (i) Why amidines are far stronger base than amines.
- (ii) Discuss the applications and limitations of Hammett equation. Explain deviation from Hammett equation.

3. (A) Answer the following :

- (i) Discuss methods of generating free radicals and also discuss their stability.
- (ii) Discuss the structure and stability of carbanions.

(B) Answer the following :



Identify product A. Name the rearrangement and offer suitable mechanism for this conversion.

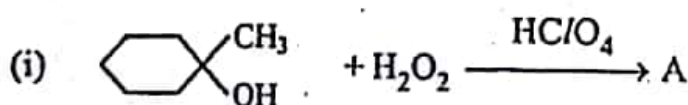
- (ii) Discuss the mechanism and applications of Baeyer - Villiger rearrangement.

OR

(A) Answer the following :

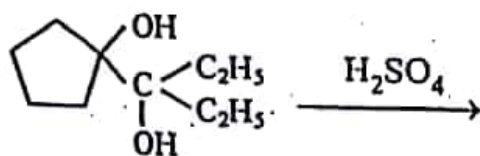
- (i) What are classical and non-classical carbonium ions ? Give important reactions of carbonium ions.
- (ii) What are nitrenes ? Give two methods of generation of nitrenes. Explain Curtius rearrangement.

(B) Answer the following :



Identify product A. Name the rearrangement and offer suitable mechanism for this conversion.

(ii) Complete the following reaction and give its mechanism.



(A) Answer the following :

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(i) What is resolution ? Give any three methods of resolution of racemates.

(ii) Discuss the stereochemistry of sulphoxides.

(B) Discuss the stereochemistry of Biphenyl derivatives.

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OR

(A) Answer the following :

7

(i) What is stereo specificity ? Explain stereo specific addition to alkenes.

(ii) Write a note on optical activity of spiran and allenes.

(B) Discuss the stereochemistry of Quaternary ammonium salts.

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Answer the following questions :

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(1) What is anchimeric assistance ? Give one example.

(2) Show how β -chlorohydrin is converted to epoxide when reaction is carried out in presence of base.

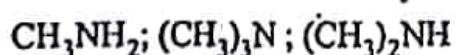
(3) What is allylic rearrangement ? Give one structure of allylic compound.

(4) Explain Antiaromaticity.

(5) How one explains the acidity of nitromethane ?

(6) Explain Homoaromatic system.

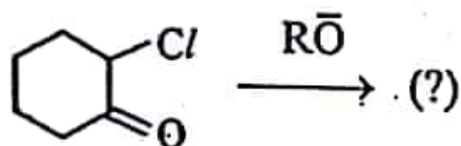
(7) Arrange the following in increasing order of basicity in aqueous solution.



(8) Give mechanism for carbylamine reaction.

(9) How acid azides are converted to corresponding urethanes.

(10) Complete the reaction



(11) Arrange the following carbocations in decreasing order of their stability. Benzyl, Triphenyl methyl and Tropylium cation.

(12) What is prochiral centre. Give one example.

(13) Explain homotopic and enantiotopic hydrogen atoms.

(14) Explain Helicity.