

## FACULTY OF SCIENCE

M. Sc. III – Semester Examination, December 2018 / January 2019

Subject : Chemistry (Organic Chemistry)

Paper – I : Synthetic Reagents, Advanced NMR, Conformational Analysis &amp; ORD

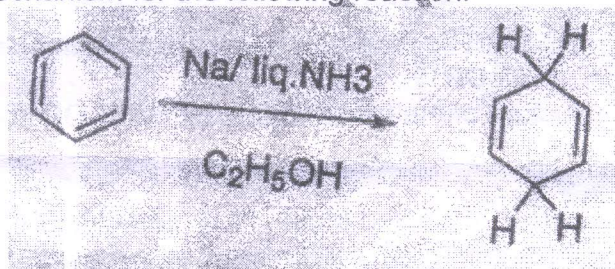
Time : 3 Hours

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)

- Illustrate the methods for the protection of carbonyl group.
  - Explain the utility of organoboranes in carbon-carbon bond formation by taking two examples.
- Write the synthetic utility of DDQ.
  - Explain the mechanism for the following reaction.



- Write a brief note on DEPT spectra with suitable examples.
  - Describe the principles of 2D-NMR.
- Explain the terms circular birefringence and circular dichroism.
  - Write the conformational structures of N-Methylpiperidine and tropine.

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

- Explain the synthetic applications of Gilman's reagent.
  - Discuss about the utility of trimethylsilylcyanides in organic synthesis.

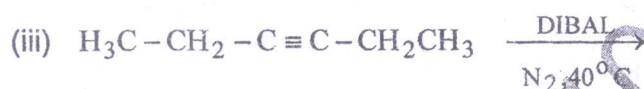
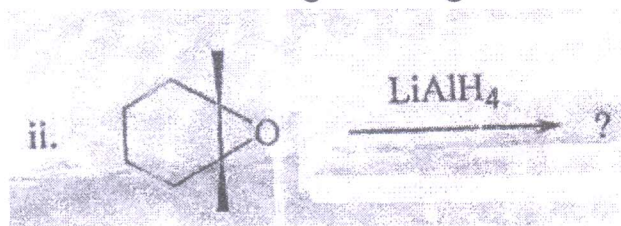
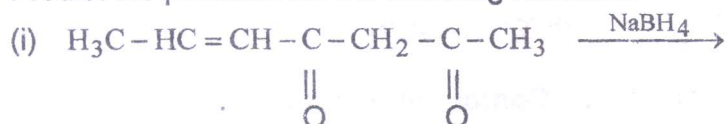
OR

  - Write the mechanism of Woodward oxidation.
  - Describe the synthetic applications of Petasis reagent.
- Explain the mechanism of Swern oxidation.
  - Give an account on the synthetic application of TEMPO.

OR

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(c) Predict the products for the following reactions



(d) Write the synthetic applications of Di-imide.

7 (a) How do you differentiate the structure (i) hexane (ii) 2-methyl pentane and (iii) 2, 2-dimethyl butane by  $^{13}\text{C}$ -NMR spectra.

(b) Write a note on the types of  $^{13}\text{C}$ -NMR spectra with appropriate examples.

OR

(c) How do you determine the structure of methyl salicylate by HETCOR spectrum?

(d) Define NOE and discuss its advantages with an example.

8 (a) Draw the conformational structures of cis and trans - 1, 2 dimethyl cyclohexanes and comment on the favoured conformation in each case by calculating their relative energies.

(b) Write note on the Axial halo ketone rule with appropriate examples.

OR

(c) Write a brief note on Cotton effect with suitable examples.

(d) The rate of acetolysis of trans 2-acetoxy cyclohexyl tosylate greater than the cis-acetoxy cyclohexyl tosylate. Explain.

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## FACULTY OF SCIENCE

M. Sc. III – Semester Examination, December 2018 / January 2019

Subject : Chemistry (Organic Chemistry)

Paper – II : Modern Organic Synthesis

Time : 3 Hours

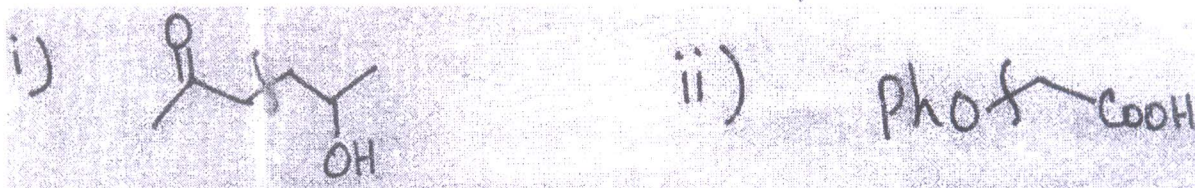
Max. Marks: 80

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)

- Predict the topicity of hydroxy groups in D-Tartaric acid and Cis-cyclopropane – 1, 2, - diol.
  - Explain Prelog's rule taking a suitable example.
- Give the synthons for the following disconnections and label them as normal or umpolung synthon.



