

MODEL QUESTION PAPER
M.Sc.(FINAL) ANALYTICAL CHEMISTRY
PRINCIPLES AND TECHNIQUES IN CLASSICAL ANALYSIS

III SEMESTER

PAPER(C.Anl 3.1)

UNIT-1

1. Write a short note on Mixed and Universal Indicators. 3M
Or
Discuss the applications of Sn(II) in reduction reactions.
2. Give a detail account on Mn(III) and Mn(VII) oxidizing agents and their applications. 7M
Or
Explain the preparation of Karl-Fischer reagent and its use in estimation of moisture content with an example.
3. Discuss iodometry and iodimetry. 10M
Or
Explain the principles involved in neutralization of acids and bases .write a detailed account on neutralisation of strong acid and weak base.

UNIT-II

4. Write a short note on action of adsorption indicators. 3M
Or
Explain the role of indicators in complexometric titrations.
5. write a note on Silver Cyanide titrations. 7M
Or
Explain the theoretical principles involved in argentometric titrations.
6. Discuss Non Aqueous titrations 10M
Or
Explain the theoretical principles involved in Complexometric titrations and its applications.

UNIT-III

7. Explain the structural requirements of organic precipitants. 3M
Or
Write a short note on sodium tetra phenyl boron
8. Write a short notes on Purity of the precipitates and discuss methods involved in the elimination of impurities. 7M
Or
Explain the applications of oxine as an organic precipitant.
9. Explain the following 10M
i) Selectivity, Sensitivity & Masking 5M
ii) Nucleation & Crystal growth 5M
or
Explain Homogeneous precipitation.

UNIT-IV

10. Write about single point method. 3M
Or
Discuss briefly the kinetics of chemical reactions.
11. Explain the following methods involved in determination of rates of reaction 7M
i) Differential Methods
ii) Integral Method.
Or
Give a brief account on Induced Reactions.
12. Discuss the kinetics of Enzyme Catalysed reactions. 10M
Or
Explain the following factors effecting the rate of enzyme catalysed reactions.

MODEL QUESTION PAPER
M.Sc.(FINAL) ANALYTICAL CHEMISTRY
PAPER II - APPLIED INORGANIC ANALYSIS

III SEMESTER

PAPER(C.Anl 3.3)

UNIT-1

1 .Explain the determination of silica in Clay materials.

3M

Or

Explain the determination of CO₂ in limestone.

2. .Explain the determination of R₂O₃ oxides.

7M

Or

Explain the analysis of haematite.

3. Give the analysis of Pyrolusite.

10M

Or

Give the analysis of Limestone.

UNIT-II

4. Give the different constituents of Feldspar.

3M

Or

Explain the gravimetric determination of aluminium in feldspar.

5. Explain the analysis of P₂O₅ by citromolybdate reagent and quinoline hydrochloride reagent.

7M

Or

What are the primary sources of phosphorus, give a brief outline on different constituents and analysis of phosphate rock.

6. Give the analysis of monazite.

10M

Or

Write a short note on the following

i) analysis of total CaO in phosphate rock.

4M

ii) Analysis of alkalies and TiO₂ in feldspar.

6M

UNIT-III

7. What are the constituents of Brass, Bronze and Solder. 3M

Or

What are the constituents of Plain carbon steels.

8. Discuss the analysis of Bronze. 7M

Or

Write the analysis of solder.

9. Write in detail the analysis of Brass. 10M

Or

Give the analysis of chromium, molybdenum and tungsten in steel.

UNIT-IV

10. What are the constituents of Glass explain in brief. 3M

Or

Give an example of artificial silicate and its constituents.

11. Explain the analysis of sesqui oxides and magnesia in cement. 7M

Or

Give an outline procedure for the analysis of glass.

12. Give a detailed account on colouring agents in Glass.

Or

Write a short notes on the following

i) Determination of chloride and fluoride in glass 6M

ii) Analysis of sulphuric anhydride in cement. 4M

MODEL QUESTION PAPER
M.Sc.(FINAL) ANALYTICAL CHEMISTRY
PAPER III – ANALYSIS OF APPLIED INDUSTRIAL PRODUCT

III SEMESTER

PAPER(C.Anl 3.3)

UNIT-1

1. What is Vehicle and give its importance. 3M
Or
What is pigment, why pigment is used in paints.
2. Explain the determination of sodium silicate and chlorides in soap. 7M
Or
Explain the analysis of total lead in paints.
3. Write short note on following 10M
i) Total fatty matter in soaps
ii) Combined Alkali in soaps.
Or
Write a detailed account on analysis of paints.

