

OCH30110
M.Sc. Degree Examinations, November-2015
III Semester - Organic Chemistry
Paper- I: Organic Spectroscopy-I
(Regulation 2010)

Time : Three Hours

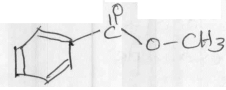
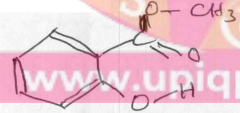
Maximum Marks: 80

Answer all Questions

Unit-I

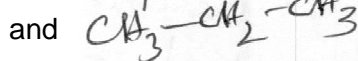
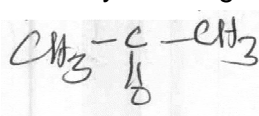
1. (a) Write a short note on UV-band structure (3)
(or)
(b) Write the formula and terms in Beer-Lambert Law (Derivation is not required)
2. (a) Describe effect of conjugation of λ_{\max} in alkenes with an example. (7)
(or)
(b) List the general features of UV spectra of enones. Describe Woodward-Fieser empirical rules for enones.
3. (a) Based on octant rule, explain the structure of haloketones (diagram is needed) (3)
(or)
(b) Explain i) ORD spectra and cotton effect and ii) Hyperchromic and hypochromic effects.

Unit-II

4. (a) Define overtones and Fermi resonance. (3)
(or)
(b) Describe with one example, conjugation effect on the carbonyl stretching frequency.
5. (a) Describe how does hydrogen bonding affect – O-H stretching frequency in alcohols and phenols. (7)
(or)
(b) Describe (i) ring size effect (ii) resonance and (iii) double bonds on IR spectra of esters.
6. (a) Draw a neat block diagram of an IR spectrometer. Write notes on pyroelectric detectors. (10)
(or)
(b) Distinguish the following with the help of IR spectroscopic information.
(i) $(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_3\text{N}$ and $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
(ii)  and 

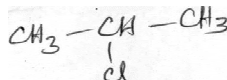
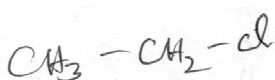
Unit-III

7. (a) Define chemical effect (3)
(or)
(b) What is coupling constant(J)?
8. (a) Explain the effect of anisotropy in PMR spectroscopy with reference to Benzene. (7)
(or)
(b) Explain how do you distinguish intra and inter molecular hydrogen bonding using PMR spectra.
9. (a) (i) Explain the use of double resonance in PMR spectroscopy.
(ii) How many PMR signals are obtained for the following compounds



(or)

- (b) (i) Discuss the nature of first order spectra of AMX type molecule with an example.
(ii) Explain the splitting pattern in the PMR spectra of the following molecules.



OCH30210
M.Sc. Degree Examinations, November-2015
III Semester - Organic Chemistry
Paper- II: Organic Synthesis, Mechanisms and Nano Chemistry
(Regulation 2010)

Time : Three Hours

Maximum Marks: 80

Answer all Questions

Unit-I

1. (a) Explain the kinetic affects on the reaction mechanisms (3)
(or)
(b) Write notes on the testing of possible intermediates.
2. (a) Write notes on differences between intermediates and transition state (7)
(or)
(b) Write the stability and reactivity of free radicals.
3. (a) Explain the following (10)
 - i) Cross over experiments
 - ii) Aromatic substitutions (SN^1 & SN^2)(or)
(b) i) Sandmeyer reaction
ii) Auto oxidation

Unit-II

4. (a) Give any four suitable reagents for the formation of diols (3)
(or)
(b) Write the mechanism for conversion of hydrocarbons into aldehydes by using SCO_2 as request.
5. (a) Give the reaction mechanism of oppenauer oxidation (7)
(or)
(b) Give the list of synthetic application of peracids.
6. (a) Give the synthetic applications of following reagents (10)
 - i) RuO_4
 - ii) MnO_2(or)
(b) Draw the reaction mechanism in the use of following reagents
 - i) $KMnO_4$
 - ii) Ag_2CO_3

