Seat No. : 337

DN-107

December-2013

M. Sc. (Sem-I)

CHE-402 : Chemistry

(Organic Chemistry)

Time : 3 Hours] **[Max. Marks : 70**

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

1. (A) Answer the following :

(I) Giving orientation draw structures for all possible E_2 products when 2-bromo butane reacts with concentrated potassium ethoxide. 4

(II) Explain Hoffmann and Saytzeff's rule of elimination with evidence. 3

OR

(I) Discuss E_1 reaction with supporting evidences.

(II) Compare Chugaev and Cope reactions with suitable example.

(B) Answer the following :

(I) When enantiomerically pure (S)-2-bromo propanoic acid reacts with conc. KOH it gives (R)-lactic acid. When the same reaction is carried out in the presence of Ag_2O and low concentration of hydroxide ion it gives (S)-lactic acid. Explain. 4

(II) What is allylic rearrangement ? Explain allylic rearrangement giving suitable example. 3

OR

(I) Acetolysis of erythro 3-phenyl-2-tosyl butane gives erythro 3-phenyl-2-acetyl butane with retention of configuration while its threo isomer gives racemic mixture. Explain.

(II) Compare SN^1 and SN^2 reaction with suitable examples.

2. (A) Answer the following :

(I) Using frost circle method show why cyclooctatetraene is not aromatic while cycloheptatrienyl cation is aromatic ? 4

(II) Discuss aromaticity in different annulenes. 3

OR

(I) State Huckel's rule of aromaticity. Explain the terms of non-aromaticity and anti-aromaticity given illustrations.

(II) Discuss aromatic character of azulene.

(B) Answer the following :

(I) Discuss the effect of hydrogen bonding on the strength of an acid. 4

(II) Discuss the applications and limitations of Hammett equation. Explain deviation from Hammett equation. 3

OR

(I) Comment on the acidity of C-H bond in a haloform.

(II) Give Hammett equation. Explain all the terms and show that the Hammett equation is a linear free energy relationship.

3. (A) Answer the following :

(I) Discuss three different reactions in which carbanion is a reactive intermediate. 4

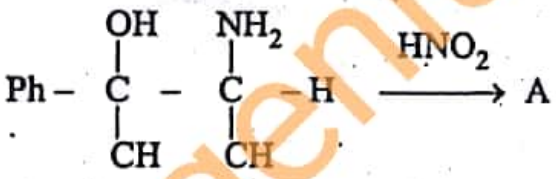
(II) Discuss non-classical carbocations. 3

OR

(I) What are free radicals ? How they are generated ? Discuss their stability.

(II) Discuss methods to distinguish singlet & triplet carbenes.

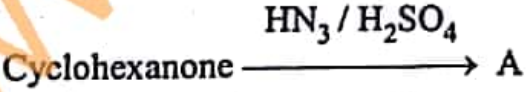
(B) Answer the following :

(I) 

Identify product A. Name the rearrangement and offer suitable mechanism for this conversion. 4

(II) Discuss the mechanism and application of Favorskii rearrangement. 3

OR

(I) 

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

(II) Discuss migratory aptitude in Baeyer-Villiger's rearrangement.

4. (A) Answer the following :

(I) What is resolution ? Give any three methods of resolution of racemates. 4

(II) Discuss stereochemistry of allenes. 3

OR

(I) Discuss prochiral relationship with suitable examples.

(II) Discuss stereochemistry of spiranes.

(B) Discuss the stereochemistry of quaternary ammonium salts. 7

OR

Explain stereo-selective and stereo-specific reactions. Give a brief account on asymmetric synthesis.

5. Answer the following : 14

(I) Arrange Se, O, Te and S in increasing order of nucleophilicity.

(II) Name the factors which affect the overall reactivity of elimination reaction.

(III) Giving the reaction show the end product when alcohol is dehydrated ?

(IV) Give the limitations of Huckel's rule.

(V) Which is more basic ? Aniline or methyl amine ? Why ?

(VI) What are nitrenes ?

(VII) Which of the following carbanions are more stable ?

$$CH_3 - CH = \overset{\ominus}{C}H, \; CH_3 - C \equiv \overset{\ominus}{C}$$

(VIII) Which type of doubl bonded compounds will produce carbene on photolysis ?

(IX) Giving example discuss geometrical isomerism.

(X) Giving one example each define chiral and achiral molecule.

(XI) How acid chloride is converted to urethane ?

(XII) Give mechanism for carbyl amine reaction.

(XIII) Explain helicity.

(XIV) Explain homotopic & enatiotopic hydrogen atoms.