UNIT-II

4. Explain saponification Value 3M
Or
Explain the analysis of hydrocarbons.
5. Explain the analysis of ketone. 7M
Or
Discuss the determination of Iodine value in Oils using Hanus Method and Wigg's method.
6. Give a detailed account on analysis of Methoxyl and N-methyl groups. 10M
Or
Write a short notes on following
- i) Acid Value of Oils. 4M
ii) Analysis of Acetic acid an industrial solvent. 6M

UNIT-III

7. Give an outline procedure for the analysis of paper. 3M
Or
Write a short note on the gravimetric determination of sugar by using Munson and Walker Method.
8. Describe briefly analysis of Endosulfon 7M
Or
Explain the analysis of starch.
9. Explain the analysis of following 10M
i) DDT
ii) Super phosphate
or
Describe briefly the analysis of nitrogen, phosphorus and potassium in NPK fertilizers.

UNIT-IV

10. What is octane number 3M
Or
Write the composition of Water gas and producer gas.
11. Explain the analysis of saturated and unsaturated hydrocarbons 7M
Or
Determine the percentage of sulphur and nitrogen in Ultimate analysis.
12. Explain the following 10M
i) Analysis of kerosene gas
ii) Analysis of producer gas
or
Describe briefly the percentage determination of carbon, hydrogen, oxygen and phosphorus in ultimate analysis.

MODEL QUESTION PAPER
M.Sc.(FINAL) ANALYTICAL CHEMISTRY
PAPER IV – OPTICAL METHODS OF ANALYSIS AND OTHER TECHNIQUES

III SEMESTER

PAPER(C.Anl 3.4)

UNIT-1

1. Explain Rayleigh scattering and Raman's Stokes lines and anti-Stokes lines. 3M
Or
Explain the differences between IR and Raman Spectroscopy
2. Explain the theory and instrumentation of Infrared Spectroscopy. 7M
Or
Describe the instrumentation and applications of Raman Spectroscopy.
3. What is Raman Effect and explain the mechanism of Raman effect. 10M
Or
Explain the structural determination of an organic compound and Quantitative analysis by using IR spectroscopy.

UNIT-II

4. Compare Fluorimetry and Phosphorimetry. 3M
Or
Write a short note on the theory involved in Nephelometry and Turbidimetry.
5. Write a note on instrumentation and application of Nephelometry and Turbidimetry. 7M
Or
Explain the factors affecting fluorescence and concentration.
6. Explain the following 10M
i) Turbidimetric titrations
ii) Differences between Nephelometry and Turbidimetry
or
Give a brief account on the theory and instrumentation of fluorescence and Phosphorescence

UNIT-1II

7. Explain the advantage of ICP over Atomic absorption Spectroscopy. 3M

Or

Explain the principle involved in Flame Photometry.
8. Write a short note on Types of emission Spectra. 7M

Or

Give an account on errors of Flame Photometry.

9. Describe the theory and instrumentation involved in Atomic-Absorption Spectroscopy with a neat labeled block diagram. 10M

Or

Explain the theory and instrumentation of Emission spectroscopy.

UNIT-1V

10. Explain different types of thermal balances. 3M

Or

Explain thermometric titrations.

11. Explain the measurement techniques involved in Radio chemical methods. 7M

Or

Give a detailed account on applications of thermometry.

12. Write a note on differential thermal analysis 10M

Or

Explain the importance of radio carbon dating and applications of Radio Active elements as tracers.

MODEL QUESTION PAPER
M.Sc.(FINAL) INORGANIC CHEMISTRY
Advances in Inorganic Chemistry

III SEMESTER

PAPER(C.Ing 3.1)

Paper-1

UNIT -I

1. (a) What are the differences between molecular orbital theory and crystal field theory?
3M

Or

- (b) What are the applications of crown ethers in Inorganic chemistry?