Unit-III

7. (a) Write a notes on reductive process of aldehydes (3)
(or)
(b) Give the differences between the properties of $NaBH_4$ and $LiAlH_4$?
8. (a) Write the mechanism and synthetic importance of Birch reduction (7)
(or)
(b) Explain the following with suitable examples
 - i) DIBAL (Di Isobutyl Aluminium hydrides)
 - ii) $NaBH_3CN$ (Sodium cyano Borohydride)
9. (a) Explain the following (10)
 - i) Catalytic hydrogenation
 - ii) Reductive process by using Di-imide(or)

(b) Give the reaction mechanism of the following:

- i) Aluminum alkoxide
- ii) Reduction of Azo and Nitro compounds

Unit-IV

10. (a) Write the short notes on carbon nanotubes (3)
(or)
(b) Draw the structure of multi-wall carbon nanotubes.
11. (a) Give the synthesis of solid-gaseous technique for production nanotubes (7)
(or)
(b) Write the applications of carbon nanotubes.
12. (a) Explain the synthesis of carbon nanotubes with growth and catalyst activated growth mechanism (10)
(or)
(b) Explain the following properties of carbon nanotubes.
i) Adsorption
ii) Electric and optical
iii) Mechanical



OCH30310
M.Sc. Degree Examinations, November-2015
III Semester - Organic Chemistry
Paper- III: Alkaloids and Phenothiazines

(Regulation 2010)

Time : Three Hours

Maximum Marks: 80

Answer all questions
Unit-I

1. Give the structure of the following: 3M
a) Cinchonine and canadine
(or)
b) Quinine and isoquinoline
2. a) Explain occurrence and isolation methods of the Alkaloids. 7M
(or)
b) Define and classify Alkaloids.
3. a) Explain how Hoffman degradation helps in the structural elucidation of Alkaloids and give the synthesis of Berberine. 10M
(or)
b) Give the structural elucidation and synthesis of Glaucine.

4. a) Give the structure of codeine 3M
(or)
b) Give the structure of Emetine
5. Give the structural elucidation and stereo chemistry of 7M
a) Thebaine (or)
b) Morphine
6. a) Give synthesis of any rearranged products of Morphine alkaloids 10M
(or)
b) Biogenesis of Alkaloids
7. Draw the structures of 3M
a) Ephedrine and Brucine (or)
b) Ergotamine and nicotine
8. Explain the structural elucidation of 7M
a) Strychnine (or)
b) Isolysergic acid
9. Give the total synthesis of 10M
a) Reserpine (or)
b) Nicotine

Unit-IV

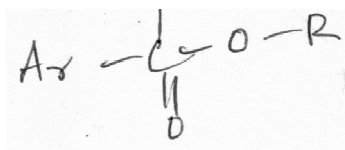
10. Write the structure of the following 3M
a) Prochlorperazine
(or)
b) Thioriazine
11. a) Outline the general methods of synthesis of phenothiazines 7M
(or)
b) Describe the synthesis of Mesoridazine
12. a) Write the synthesis of Promazine and Trifluoperazine 10M
(or)
b) Discuss the pharmacological properties of phenothiazines.

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Unit-IV

10. (a) List prominent IR frequencies for

(3)



(or)

- (b) Write λ_{max} in the UV spectrum of benzene

11. Predict the possible structure for the following.

(7)