- What are two group C-X disconnections? Explain taking 1,1-difunctionalised compounds.
- What is Mitsunobu reaction? Explain its mechanism.
    - Give the necessary reagents for the following conversions.



- Explain the terms with suitable examples.
    - Chiral pool
    - Glycosyl donor
  - What is Tandem synthesis? Explain taking conjugate addition-aldol reaction.

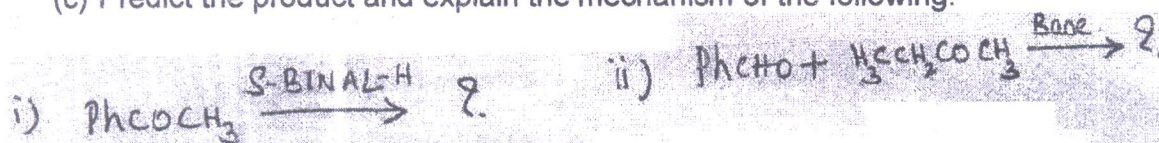
PART – B (4 x 12 = 48 Marks)

(Essay Answer Type)

- What is Cram's rule? What are its limitations? Explain with suitable examples.
  - Discuss briefly about the % ee determination by using chiral derivatizing agents.

OR

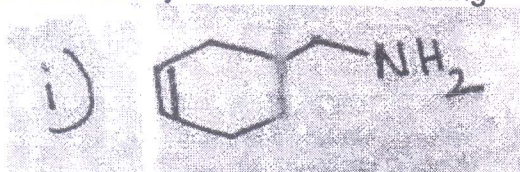
- Predict the product and explain the mechanism of the following.



- Explain briefly about prochiral nomenclature.

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- 6 (a) Explain the terms functional group addition and chemoselectivity with suitable examples.  
 (b) Give the retrosynthesis of the following

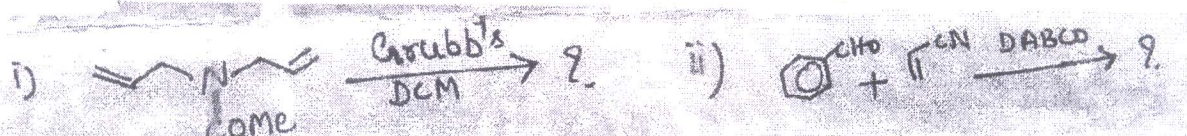


(ii) Propoxycaine

OR

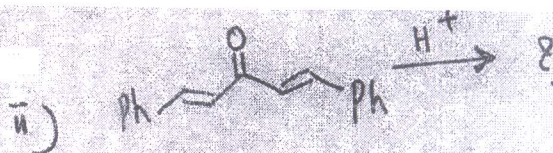
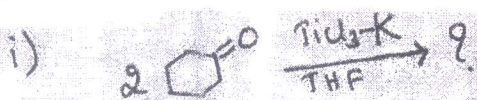
- (c) What is meant by control in carbonyl condensation? Explain taking oxanamide.  
 (d) Explain the retrosynthesis of Retronecene.

- 7 (a) What is Biginelli reaction? Give its mechanism.  
 (b) Predict the product of the following and give its mechanism.



OR

- (c) Discuss the following with suitable examples  
 (i) Pausan – Khand reaction  
 (ii) Stille coupling  
 (d) Complete the following



- 8 (a) Formulate the synthesis of shikimic acid from D-arabinose.  
 (b) Explain the oligonucleotide synthesis by phosphoramidite pathway.

OR

- (c) Explain Mosher's method for the determination of configuration of 2-Butanol.  
 (d) Give the synthesis of tripeptide Phe-Val-Ala by Merrifield solid phase synthesis.

