12. (a) Explain properties of carbon nanotubes. (10)

Or

(b) Explain production techniques.

(OCH30210)

M.Sc. DEGREE EXAMINATION, DECEMBER 2016.

Third Semester

Organic Chemistry

Paper II — ORGANIC SYNTHESIS, MECHANISMS AND NANO CHEMISTRY

(Regulation 2010)

Time : Three hours Maximum : 80 marks

Answer ALL questions.

UNIT I

1. (a) Explain energy profile diagram. (3)

Or

(b) Explain trapping of intermediates.

2. (a) Explain Sandmeyer reaction. (7)

Or

(b) Explain decomposition of dialkyl and diacyl peroxides.

3. (a) Explain generation, stability of free radicals. (10)

Or

(b) Explain halogenation and aromatic substitution.

UNIT II

4. (a) Explain oxidation of alkynes. (3)

Or

(b) Explain prehydroxylation of alkenes with OsO_4.

5. (a) Explain oxidations of aldehydes and ketones. (7)

Or

(b) Explain oxidation of aromatic rings.

6. (a) Explain oxidation of amines, hydrazines. (10)

Or

(b) Explain role of Ag_2CO_3, RuO_4.

UNIT III

7. (a) Explain reduction of alkanes. (3)

Or

(b) Reduction with diimide.

8. Explain : (7)

(a) Catalytic reductions, Birch reduction.

Or

(b) Reduction of carbonyl compounds.

9. Explain the role of : (10)

(a) $LiAlH_4$, $NaBH_4$ in reductions of -COOH & -CHO

Or

(b) Reductions of ozo, oxime group.

UNIT IV

10. (a) Explain applications of Nanochemistry. (3)

Or

(b) Explain about carbon nanotubes.

11. (a) Explain synthesis of single and multi walled carbon nanotubes. (7)

Or

(b) Explain growth mechanism of carbon nanotubes.

(OCH30112)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2016.

Third Semester

Organic Chemistry

Paper I — ADVANCED ORGANIC SPECTROSCOPY

(Regulation 2012)

Time : Three hours Maximum : 70 marks

Answer ALL questions.

UNIT I

1. (a) Write the similarities and differences between PMR and CMR spectroscopy. (6)

(b) Explain the following in ^{13}C-NMR spectroscopy. (8)

(i) Coupling constants

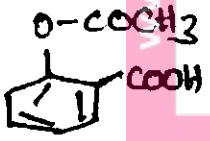
(ii) Chemical shift.

Or

2. (a) Write a short note on CMR recording techniques in CMR spectrum. (6)

(b) Predict the ^{13}C-NMR signals for the following compounds and assign the δ values. (8)

(i) $CH_3 - CH_2 - CH_2 - CH_2 - c \equiv CH$

(ii) 

UNIT II

3. (a) Describe the nuclear Overhauser effect with suitable examples. (6)

(b) Discuss in detail the Fourier transform technique and its application in nuclear magnetic spectroscopy. (8)

Or

4. (a) Write about the basic theory involved in ^{19}F NMR. (6)

(b) Discuss the following in detail. (8)

(i) Chemical shift reagents

(ii) Nuclear magnetic double resonance.

UNIT III

5. (a) Write about the types of ORD and CD curves by giving each one example. (6)

(b) Explain cotton effect. How will you determine the conformation of (+) cis-10-methyl-2-decelone by an application of cotton effect? (8)

Or

6. (a) Describe the theory involved in optical rotatory dispersion. (6)

(b) Explain the octant rule and list out its applications in structural studies giving examples. (8)

UNIT IV

7. (a) Discuss the DQFCOSY with suitable examples. (6)

(b) Explain the importance of HOMCOR and INDOR with suitable examples. (8)

Or

8. (a) Explain the use of NOESY in 2D-NMR spectroscopy with suitable examples. (6)

(b) Define the following terms. (8)

(i) HET2DJ

(ii) INADEQUATE

(iii) COSY.