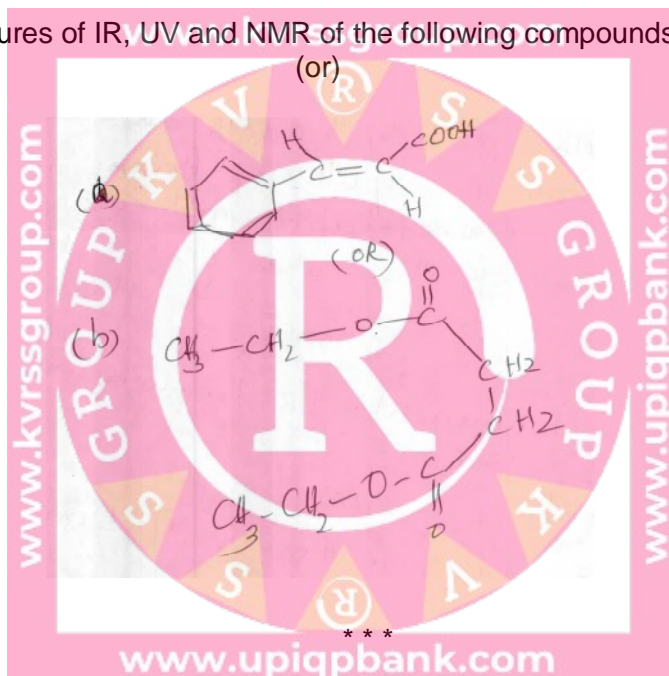
- (a) A compound has a strong absorption peak at 1718cm^{-1} and medium peak at 2900cm^{-1} . NMR of this compound shows a quartet at $2.45\delta(2\text{H})$, a singlet at $2.2\delta(3\text{H})$ and a triplet at $1.1\delta(3\text{H})$. Its molecular weight is 72.

(or)

- (b) UV spectrum of a compound of molecular weight 86 shows λ_{max} around 280nm with $\log \epsilon = 1.3$. Its NMR spectrum shows a quartet at $2.45\delta(6\text{H})$ and a triplet at $1.4\delta(4\text{H})$.

12. Describe salient features of IR, UV and NMR of the following compounds.

(10)



OCH30410
M.Sc. Degree Examinations, November-2015
III Semester - Organic Chemistry
Paper- IV: Chemistry of Natural Products
(Regulation 2010)

Time : Three Hours

Maximum Marks: 80

Answer all questions

Unit-I

1. a) Draw the structures of Zingiberene and Eudesmol
(or)
b) Give the classification of terpenoids 3M
2. a) Explain the sources and isolation techniques for flavanoids.
(or)
b) Write the general methods for the structural elucidation of terpenoids. 7M
3. a) Discuss the synthesis of Kampferol
(or)
b) Write the Biosynthesis of terpenoids 10M

Unit-II

4. Draw the structures of
a) Progesterone
(or)
b) Oxytocin 3M
5. Write the structural elucidation of following
a) Oestrone
(or)
b) Thyroxine 7M
6. Write the structural elucidation and synthesis of
a) Androsterone
(or)
b) Progesterone 10M

Unit-III

7. a) Give the structures of any two fat soluble vitamins
(or)
b) Write the classification of enzymes 3M
8. a) Write the biosynthesis of B₁
(or)
b) Write the biological importance and synthesis of PGE₁ 7M
9. a) Write the synthesis and physiological importance of vitamin A₁
(or)
b) Explain briefly about the coenzymes NAD & FAD. 10M

Unit-IV

10. a) What are the sources of naturally occurring insecticides
(or)
b) Draw the structure of Rotenone 3M
11. Give the structure and synthesis of the following:
a) Jasmonone
(or)
b) Spilanthol 7M
12. Discuss the structural elucidation and synthesis of the following
a) Rotenone
(or)
b) Pyrethrin 10M

(OCH 30112)

M.Sc. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Third Semester

Organic Chemistry

Paper I – ADVANCED ORGANIC SPECTROSCOPY

(Regulation 2012)

