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[40/A-13]

SARDAR PATEL UNIVERSITY

M.Sc. (Organic Chemistry) Examination (CBCS) IV<sup>th</sup> Semester

October-2016

Thursday, Date: 27.10.2016

Time: 2.00 p.m. to 5.00 p.m., Paper: PS04CORC03

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]

- i) BINOLS are known to show....
  - a) Axial chirality
  - b) Atroisomerism
  - c) Both a) and b)
  - d) None
- ii) D-Glucose and D-mannose are
  - a) Diastereomers
  - b) Epimers
  - c) Isomers
  - d) All
- iii) A conformer of cyclohexane higher in energy would be
  - a) Chair form
  - b) Boat form
  - c) Twist-boat form
  - d) Half-chair form
- iv) Both the ring and pyramidal inversions exist in
  - a) Ethylamine
  - b) 1,4-Dioxan
  - c) Inositol
  - d) 1,3-Dimethylpiperidine
- v) Thermally allowed electrocyclozation of butadiene would be
  - a) Disrotatory
  - b) Conrotatory
  - c) Both a) and b)
  - d) None
- vi) A net economy of bonding in cycloaddition would be
  - a)  $0\sigma, 0\pi$
  - b)  $+ \sigma, - \pi$
  - c)  $+2\sigma, -2\pi$
  - d)  $+3\sigma, -3\pi$
- vii) The E vector of circularly polarized light would be constant in its
  - a) Amplitude
  - b) Direction
  - c) Both a) and b)
  - d) None
- viii) The % of minor enantiomer in a racemate having e.e. value 96% is
  - a) 2
  - b) 4
  - c) 6
  - d) Zero

**Q.2** Attempt any SEVEN [14]

- i) State Cotton effect, with suitable examples.
- ii) What do you understand by plane polarized light? State its significance in optical activity study.
- iii) Draw and discuss the MO diagram of 1,3-dipole, and its use in cycloaddition reaction.
- iv) State 'conrotatory' and 'disrotatory' transformations.
- v) What is Aldol-condensation? Show that this reaction is diastereoselective in nature.
- vi) Illustrate the terms 'racemization' and 'resolution' with suitable examples.
- vii) State the 'dihedral angle' and its importance in conformational studies.
- viii) Discuss in brief the conformation of monocyclic cycloheptane.

ix) State 'entrainment', and give its importance in the resolution of racemic mixture.

- Q.3**
- a) What do you mean by conformational energy? Ethane is higher in conformational energy than methylsilane and methanol! Explain [06]
- b) Draw and discuss conformational structures of 1, 2-, 1, 3- and 1, 4-dimethylcyclohexane. [06]

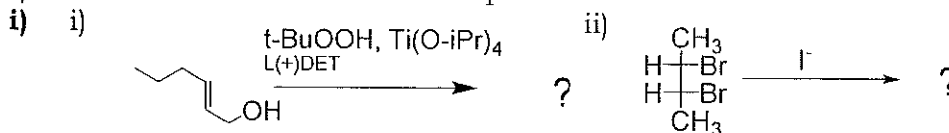
**OR**

b) Write a note on conformational features of six-membered heterocyclics.

- Q.4**
- a) What do you mean by asymmetric synthesis? Classify the strategies used. State the use of at least two chiral compounds to advance this synthesis. [06]
- b) Outline [06]
- i) Resolution of octan-2-ol
- ii) Kinetic asymmetric transformation

**OR**

b) Predict the stereo-chemical output of



- Q.5**
- a) Highlight the general features of pericyclic reactions. Explain based on the correlation diagram that thermal [2+2] cycloaddition is symmetry forbidden transformation. [06]
- b) What do you mean by sigmatropic rearrangement? Write a note on cope rearrangement. [06]

**OR**

b) Describe thermal and photochemically promoted electrocyclicization of 1,3,5-hexatriene via Huckel-Mobius transition states.

- Q.6**
- a) Describe in brief molecular recognition. Write a note on cyclodextrins and their uses. [06]
- b) Discuss in brief applications of ORD and CD spectra. [06]

**OR**

b) What is octant rule? Describe in brief. Deduce the absolute configuration of 3-methyl-cyclohexanone, R or S, provided its CD spectra confirmed +ve cotton effect.

-//--e--//--n--d--//--//-