2. (a) Sketch the MO diagram for Tetrahedral and Square planar geometries
7M

Or

- (b) Explain chelate effect by using any two chelate ligands

- 3.(a) Describe the bonding in $[\text{Co}(\text{NH}_3)_6]^{3+}$ by using MO theory
10M

Or

- (b)What are macro cycles and discuss their applications?

UNIT -II

- 4.(a) What is template effect?
3M

Or

- (b)What are Organometallic compounds and give any four arene metal complexes?

- 5.(a)What is homogeneous catalysis and describe the reactions involved in hydrogenation with
7M

Wilkinson's catalyst.

Or

- (b) Write the synthesis and properties of ferrocene?

- 6.(a) What are carbonylate anions and discuss the properties of carbonyl hydrides
10M

Or

- (b)Explain photochemical decomposition of Co(III) and Cr(III) complexes?

UNIT -III

- 7.(a) What is Inorganic Benzene and give any two preparations?
3M

Or

- (b) What is $18e^-$ rule and verify for the complex $[\text{Cr}(\text{CO})_6]$

8.(a) Explain Intercalation chemistry and discuss their applications?

7M

Or

(b) What are wades rules and give a example for each type of borane?

9.(a) Write the preparations and properties of phosphazenes and poly siloxanes?

10M

Or

(b) Explain the bonding in $\text{Re}_2\text{Cl}_8^{2-}$

UNIT -IV

10.(a) What is oxidative reaction?

3M

Or

(b) What are insertion and migration reactions?

11.(a) Discuss hydroformylation with catalytic loop?

7M

Or

(b) Explain Olefin isomerisation?

12.(a) Describe the catalytic way of synthetic gasoline?

10M

Or

(b) Explain Nitrogen fixation?

MODEL QUESTION PAPER
M.Sc.(FINAL) INORGANIC CHEMISTRY
PHYSICAL INORGANIC CHEMISTRY

III SEMESTER

PAPER (C.Ing 3.2)

PAPER-2

UNIT-I

1. (a) Explain thermodynamic variables such as enthalpy, entropy and free energy?

3M

Or

(b) What are the effects of temperature on equilibrium constant?

2.(a) Explain Born Haber cycle with suitable examples?

7M

Or

(b) Derive relationship between emf, free energy and equilibrium constant

3.(a) Explain thermodynamic approach to the use of high temperature technique in inorganic Synthesis?

10M

Or

(b) Explain the general principles of thermo chemistry

UNIT-II

4.(a) Explain the Band theory of solids

3M

Or

(b) Explain the types of semi conductors

5.(a) Explain Hume rutherly rules

7M

Or

(b) What is meant by packing efficiency and explain the types of HCP and CCP

6.(a) Describe the properties of Dielectric, Ferro electric, pyro electric and Piezo Electric materials

10M

Or

(b) Describe solid –solid reactions?

UNIT-III

7.(a) Explain Arrhenius and Bronsted Lowry theories?

3M

Or

(b) Explain symbiosis

8.(a) Explain HSAB theory with suitable examples

7M

Or

(b) Explain reactions in liquid ammonia, sulphur dioxide and acetic acid as non aqueous solvents?

9.(a) Explain reactions in anhydrous sulphuric acid liquid sulphur dioxide and liquid HF

10M

Or

(b) Describe the titrations in non aqueous solvents

UNIT-IV

10.(a) What is Hetero Catenation?

3M

Or

(b) What are boranes and carboranes?

11.(a) What is intercalation chemistry and give any one application

7M

Or

(b) Write preparations and properties of Phosphazenes

12.(a) Explain the bonding in binuclear and trinuclear clusters

10M

Or

(b) What are cage compounds and explain the Wadsworth's rules?

MODEL QUESTION PAPER
M.Sc.(FINAL) INORGANIC CHEMISTRY
INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS

III SEMESTER

PAPER(C.Ing 3.3)

PAPER-3

UNIT-I

1. (a) Explain the principle and theoretical aspects of radiochemical methods? 3M
Or
(b) Explain the types of thermal balances?
- 2.(a) Explain Gas counter and scintillation counter? 7M
Or
(b) Explain thermo metric titrations?
- 3.(a) Explain sample preparation and applications 10M
Or
(b) Explain briefly Differential thermal analyses and differential scanning calorimetry?