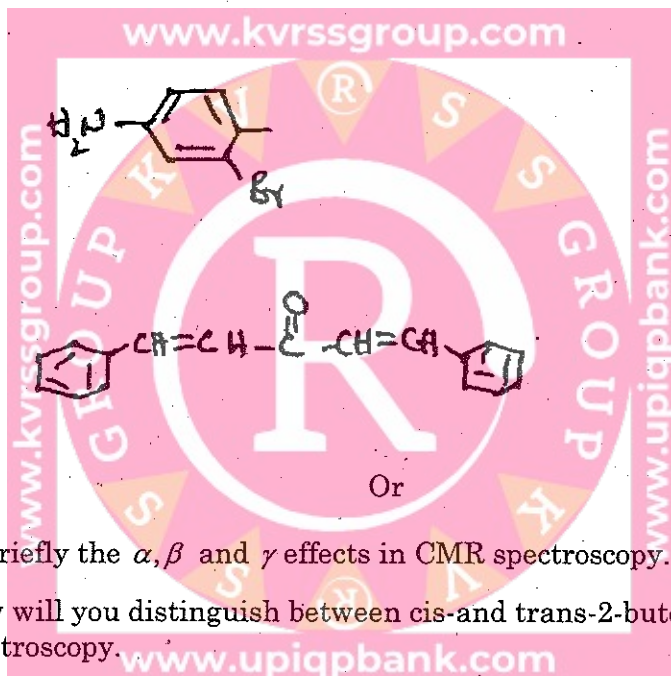
Time : Three hours

Maximum : 70 marks

UNIT I

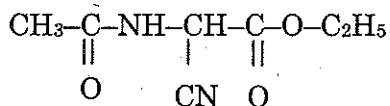
1. (a) Write a short note on Gate pulse CMR spectrum. (6)
(b) Predict the ^{13}C -NMR signals for the following compounds and assign the δ values. (8)

(i)



(ii)

2. (a) Explain briefly the α , β and γ effects in CMR spectroscopy. (6)
(b) (i) How will you distinguish between cis- and trans-2-butens on the basis of ^{13}C -NMR spectroscopy. (6)
(ii) Predict the ^{13}C -NMR signals for the following compound and assign the δ -values (8)



UNIT II

3. (a) Write about nuclear magnetic double resonance in PMR and CMR spectroscopy. (6)
(b) Explain the resonance of the nuclei for ^1H - ^{19}F and ^1H - ^{31}P coupling interactions with suitable examples. (8)

Or

4. (a) An organic compound exhibits the following spectral data : MF:160 (6)

OV nm : 212

IR cm^{-1} : (2941–2857 (m); 1742 (s) ; 1460 (m); 1380 (m) ; 1260 (s) ; 1056 (s).

^1H NMR : δ 1.29 (6H, t $J=7.2$ Hz) ; 2.5 (2H, S); 4.16 (4H, q $J = 7.2$ Hz)

Determine the structure of the compound.

- (b) A Carbonyl compound A (mol-formula $\text{C}_3\text{H}_6\text{O}$) gives a singlet at δ 2.17 in its PMR spectrum. when it is treated with $\text{C}_6\text{H}_5\text{CHO}$ in dil. ethanolic NaOH , it forms B which gives the following data. (8)

MF of B = $\text{C}_{17}\text{H}_{14}\text{O}$

IR (cm^{-1}) : 3025, 1665, 1630, 1600, 1495, 763, 753

PMR δ : 7.05 (2H, d $J = 18$ Hz); 7.60 (10H, m); 7.82 (2H, d $J=18$ Hz)

Determine the structures of A and B.

UNIT III

5. (a) Write in detail about circular birefringence and circular dichroism. (6)

- (b) Explain α = haloketone rule and its relationship to cotton effect by giving suitable examples. (8)

Or

6. (a) Explain briefly the application of CD in structure elucidation of cyclic ketones. (6)

- (b) Explain briefly the following. (8)

(i) Single cotton curve and multiple cotton curve.

(ii) Benzoate ester rule.

UNIT IV

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

- (b) Explain the importance of INADEQUATE and COSY with suitable examples. (8)

Or

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

- (b) Define the following terms

(i) DQF-COSY

(ii) HOM2DJ

(iii) INEPT

UNIT V

9. (a) Deduce the structure of the compound from the spectral data given below.

MF : $C_3H_8O_2$

(6)

$IR_{cm^{-1}}$: 1710 (s); 3000–2500(br) (imp peaks only)

$^1H_{NMR} \delta$: 7.2 (5H, s); 3.5 (2H, s); 11.6 (1 H, S) exchange with D_2O .

- (b) A compound having the following spectral data is given below.