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## FACULTY OF SCIENCE

M.Sc. III -Semester Examination, December 2018/January 2019

Subject : Chemistry (Organic Chemistry)  
Paper – III : Bio Organic Chemistry

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 (4X8=32 Marks)

(Short Answer Type)

1. (a) Discuss about Ferrier rearrangement reaction with examples.  
(b) Write the conformational structure of Gentobiose.
2. (a) Write the classification of Lipids.  
(b) What is Genetic code? Explain briefly.
3. (a) Write a note on Immobilised enzymes.  
(b) Write a note on classification and nomenclature of Peptides with examples.
4. (a) Give the structure and biological function of Pyridoxal Phosphate (PLP).  
(b) Write the synthesis of Riboflavin (Vitamin B2)

## PART – B (4x12=48 Marks)

(Essay Answer Type)

5. (a) Give any two synthetic methods for the synthesis of halo sugar and thio sugars.  
(b) Determine the ring size of Sucrose.
- OR
- (c) Write the conformational structures of the following disaccharides.  
i) Lactose ii) Maltose iii) Cellobiose
  - (d) Write the structure and biological function of the following:  
i) Cellulose ii) Chitin
6. (a) Write about any two chemical synthesis of Glycolipids.  
(b) Discuss about Retro synthetic analysis of Nucleosides. Give the synthesis of any one nucleoside.
- OR
- (c) Explain briefly about DNA finger printing.
  - (d) Write briefly about the replication and translation.
7. (a) Describe the Peptide synthesis by solution phase method.  
(b) What is terminal residue analysis of peptides ? Explain two methods for determination of N terminal amino acid of a peptide.
- OR
- (c) Write about enzyme chemo selectivity reaction specificity, stereoselectivity with suitable examples.
  - (d) Write mechanism of enzyme catalysis lock and key, Induced – fit and three-point contact models.
8. (a) Discuss about oxidation and Reduction form of the following coenzymes.  
i) Flavin adenine nucleotide FAD, FADH<sub>2</sub> ii) Ubiquinone  
(b) Write briefly about the mechanism of reaction of interconversions of one carbon functional groups on Tetrahydrofolate.
- OR
- (c) Discuss the synthesis of vitamin 'B<sub>6</sub>' and vitamin 'C'.
  - (d) Give the structure of the following coenzymes:  
i) ADP ii) UDP-Sugar.

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**FACULTY OF SCIENCE**

**M.Sc. III – Semester Examination, Dec. 2018 / Jan. 2019**

**Subject: Chemistry (Organic Chemistry)**

**Paper – IV**

**Green Chemistry and Organic Materials**

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

- 1 a) Define green chemistry and write the principles of green chemistry.  
b) What are green solvents? Give three examples.
- 2 a) What is the principle in heating by microwave radiation and how does it differ from conventional heating?  
b) What is the difference between solid state reactions and solid supported reactions?
- 3 a) Explain why the nanomaterials exhibit unusual properties compared to the bulk materials. Give two examples.  
b) What are liquid crystals and the basic phases of them? How the molecules are arranged in each phase?
- 4 a) Define supramolecular chemistry. What are the various interactions that are observed in supramolecular chemistry?  
b) What is "lock and key analogy"? Give an example.

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

- 5 a) Define atom economy. Explain by taking different types of organic reactions.  
b) Write short note on the following:
    - i) Prevention of hazardous materials
    - ii) Disadvantages of derivatization.
- OR**
- c) Give benefits and limitations of microwave assisted organic synthesis (MAOS).
  - d) Discuss briefly about micro wave assisted solvent free reactions.
- 6 a) What are ionic liquids? Give the applications of ionic liquids with reference to Beckman rearrangement, Suzuki cross coupling reaction and Diels-Alder reaction.  
b) Write a brief note on biochemical oxidations and reductions.
- OR**
- c) Explain about microwave assisted deacetylation, saponification of esters and alkylation of active methylene compounds.
  - d) How the ultrasound finds applications in the Cannizzaro reaction, Reformatsky reaction and Strecker synthesis?

- 7 a) Explain any three methods for the preparation of nanomaterials.  
b) Write short notes on:  
i) Molecular switches and  
ii) Molecular muscles.

OR

- c) Write a brief note on chemical synthesis of fullerenes.  
d) Write a note on optoelectronic molecules.

- 8 a) Explain the different supramolecular interactions with examples.  
b) Write a note on chiral receptors from Kemp's triacid.

OR

- c) Write a brief note on structure and applications of calixerenes and cyclophanes.  
d) Explain briefly about self-assembly capsules.

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