UNIT V

9. (a) Predict 'HNMR, ^{13}CNMR, IR, UV and mass spectroscopy signals for the following compounds. (6)

(b) Assign the structure of the compound has the following spectral characteristics. (8)

Mol. formula : $C_{10}H_{13}NO_2$

IR cm–1 : 3250, 1650, 1275, 1050

'H NMR f : 1.4 (t, 3H); 2.05 (s, 3H); 3.9 (q, 2H); 6.7 (d, 2H, J = ~8H$_3$); 7.4 (d, 2H, J = ~8H$_3$); 3.1 (bs, 1H)

Or

10. (a) An organic compound shows the following spectral characteristics. (6)

IR cm–1 : 3350, 2833, 2760, 1667, 1616, 1580

UV nm : 256, 322

'H NMR f : 10.83 (1H, s); 9.59 (1H,s); 7.31(2H, multiplet) 6.79 (2H, mutiplet)

M.S m/3 : 29(8), 39(40), 65(30), 93(20), 121(90) and 122(100)

Deduce its structure.

(b) Assign suitable structure to the compound having the following significant spectral features.

MF : $C_{10}H_{13}NO_2$

IR cm–1 : 3402(s), 3318(s), 3025(w), 1695(s), 1602(s), 1580(m)

UV λ_{max} : 290 nm

'HNMR f : 7.9 (2H,d); 67(2H,d); 4.75 (1H, septet); 4.2(2H, bv); 1.25(6H,d)

10. (a) Describe the photoreactions of vitamin D. (6)

(b) Write a short note on : (8)

(i) Singlet oxygen generation

(ii) Di-π-methane rearrangement.

(OCH30212)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2016.

Third Semester

Organic Chemistry

Paper II — ORGANIC REACTIONS AND MECHANISMS

(Regulation 2012)

Time : Three hours Maximum : 70 marks

Answer ALL questions.

UNIT I

1. (a) Explain the mechanism and applications of Stork Enamine reaction. (6)

(b) Discuss the mechanism of the following reactions

(i) Benzion condensation

(ii) Reformatsky reaction. (8)

Or

2. (a) Explain the mechanism and stereochemistry of witting reaction. (6)

(b) Discuss the mechanism of the following reactions

(i) Perkin reaction

(ii) Dakin reaction.

UNIT II

3. (a) Discuss the mechanism and applications of Oppenauer oxidation. (6)

(b) Write a short note on the following : (8)

(i) Enantioselective epoxidation of allyl alcohols.

(ii) Ozonolysis.

Or

4. (a) Discuss the mechanism and application of Birch reduction. (6)

(b) Discuss the synthetic importance of : (8)

(i) Aluminium alkoxide

(ii) $NaBH_4$

(iii) Sodium cyanoborohydride.

UNIT III

5. (a) Discuss the mechanism and applications of Benzil-Benzilic acid rearrangement. (6)

(b) Discuss the mechanism of the following : (8)

(i) Pinacole-Pinacolone rearrangement

(ii) Dienone-Phenol rearrangement.

Or

6. (a) Write a brief note on Baeyer-Villiger rearrangement. (6)

(b) Discuss the mechanism of the following : (8)

(i) Fries rearrangement

(ii) Curties rearrangement.

UNIT IV

7. (a) Discuss the (4 + 2) cyclo addition reactions with suitable examples. (6)

(b) Discuss in detail, the [1, 3] and [1, 5] sigmatropic shifts by giving suitable examples. (8)

Or

8. (a) Write a short note on Fluxinol molecules. (6)

(b) Discuss the selection rules for cyclo additions and cycloreversions by the FMO method. (8)

UNIT V

9. (a) Write a short note on sensitization and quenching. (6)

(b) Explain the photochemistry of carbonyl compounds. (8)

Or

10. (a) Discuss in detail the one group C-C disconnection in carbonyl compounds with examples. (8)

(b) Write the reterosynthesis of salbutamol and paracetamol with examples. (6)

(OCH30312)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2016.

