

**FACULTY OF SCIENCE**  
**M.Sc. III Semester Examination, March 2021**

**Subject: Chemistry (Organic chemistry)**  
**Paper: I – SRA NMR, Conformational Analysis of ORD**

Time: 2 Hours

Max. Marks: 80

**PART – A****Note: Answer any five questions.****(5 x 7 = 35 Marks)**

- 1 Write briefly about the Rhodium based carbene complexes.
- 2 Write briefly about the protection of carbonyls by cyclic acetal/cyclic ketal formation.
- 3 Discuss the oxidative cleavage of 1,2- diols using the lead tetra acetate.
- 4 Write briefly about the use of tri-n-butyl tin hydride in radical reductions.
- 5 Explain the terms Homonuclear and Heteronuclear couplings in  $^{13}\text{C}$ -NMR spectroscopy.
- 6 Write briefly about the NOESY spectra with examples.
- 7 Explain the terms cotton effect, plain curves and anomalous curves.
- 8 Write the conformational structures for N-Methylpiperidine and quinolizidine.

**PART – B****Note: Answer any three questions.****(3 x 15 = 45 Marks)**

- 9 (a) Explain briefly about the phosphorousylide mediated olefination.  
 (b) Explain briefly about the organic reactions involving  $\beta$ -carbocations of organosilicon reagents.
- 10 (a) How organoboranes are useful in C-C bond formation? Explain with suitable examples.  
 (b) Write short notes on (1) Protection of alcohols as silyl ethers (2) Petasis reagent
- 11 (a) Write briefly about the reagents DMP, CAN with one example each.  
 (b) Write short notes on (1) Wilkinson's catalytic reduction (2) Birch reduction.
- 12 (a) Explain briefly about the prevost oxidation.  
 (b) Write short notes on (1) Use of  $\text{NaBH}_4$  (2) PCC.
- 13 (a) Calculate the chemical shift value for the following compound.  
 $\text{CH}_3\text{-CH}_2\text{-CH}=\text{[CH]-CH}_3$   
 Increment values for  $\alpha$  is + 10.6;  $\alpha^1$  is -7.9 and  $\beta^1$  is - 1.8  
 (b) How  $^{13}\text{C}$ -NMR spectra is useful in the reaction mechanisms of organic molecules.
- 14 (a) Discuss in detail about the HETROCOSY using the example of 1-nitropropane.  
 (b) Explain briefly about the HMQC spectra using an example.
- 15 (a) Discuss in detail about the stereo chemistry of decalines.  
 (b) Write briefly about the conformational analysis of 1,3-disubstituted cyclohexanes.
- 16 (a) Mention the conformations of cyclohexane. Discuss in detail about the chair and boat conformations.  
 (b) Explain the reaction of acid catalysed reaction of 1,2-dimethylcyclohexane-1,2-diols using cis isomer.

FACULTY OF SCIENCE  
M.Sc. III Semester Examination, March 2021

Subject: Chemistry (Organic Chemistry)  
Paper - II : Modern Organic Synthesis

Time: 2 Hours

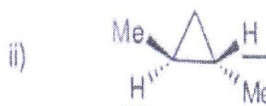
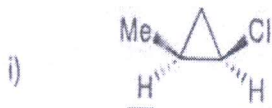
Max. Marks: 80

## PART - A

Note: Answer any five questions.

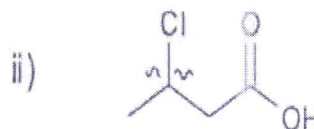
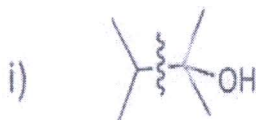
(5 x 7 = 35 Marks)

1 Predict the topicity of the underlined atoms in the following



2 Explain Cram's rule taking a suitable example.

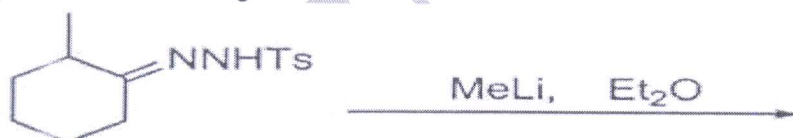
3 Give the synthons and synthetic equivalents for the following disconnections



4 What is FGI? Explain taking suitable example.

5 What is Michael reaction? Give its mechanism.

6 Complete the following reaction with mechanism.



7 Explain the mechanism of phase transfer catalysis.

8 Formulate the synthesis of S-ipsenol from S-leucine.

## PART - B

Note: Answer any three questions.

(3 x 15 = 45 Marks)

- 9 (a) What is 1,4-asymmetric induction? Explain it with an example.  
(b) Define % enantiomeric excess and explain its determination by using chiral derivatising agents.
- 10 (a) Explain the diastereoselective aldol reaction taking a suitable example.  
(b) Write a brief note on methods of inducing enantioselectivity.

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- 11 (a) Explain Convergent synthesis with suitable examples.  
(b) Explain the Reversal of polarity with suitable examples.