MF : $C_3H_6Cl_2$

UV_{nm} : 210

$IR_{cm^{-1}}$: 2940 (m); 1265 (w); 690 (s)

$^1H_{NMR} \delta$: 3.5 (2 H, d); 3.3 (1H, m); 1.25 (3H, d)

Assign suitable structure to the compound and explain the data.

(8)

Or

10. (a) Determine the structure of an organic compound which shows the following spectral data :

(6)

MF : C_4H_7N

UV_{nm} : 200

$IR_{cm^{-1}}$: 2941 (m); 2270 (m); 1460 (m)

$^1H_{NMR} \delta$: 2.72 (septet, $J = 6.7$ Hz, 1H) ; 1.33 (d, $J=6.7$ Hz, 6H)

- (b) A compound having the following spectral given below.

(8)

MF : $C_4H_8O_3$

$IR_{cm^{-1}}$: 2500-3000, 1715

$^1H_{NMR} \delta$: 1.27 (t); 3.66 (q); 4.13 (s); 10.95 (s).

Assign suitable structure to the compound and explain the data.

UNIT II

3. (a) Describe Diastereo selective epoxidation of Homo allylic alcohols. (6)
- (b) Write a short note on the following
 - (i) Perhydroxylation using OSO_4
 - (ii) Applications of $m - ClC_6H_4COOOH$.

Or

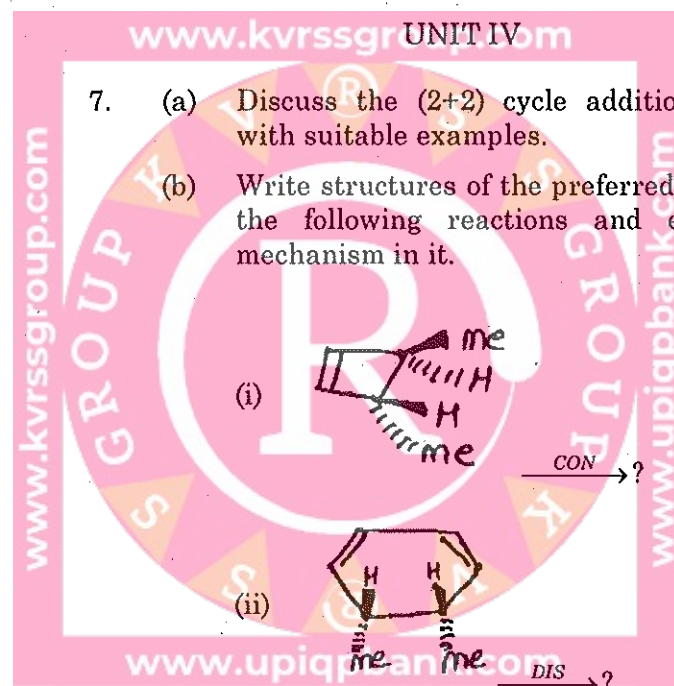
4. (a) Write a short note on reduction with di-imide.
- (b) Discuss the following :
 - (i) Hydrogenolysis
 - (ii) Wolf-Kishner reduction.

UNIT III

5. (a) Discuss the mechanism and applications of Favorski rearrangement.
- (b) Discuss the mechanism of the following
 - (i) Wagner–Meerweian rearrangement
 - (ii) Claisen rearrangement

Or

6. (a) Discuss the mechanism and applications of Sommelete–Hauser rearrangement. (6)
- (b) Discuss the mechanism of following. (8)
 - (i) Curtius rearrangement
 - (ii) Smiles rearrangement.



Or

UNIT V

(OCH 30312)

9. (a) What is stereoselectivity? Explain its importance in retrosynthetic disconnection approach with examples. (6)
- (b) Discuss in detail the one group C-C disconnection in alcohols with examples. (8)

Or

10. (a) Explain the retrosynthetic pathway for the synthesis of aspirin. (6)
- (b) What is functional group inter conversion? Explain in detail by giving suitable examples. (8)

M.Sc. DEGREE EXAMINATION,
NOVEMBER/DECEMBER 2015.

Third Semester

Organic Chemistry

Paper III— ORGANIC SYNTHESIS

(Regulation 2012)

Time : Three hours

Maximum : 70 marks

Answer ALL questions.

