FACULTY OF SCIENCE
M.Sc. III-Semester Examination, December 2013

Subject: Organic Chemistry
Paper - II: Asymmetric Synthesis, Synthetic Strategies and Hetro Cycles

Time: 3 hours Max. Marks: 80

Note: Answer all questions from Part-A and Part-B. Each question carries 8 marks in Part-A and 12 marks in Part-B.

PART - A (4 x 8 = 32 Marks)
(Short Answer Type)

1.a) Explain the idea of “prochirality” with examples.
   b) What do you understand by “Topocity” in molecules?

2.a) Discuss Sharpless epoxidation using a chiral catalyst.
   b) Write about enzyme-mediated enantioselective synthesis.

3.a) Discuss the concept of functional group elimination in organic synthesis.
   b) State and explain the addition of hydroxylamine to benzylideneacetophenone.

4.a) Outline a simple synthesis of pyrimidine.
   b) Explain the reactivity of imidazoles.

PART - B (4 x 12 = 48 Marks)
(Essay Answer Type)

5.a) Discuss the symmetry and transition-state criteria for stereoselectivity in reactions.
   b) Describe the use of chiral HPLC in separation and determination of enantiomeric mixtures.

   OR

   c) Explain the kinetic versus thermodynamic control criteria for selectivity in chemical reactions giving examples.
   d) Write a note on use of chiral NMR in analysis of reaction product mixtures.

6.a) Discuss the α-alkylation of chiral enolates.
   b) What are asymmetric hydroborations? Explain the use of IPC(BH) and IPCBH in these reactions.

   OR

   c) Describe nucleophilic additions to chiral carbonyl compounds. Explain Cram’s rule and Felkin-Ann model.
   d) Explain the use of chiral auxiliaries in Diels-Alder and Cope reactions

7.a) Discuss linear and convergent synthesis with examples.
   b) Describe “Synthesis Umpoling” with examples.

   OR

   c) What are one group and two group C-X disconnections? Explain with examples.
   d) Describe the synthesis of Disparluse by rerosynthetic approach.

8.a) Explain the aromatic character of 1, 3 and 1, 2 – Azoles.
   b) Discuss the syntheses and reactivity of thiazoles.

   OR

   c) Explain the reactivity of pyrimidines towards nucleophiles and resistance to electrophilic aromatic substitutions.
   d) Outline one synthesis each for imidazoles and oxazoles.

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