

**(117) SARDAR PATEL UNIVERSITY**M.Sc. (Organic Chemistry) **Examination** (CBCS) **IV<sup>th</sup>** Semester**April-2016****Monday, Date: 11.04.2016****Time: 2.30 p.m. to 5.30 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) Secondary structure of which of the following can be confirmed by ORD and CD studies?
 

a) Proteins	b) DNA
c) RNA	d) All
  - ii) Which of the following is/are assumed to be in A vertical plane of cyclohexanone derivative as per axial heloketone rule?
 





a) C <sub>1</sub>	b) C <sub>4</sub>
c) Both C <sub>1</sub> and C <sub>4</sub>	d) C <sub>3</sub>
  - iii) In resolution, a substance acting as a resolving agent must be
 

a) Unstable	b) Higher in MW
c) Toxic	d) Pure
  - iv) The bromination of cyclohex-1-ene gives exclusively
 

a) <i>trans</i> -1,3-dibromo-product	b) <i>Cis</i> -1,2-dibromo-product
c) <i>trans</i> -1,2-dibromo-product	d) None
  - v) In gaseous state, 1,2-dichloro-ethane prefers
 

a) M-Gauche conformer	b) P-Gauche conformer
c) Both a) and b)	d) Anti-conformer
  - vi) Which of the following has conformational energy barrier lowest?
 

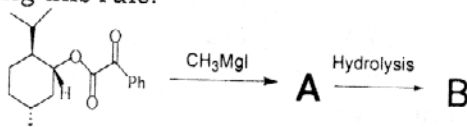
a) <i>n</i> -Butane	b) Propane
c) Methanol	d) Ethane
  - vii) Which of the following is called aromatic system?
 

a) 	b) 
c) 	d) 
  - viii) Non-bonding MO will be absent in
 

a) Allyl cation	b) 2,4-Pentadienyl cation
c) 1,3-Butadiene	d) Allyl anion

- Q.2** Attempt any **SEVEN** [14]
- i) State the term 'circular dichroism'. In what way, it differs from the conventional absorption spectroscopy.
  - ii) State the terms 'racemization' and 'resolution', giving suitable examples.
  - iii) State the term 'conformational energy'. Draw various conformers of *n*-pentane, and discuss their conformational energies.
  - iv) What do you mean by ORD spectra with cotton effect?

- v) State the stereo-specific reaction by giving a suitable example.  
vi) State the Prelog's rule. Predict the outcome of the following reaction applying this rule.



- vii) State 'ring inversion', and discuss ring inversion of cyclohexane.  
viii) In general,  $\alpha,\beta$ -unsaturated aldehyde prefers *S-trans*-conformer. In furfuraldehyde, however, it prefers *S-Cis* form in gaseous state! Explain

- ix) State the terms 'HOMO' and 'LUMO'. Show 'HOMO' and 'LUMO' of octa-1,3,5,7-tetraene drawing its MO diagram.  
Q.3 a) What do you mean by asymmetric synthesis? Give its general classification. Write a note on 'Sharpless epoxidation'. [06]  
b) Outline [06]  
i) Preferential crystallization  
ii) Chromatography and SMB techniques.

OR

- b) Illustrate the terms chiral auxiliaries and reagents. Demonstrate use of at least one compound from each class, in asymmetric synthesis.  
Q.4 a) State the term 'conformational analysis'. Discuss conformations of ethane, propane and *n*-butane, and comment on their energy barrier diagrams. [06]  
b) Draw and discuss various conformers of monocyclic cycloheptane, cyclononane and cyclodecane. [06]

OR

- b) State conformational features of cyclohexanone with a special reference to cyclohexane. Outline '2-alkyl ketone' and 'reflex' effects.  
Q.5 a) What do you mean by electrocyclization? Predict the outcome of ring closing of 1,3,5-hexatriene drawing appropriate correlation diagram. [06]  
b) Outline the following [06]  
i) Sigmatropic rearrangement.  
ii) Group transfer reaction.

OR

- b) Discuss the feasibility of [2+2] cycloaddition reaction, based on Woodward-Hoffmann rule.  
Q.6 a) Describe in brief the 'octant' rule, and predict the sign of the cotton effect that 3(R)-methyl-cyclohexanone will show in its CD spectra, applying this rule. [06]  
b) Write note on applications of ORD and CD spectra. [06]  
b) Discuss the structural aspects of cyclodextrins and their uses.

OR

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