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SEAT No. _____

No. of Printed Pages: 2

(109) SARDAR PATEL UNIVERSITY
 M.Sc. (Organic Chemistry) Examination (CBCS) IVth Semester
 March-2019

Saturday, Date: 23.03.2019

Time: 2.00 p.m. to 5.00 p.m., Paper: PS04CORC23

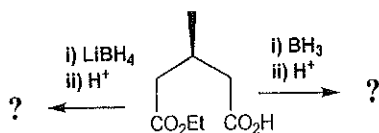
Subject: Stereochemistry of organic compounds, Max. Marks: 70

N.B.: i) Figures to the right indicate marks which are carried by each question.

- Q.1** Answer by highlighting the correct option [08]
- A most stable conformer of *n*-pentane will be...
 - (-sc, +sc)
 - (+sc, +sc)
 - (±ap, ±ap)
 - (±ap, +sc)
 - Axial chirality will be shown by.....
 - LDA
 - BINOLs
 - (s)-Valine
 - (s)-Proline
 - Enantiomers differ in their.....
 - Solubility
 - Interaction with achiral environment
 - Melting point
 - Interaction with chiral environment
 - Lowest energy conformer of cyclohexane of the following will be..
 - Chair form
 - Boat form
 - Twist-boat form
 - Half-chair form
 - A^{1,3}-Strain will be observed in...
 - Alkylidene cyclohexane
 - 2-Alkyl cyclohexanone
 - 2-Halo-cyclohexanone
 - Cyclohexene
 - Polar C-Cl bond in 2-chloro-cyclohexanone...
 - Causes bathochromic shift to C=O absorption, if equatorial
 - Increases stretching frequency $\nu_{C=O}$, if equatorial
 - Increases stretching frequency $\nu_{C=O}$, if axial
 - Causes hypsochromic shift to C=O absorption, if axial
 - DNAs are polymers, with repeating unit...
 - Amino acid
 - Nucleotide
 - Nucleoside
 - 2-Deoxy-D-ribose
 - Synthetic receptor(s) include(s)...
 - Cyclodextrins
 - Kemp's triacid based receptors
 - Calixarenes
 - Both b) and c)

Q.2 Attempt any SEVEN [14]

- State the term 'resolution'. Suggest ways of resolving the racemates of amino acids
- State in brief 'MCTC', 'CSP' and 'SMB', emphasizing on their uses in the resolution
- Complete the following with correct structures of major products



- State Sharpless epoxidation and its use in asymmetric synthesis

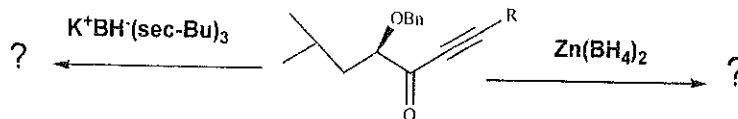
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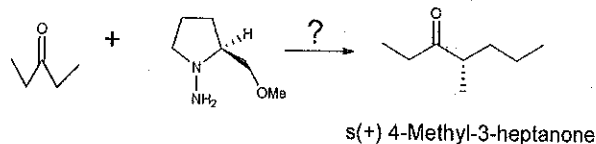
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- v) The *cis*- and *trans*-cyclohexane-1, 2-dicarboxylic acids both will undergo forming anhydrides! Explain
- vi) State the 'rabbit-ear effect' in tetrahydro-1,3-oxazin
- vii) List the distinguished features of DNA and RNA
- viii) Illustrate the term "molecular tweezers".
- ix) Ethane is higher in conformational energy than methanol and methylsilane! Explain

- Q.3** a) State Felkin-Anh and Cram's chelated rules. Complete the following with correct major products mentioned, according to these rules. [06]



- b) Illustrate 'enantio- and diastereo-selectivities. Complete the following with required conditions, reagents and reactants identified. [06]



OR

- Q.4** b) What do you understand by asymmetric synthesis? State the use of $(\text{IPC})_2\text{BH}$, CBS and IPC-BBN in asymmetric synthesis.
- a) List the requirements to promote resolution via formation of diastereomers. Describe resolution of $(\pm)\alpha$ -methyl-benzylamine [06]
- b) Describe in brief i) Kinetic method of resolution, ii) Preferential crystallization [06]

OR

- b) List different forces existing in the conformer. Describe conformational analysis of 2,3-dibromo-butane.
- Q.5** a) Write note on conformational analysis of fused bicyclic systems which contain nitrogen. [06]
- b) State ring- and pyramidal inversions. Discuss conformations of 1, 3, 5-trimethyl-hexahydro-1,3,5-triazine. [06]

OR

- b) Outline
- i) 2-Alkyl and 3-alkyl ketone effects in substituted cyclohexanones.
- ii) Conformational analysis of "1,3- and 1,4-dimethyl cyclohexanes."
- Q.6** a) Describe in brief [06]
- i) Dehydrogenation of succinic acid by succinate dehydrogenase.
- ii) Molecular recognition of aromatic amino acids by cyclodextrins.
- b) Write notes on i) "Structure of DNA", ii) Spherical macrotricyclic polyethers [06]

OR

- b) Write note on "Kemp's triacid-based receptors".

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