UNIT I

1. (a) Discuss in detail the alkylation of α - thiocarbanions with examples. (6)
- (b) Explain the umplang reaction along with mechanism and write about its significance in c-c single bond formation. (8)

Or

2. (a) What are sulfonylides? Explain its importance in organic synthesis. (6)
- (b) Discuss briefly the alkylations of relatively acidic methylene groups with examples. (8)

UNIT II

3. (a) Explain the stereospecific synthesis from h₂-diols with suitable examples. (6)
- (b) Write briefly about the following: (8)
- (i) Pyrolytic syn elimination
 - (ii) Shapiro reaction.

Or

4. (a) Discuss briefly the Claisen rearrangement of allyl vinyl ethers. (6)
- (b) Write a short note on the following: (8)
- (i) Wittig reaction
 - (ii) Fragment reactions.

UNIT III

5. (a) Describe briefly the 1,3-dipolar cycloaddition reactions. (6)
- (b) Discuss the following: (8)
- (i) Catalysis by lewis acids
 - (ii) Asymmetric diels alder reactions.

Or

6. (a) Explain the mechanism of the photosensitized diels alder reaction. (6)
- (b) Discuss the following reagents synthetic utility. (8)
- (i) Oxygen as dienophile
 - (ii) Cyclopenta dienones.

UNIT IV

7. (a) Write a short note on photolysis of N-nitrosoamides with examples. (6)
- (b) Discuss the following reactions with mechanisms. (8)
- (i) HLR reaction
 - (ii) Bartas reaction.

Or

8. (a) Write a short note on photolysis of organic hypohalites. (6)
- (b) Discuss briefly the photolysis of ketones with suitable examples. (8)

(OCH 30412)

M.Sc. DEGREE EXAMINATION,
NOVEMBER/DECEMBER 2015.

Third Semester

Organic Chemistry

Paper IV – ORGANIC REAGENTS, HETEROCYCLIC
CHEMISTRY AND NATURAL PRODUCTS

(Regulation 2012)

Time : Three hours

Maximum : 70 marks

Answer ALL questions.

All questions carry equal marks.

UNIT I

1. (a) Explain the functional group transformations of organoboranes. (8)
(b) Write a note on the reactions of trialkenyl borates. (6)

Or

2. (a) Write the preparation and synthetic applications of following organoboranes with suitable examples.
(i) 9-BBN
(ii) Disiamylborane. (8)
(b) Write the reactions of organosilanes with α - Bromoketones and α - bromoesters. (6)

UNIT II

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

- (i) Dimethyl-t-butylsilylchloride
(ii) Silyleneethers.

(8)

- (b) Write a note on the control of rearrangement of Carbonium ions by silicon.

(6)

Or

4. (a) Discuss in detail the synthetic applications of β -silyl carbonyl compounds.
(b) How do organosilanes play a vital role in the protection of functional groups? Explain.

(8)

(6)

UNIT III

5. (a) What are organocopper reagents. Explain their preparation and synthetic applications in organic synthesis.

(8)

- (b) Write the preparation of π -allylnickel complexes with applications.

(6)

Or

6. (a) What are Organo palladium reagents? Explain their preparation and synthetic applications in organic synthesis.

(8)

- (b) Write the reactions of Grignard reagents with Carbonyl Compounds and amines.

(6)

UNIT IV

7. (a) Write the synthesis and reactions of Azetidines and Thiophene.

(8)

- (b) Write the synthesis and reactions of Pyrimidine.

(6)

Or

8. (a) Write the synthesis and reactions of Oxiranes and Isothiazole.

(8)

- (b) Write the synthesis and reactions of pyrazine and Indole.

(6)

UNIT V

9. (a) What are Antibiotics? Explain their classification and write the synthesis of terramycin.

(8)

- (b) What are sulphanalamides? Write the preparation of sulfa drugs.

(6)

Or

10. (a) Discuss the structural elucidation and synthesis of Quinine.

(8)

- (b) Write the synthesis of Quercetin.

(6)