FACULTY OF SCIENCE
M.Sc. III – Semester Examination, December 2016
Subject: Organic Chemistry
Paper – III
Modern Organic Synthesis

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 (4x8 = 32 Marks)
[Short Answer Type]

1. a) Discuss the oxidative cleavage of 1,2-diols with periodic acid.
   b) What are protecting groups? Discuss the role of protecting groups in organic synthesis.
   Explain the use of hydroxyl protecting groups.

2. a) How will you convert \( \text{CH}_3 - \text{C} - \text{C} = \text{O} \) into \( \text{CH}_3 - \text{C} - \text{CH} = \text{CH}_2 \) by using organo lithiunm compounds.
   b) Write short notes on trimethylsilyl iodide and trimethylsilyl triflate.

3. a) Give the reaction and mechanism of the reaction of sulfonyl stabilized carbanions with carbonyl compounds.
   b) What happens when bromobenzene is treated with in presence of \( \text{Pd(OAc)}_2, \text{Ph}_3\text{P}, (\text{Et})_3\text{N} \).
   Give the product and write the mechanism.

4. a) Explain the Chiron approach in the organic synthesis with suitable example.
   b) What is Felkin-Anh model? Explain.

PART – B (4x12 = 48 Marks)
[Essay Answer Type]

5. a) What is Birch reagent? Give any four applications of it.
   b) What is NBS? Give its importance in-organic synthesis through a reaction and discuss its mechanism.
   OR
   c) Write short notes on the following:
      i) Prerost oxidation
      ii) Swern oxidation
   d) Explain the importance of PCC and \( \text{Ag}_2\text{CO}_3 \) in the organic synthesis with any four applications.
6 a) Give any four applications of organo copper reagents.
   b) Write short notes on reactions involving β-carbocation of organo silicon compounds.

   OR

   c) How do you convert using Stork – Enamine reaction?

        \[ \text{HC} \]
    \[ \text{3} \]
    \[ \text{O} \]

   \[ \rightarrow \]

        \[ \text{NCH}_2\text{CH}_2\text{C} \]
    \[ \text{Cl} \]
    \[ \text{CH}_3 \]

   d) What is umpolung? Explain the umpolung importance in organic synthesis with suitable examples.

7 a) Write short notes on:
    i) Buchwald – Hartwig coupling
    ii) Ugi reaction

   b) What is Mc Murray reaction? Give its mechanism.

   c) Complete the following and give mechanism

        \[ \text{O}_2\text{N} \]
    \[ \text{CHO} \]

   \[ \rightarrow \]

        \[ \text{CN} \]
    \[ \text{DABCO} \]

   d) Explain the use of BINAL and BINAP reagents in organic synthesis using suitable examples.

8 a) How do you determine the absolute configuration using Mosher’s method.

   b) Write the solid phase oligonucleotide synthesis.

   OR

   c) What is phase transfer catalysis? Explain the applications of PTC.

   d) Write the Tandem synthesis with suitable examples in conjugate addition aldol reaction and electrocyclic-Diels – Alder reaction.

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