UNIT-II

- 4.(a) Discuss various types of molecular vibrations briefly? 3M
Or
(b) Explain the mechanism behind Raman spectroscopy?
- 5.(a) Explain structure determination by using IR spectroscopy? 7M
Or
(b) Explain differences between Raman and IR spectroscopy?
- 6.(a) Explain theory and instrumentation of IR spectroscopy? 10M
Or
(b) Explain theory and instrumentation of Raman spectroscopy?

UNIT-III

- 7.(a) Explain the differences between Nephelometry and Turbidometry? 3M
Or
(b) Give application of Phosphorimetry and fluorimetry?
- 8.(a) Explain the theory behind Nephelometry and Turbidometry? 7M
Or
(b) What are the factors affecting fluorescence and phosphorescence
- 9.(a) Discuss the Instrumentation and applications of Nephelometry and Turbidometry? 10M
Or
(b) Compare and contrast the Phosphorimetry and fluorimetry and discuss their applications?

UNIT-IV

- 10.(a) Discuss briefly errors in Flame photometer? 3M
Or
(b) Explain briefly the relation between Atomic absorption and Flame emission spectrometry
- 11.(a) Explain the advantages of inductively coupled spectrometer and over atomic absorption spectroscopy 7M
Or
(b) Explain instrumentation of flame photometry
- 12.(a) Explain the theory and principle of flame photometry and give some applications 10M
Or
(b) What is the theory and principle involved in atomic absorption spectroscopy and gives some applications

MODEL QUESTION PAPER
M.Sc.(FINAL) INORGANIC CHEMISTRY
BIO - INORAGANIC CHEMISTRY

III SEMESTER

PAPER (C.Ing 3.4)

PAPER-4

UNIT-I

1.(a) Explain metallo porphorines with suitable examples?

3M

Or

(b) Give any three differences between Hemoglobin, hemerythrin and Heamocyanin

2.(a) Explain the role of Mg in photosynthesis

7M

Or

(b) Write the structure and mechanism of Hemoglobin

3.(a) What are essential and nonessential elements, and explain briefly with any three elements.

10M

Or

(b) Write the structure and functions of chlorophyll.

UNIT-II

4.(a) Explain the importance of Enzymes with suitable examples

3M

Or

(b) What are cytochrome and give any two examples

5.(a) Explain briefly enzymes of Cobalt (II) and copper and Molybdenum.

7M

Or

(b) Explain the oxidation of ascorbic acid by Cu(II) enzymes

6.(a) Explain the structure and functions of Enzymes?

10M

Or

(b) Write the properties of vitamine B12 and B12 coenzymes

UNIT-III

7.(a) Define carboxylation and decarboxylation in biological system

3M

Or

(b) Write about exchange of functional groups

8.(a) What are the differences between exchange of functional groups and blocking of Functional groups?

7M

Or

(b) Write about phosphorilation

9.(a) Explain the importance of nitrogenase in reduction of Nitrogen
10M

Or

(b) Explain transportation and storage of metal ions by complex formation?

UNIT-IV

10.(a) Explain metal ion toxicity with suitable examples
3M

Or

(b) What are antibiotics?

11.(a) Explain biochemistry of metals ADP and ATP
7M

Or

(b) Describe the importance of antibiotics in living system?

12.(a) Describe Nitrogen fixation In invitro and invivo systems
10M

Or

(b) Write the differences between metal ion toxicity and metal ion detoxification by using few examples.

MODEL QUESTION PAPER

ACHARYA NAGARJUNA UNIVERSITY
M.Sc.(FINAL) SEMESTER-IV(BATCH: 2010-2011)
PAPER-I: ORGANIC SPECTROSCOPY (C4.1 (O)-10)

Time: 3 hours

Max.Marks:80

Answer All Questions

UNIT-I

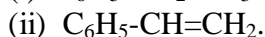
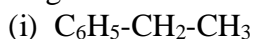
1. (a) Discuss about ^{13}C NMR and simplification of ^{13}C -spectra by process of decoupling. (3M)

(OR)

- (b) What are the main differences between ^1H NMR and ^{13}C NMR.

- 2 (a) Describe the ^1H NMR of neat ethanol. (7M)

- (b) Assign the ^{13}C NMR chemical shifts for the following compounds.



(OR)

- (c) Sketch the off resonance decoupled ^{13}C NMR spectra of n-propylchloride and acetaldehyde.