- 12 (a) Give the retrosynthesis of the following.



- (b) What are two group C-X disconnections? Explain it taking 1,3-difunctionalised compounds.

- 13 Explain the following reactions with suitable examples.

- (a) Baylis-Hillman reaction      (b) Sonogishira cross coupling reaction

- 14 Explain the following reactions with suitable examples.

- (a) Julia-Lythgoe olefination      (b) Nazarov cyclisation.

- 15 (a) Explain oligopeptide synthesis by using Merrifield resin.

- (b) State and explain Baldwin rules.

- 16 (a) What is Kahne glycosidation? Explain.

- (b) What is tandem synthesis? Explain with a suitable example.

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FACULTY OF SCIENCE  
M.Sc. III Semester Examination, March/April 2021

Subject: Chemistry (Organic Chemistry)  
Paper - III : Bio-organic Chemistry

Time: 2 Hours

Max. Marks: 80

## PART – A

Note: Answer any five questions.

(5 x 7 = 35 Marks)

- 1 Write a brief note on types of naturally occurring sugars.
- 2 Discuss the structure and biological function of chitin.
- 3 Write the synthesis of any two nucleosides.
- 4 Discuss the classification of lipids.
- 5 Discuss the Edman's method to determine the NTAA of a peptide.
- 6 What are Immobilized enzymes? Explain their formation and applications.
- 7 Write the structure and biological functions of S-adenosylmethionine (SAM).
- 8 Discuss the classification and biological importance of vitamins.

## PART – B

Note: Answer any three questions.

(3 x 15 = 45 Marks)

- 9 (a) Write the synthesis of amino and halo sugars.  
(b) Give the conformational structures of cellobiose and lactose.
- 10 (a) How do you determine the configuration and ring size of D-Glucose.  
(b) Write a short note on :  
(i) Ferrier rearrangement (ii) role of sugars in blood groups
- 11 (a) Write a brief note on primary, secondary and tertiary structure of DNA.  
(b) What is stereo chemical notation in lipids? Write the synthesis of phospholipids.
- 12 (a) Discuss DNA finger printing and its applications.  
(b) Write a short note on : (i) lipid aggregates (ii) Replication
- 13 (a) Describe the solid phase synthesis for a tripeptide.  
(b) Write a brief note on Induced-Fit model and three point contact model.
- 14 (a) Write the primary, secondary and tertiary structure of proteins.  
(b) What are the factors affecting enzyme catalysis? Discuss.
- 15 (a) Discuss the structure and biological functions of thiamine pyrophosphate (TPP) and pyridoxal phosphate (PLP).  
(b) Write structure determination of vitamin B1.
- 16 (a) Discuss the structure and biological functions of adenosine triphosphate (ATP) and adenosine diphosphate (ADP).  
(b) Write synthesis of vitamin C and vitamin K.

FACULTY OF SCIENCE  
M.Sc. III Semester Examination, July 2021

Subject: Chemistry (Organic Chemistry)  
Paper - IV : Green Chemistry and Organic Materials

Time: 2 Hours

Max. Marks: 80

## PART – A

Note: Answer any five questions.

(5 x 7 = 35 Marks)

- 1 What is atom economy? Explain it with an example
- 2 How do you define green chemistry? Write the principles of green chemistry.
- 3 Explain Suzuki cross-coupling reaction with mechanism using ionic liquids.
- 4 Discuss about biochemical (microbial) oxidations.
- 5 Write a short note on molecular nanowires.
- 6 Explain structure and properties of graphene.
- 7 Explain structure and applications of cyclodextrins.
- 8 Write a short note on ionophore.

## PART – B

Note: Answer any three questions.

(3 x 15 = 45 Marks)

- 9 (a) Discuss about the selection of appropriate auxiliary substances for green synthesis.  
(b) What are the analytical techniques developed to prevent and minimize the generation of hazardous substances in chemical processes?
- 10 (a) Explain the use of microwaves in organic synthesis.  
(b) Explain the use of ultrasonic energy in organic synthesis.
- 11 (a) Discuss about Diels-Alder, Hoffman elimination reactions as aqueous phase green reactions.  
(b) What is phase transfer catalyst? Explain it with suitable examples.
- 12 (a) Explain Fries rearrangement and Claisen rearrangement under microwave assisted conditions in organic solvent.  
(b) Explain Cannizzaro reaction, Reformatsky reaction under ultrasound assisted conditions.
- 13 (a) Explain 'top-down' and 'bottom-up' approaches for synthesis of nanomaterials.  
(b) Explain Zig Zag, armchair and chiral structures of CNTs.
- 14 (a) Write briefly about organic light emitting diodes.  
(b) Write briefly about liquid crystals.
- 15 (a) Explain briefly about ion-ion, ion-dipole interactions.  
(b) Write brief note on structures and applications of cryptands.
- 16 (a) Write synthesis, properties and applications of self-assembly capsules.  
(b) Explain briefly about crown ethers.