Third Semester

Organic Chemistry

Paper III — ORGANIC SYNTHESIS

(Regulation 2012)

Time : Three hours Maximum : 70 marks

UNIT I

1. (a) What are carbenes and carbenoids? Explain its synthetic applications in organic synthesis. (8)

(b) Write a note on the Aldol reaction with suitable examples. (6)

Or

2. (a) Write a short note on the following. (8)

(i) Alkylation of ketones

(ii) Allylic alkylation of alkenes.

(b) Explain the formation of carbon-carbon single bond by the addition of free radicals to alkenes.

UNIT II

3. (a) Write briefly about the following. (8)

(i) Sulphoxide-sulphonate rearrangement.

(ii) Reductive dimerisation of carbonyl compound.

(b) Explain the stereo selective synthesis of tri and tetra substituted alkenes. (6)

Or

4. (a) Write a short note on the following. (8)

(i) Synthesis of allyl alcohols.

(ii) Decarboxylation of β-lactones.

(b) Explain the oxidative decarboxylation of carboxylic acids. (6)

UNIT III

5. (a) Explain the mechanism of the following reactions (8)

(i) Retro Diels Alder reaction

(ii) The Ene reaction.

(b) Define the terms diene, dienophile and hetero dienophile. Explain their synthetic utility in organic synthesis with examples. (6)

Or

6. (a) Explain the cyclo addition reactions with allyl cations and allyl anions. (8)

(b) Write a short note on O-quinones and O-quinodimethanes. (6)

UNIT IV

7. (a) Explain the photolysis of organic nitrites and hypohalites. (8)

(b) Write about the reaction of monohydric alcohols with lead tetra acetate with examples. (6)

Or

8. (a) Explain the long range functionalisation of unactivated carbons on the steroid nucleus. (8)

(b) Write an account on cyclisation reactions of nitrenes. (6)

UNIT V

9. (a) Explain the linear and convergent synthesis with examples. (8)

(b) Write about chemoselectivity with examples. (6)

Or

(OCH30412)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2016

Third Semester

Organic Chemistry

Paper IV — ORGANIC REAGENTS, HETEROCYCLIC CHEMISTRY AND NATURAL PRODUCTS

(Regulation 2012)

Time : Three hours Maximum : 70 marks

Answer ALL questions.

UNIT I

1. (a) Write the preparation and synthetic applications of following organoboranes with suitable examples.

(i) Dicyclohexylboranes.

(ii) Thexylborane. (8)

(b) Write a note on free radical reactions of organoboranes. (6)

Or

2. (a) Discuss the following reactions of organoboranes with mechanism (i) protonolysis. (ii) Isomerisation. (8)

(b) Write about hydroboration with BH_3–THF. (6)

UNIT II

3. (a) Write the preparation and synthetic applications of following organosilanes with suitable examples. (8)

(i) Trimethyl silyl cyanide.

(ii) Trimethyl silyl triflate.

(b) Write a brief note on the β-effect in organosilenes. (6)

Or

4. (a) Discuss in detail the synthetic applications of α–silyl carbanion. (8)

(b) Write the synthetic applications of trimethyl silyl chloride with examples. (6)

UNIT III

5. (a) Explain the preparation and synthetic applications of organo lithiums reagents in organic synthesis. (8)

(b) Write the preparation of grignard reagents with alkyl and propargyl helides. (6)

Or

6. (a) Explain the synthesis of 1, 5–cyclic diemes and π–alkyl palledіums complexes in detail. (8)

(b) Write a short note on oxidative coupling of terminal alkynes. (6)

UNIT IV

7. (a) Write the synthesis and reactions of oxiranes and theitance. (8)

(b) Write the synthesis and reactions of pyrrole and furan. (6)

Or

8. (a) Write the synthesis and reactions of pyrazine and Imidzole. (8)

(b) Write the synthesis and reactions of Thiazoles. (6)

UNIT V

9. (a) Write the structural elucidation of sankonin and give its synthesis. (8)

(b) Write the bio-synthesis of kaemferol. (6)

Or

10. (a) Write the isolation and synthesis of antibiotic chloramphenicol. (8)

(b) Write the synthesis of abietic acid. (6)