- 3 (a) Write short notes on off resonance decoupling. (10M)

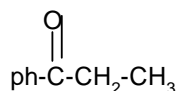
- (b) Suggest structure based on the given ^1H NMR data and molecular formula

Molecular formula C_9H_{12} .

δ 0.95 (t, 3H), 1.70 (sextet : 2H), 2.6 (t, 2H), and 7.25 (s, 5H)

(OR)

- (c) Predict the CMR values of the following compound



- (d) Deduce the structure of the organic compound with following data, having
Molecular formula C_9H_{10} δ 7.30 (m, 5H), 5.34 (d, 1H), 5.05 (m, 1H), 2.11 (d, 3H).

UNIT-II

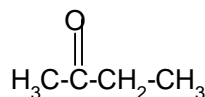
4. (a) Write a note on HECTOR 2D NMR spectroscopy. (3M)

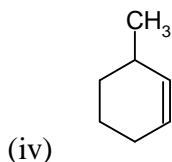
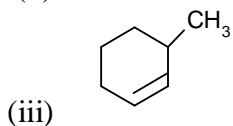
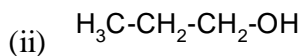
(OR)

- (b) Explain the mass spectra fragmentation of pyrole.

5. (a) How could the following compounds be identified by their mass spectrum?.

- (i) (7M)





(OR)

(b) In the mass spectrum of methyl butylate peaks at m/z . 102, 74, 59 and 53 are observed. Explain the formation of these ions.

6. (a) (i) Write a brief note on application of mass spectrum in the analysis of halogen Compounds.
(ii) Explain about meta stable ion peaks in mass spectrometry. (10M)

(OR)

- (b) (i) Write a note on β -cleavage in mass spectrometry.
(ii) Determine the molecular formula and structure of organic compound by the following mass spectral data.
 m/z 109, 108, 93, 78, 77, 66, 65, 51, 39, 30
RA (7), (100), (18), (50), (20), (3), (46), (12), (18), (40).

UNIT-III

7. (a) Explain What is NOESY and mention the importance of it. (3M)

(OR)

(b) Write about the application of 2D-INADEQUATE spectra.

8. (a) How HET2DJ is useful for identification of hetero annular coupling constant? Explain with suitable example. (7M)

(OR)

(b) Discuss about the Homocosity with appropriate examples and draw the spectrum..

9. (a) Assign the structures using given spectral analysis. Molecular formula $\text{C}_9\text{H}_{10}\text{O}_2$
U.V.268 nm, IR 2960 cm^{-1} , $^1\text{H NMR}$ δ 2.0(s, 3H), δ 5.0(s, 2H), δ 7.2(s, 5H).

(OR)

(10M)

- (b) (i) Deduce the structure of organic compound using the following spectral Properties.

Molecular formula $C_{10}H_{12}O$

U.V 243 (55%)

IR 650cm^{-1} , 750cm^{-1} , 900cm^{-1} , 1000cm^{-1} , 1200cm^{-1} , 1750cm^{-1} , 3000cm^{-1} .

PMR 1.03H(t), 1.8 2H(t), 7.5 3H(m), 8.0 2H(m)

Mass: 148, 133, 120, 105(100%), 100, 72, 51, 39.

- (ii) How do you identify a organic compound with the help of IR, UV, NMR and Mass spectra?

UNIT-IV

10. (a) Predict the mass spectral character of Lawsone. (3M)

(OR)

- (b) Predict the IR, NMR and mass spectral character of Nicotin.

11. (a) Discuss the structure of disubstituted naphthalene with the help of PMR &CMR.

(7M)

(OR)

- (b) How do you differentiate the terpene and Alkaloid with the help of spectral data?

12. (a) Discuss the detailed structure of 4¹-8¹-dimethyl flavone by employing UV, IR, NMR spectral data and predict the value. (10M)

(OR)

- (b) Explain how spectroscopy is useful to identify the structure of material produces. Taking example of camphor, how do you substantiate your decision?

MODEL QUESTION PAPER
ACHARYA NAGARJUNA UNIVERSITY
M.Sc.(FINAL); SEMESTER-IV(BATCHC: 2010-2011)
PAPER – II: ORGANIC SYNTHESIS, MECHANISMS AND GREEN CHEMISTRY (C4.2 (O)-10)
Time: 3 hours **Max.Marks:80.**

Answer All Questions

UNIT-I

1. (a) What is diene and dienophile? Give one examples **(3M)**

(OR)

(b) What is stereoselective synthesis? Give an example.

2. (a) Explain the mechanism of intra molecular diels-Alder reaction. **(7M)**

(OR)

(b) Explain the stereochemistry and mechanism of Retero Diels-Alder reaction.

3. (a) what are phosphorous ylides? Give any two methods for the preparation of phosphorous ylides and discuss their application in organic synthesis.

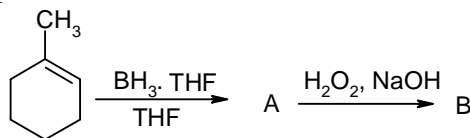
(10M)

(OR)

(b) what are enamines? Give any two methods for the preparation of enamines and discuss their importance in organic synthesis.

UNIT-II

4. a. Give the structures of the products A and B. **(3M)**



(or)

b. What is meant by synthon? Give two examples

5. a. Narrate a brief account on carbonylation reactions of alkenyl boranes? **(7M)**

(or)

b. Discuss the two group disconnections in aryl ketones and 1,3-dicarbonyl compounds.

6. a. What are organo lithium compounds? Discuss their synthetic applications in organic synthesis. **(10M)**

(or)

b. Write notes on the following a. functional group interconversion with examples

b. One group disconnections in simple molecules

UNIT-III

7. (a) What is meant by Green chemistry. **(3M)**

(OR)

(b) Give the mechanism involved in Di- π methane rearrangement.

8. (a) Explain the synthesis of Ibuprofen with a comparison conventional method. **(7M)**

(OR)

(b) Give the isomerisation and addition reactions of aromatic compounds.

9. (a) Explain in detail about microwave reactions and its applications. **(10M)**

(OR)

(b) Explain the photochemistry of conjugated olefins.

UNIT-IV

10. a. Explain the electronic configuration in ground and first excited states of Ethylene. **(3M)**

(or)

b. Explain the stereochemistry of electrocyclic reactions by taking one example.

11. a. Explain by FMO approach of (2+2) and (4+2) cycloaddition reactions. **(7M)**

(or)

b. Explain Woodward-Hoffman rules for pericyclic reactions.

12. a. Write the correlation diagram for electrocyclic reactions of 1,3-butadiene to cyclobutene and 1,3,5-hexatriene to cyclohexadiene. **(10M)**

(or)

b. Give the mechanism of Cope and aza-Cope rearrangements.

MODEL QUESTION PAPER

ACHARYA NAGARJUNA UNIVERSITY
M.Sc.(FINAL) SEMESTER-IV(BATCH: 2010-2011)
PAPER-III: ANTIBIOTICS AND DRUGS (C4.3 (O)-10)

Time: 3 hours

Max.Marks:80

Answer All Questions

UNIT-I

1. (a) What are inhibitors? Give two examples. (3M)
(OR)
(b) Write a note on cell wall biosynthesis.
2. (a) Write the synthesis of Amoxycillin. (7M)
(OR)
(b) Write the synthesis of Penicillin-G.
3. (a) Establish the structure of streptomycin and prove it by synthesis. (10M)
(OR)
(b) What are Antibiotics? Describe in detail their structural and biological aspects.

UNIT-II

4. (a) Write a note on treatment of various cancers by chemotherapy. (3M)
(OR)
(b) Explain how activity is related to structure with an example.
5. (a) Explain the structural aspects of Vincristine and Vinblastine. (7M)
(OR)
(b) What are anticancer agents? Explain the activity of Taxol.
6. (a) What is Vinblastine? Write the structure and give its source. Discuss the biological properties of it. (10M)
(OR)
(b) Explain in detail the structure of camphothecin with synthesis and give its pharmacological importance?

UNIT-III

7. (a) Write note on neurotransmitters? (3M)
(OR)
(b) Explain about sedatives and hypnotics.
8. (a) Explain strychnine as CNS stimulant. (7M)
(OR)
(b) Explain CNS depressants with suitable examples.
9. (a) Explain the structural elucidation of Picrotoxin and give its activity? (10M)
(OR)
(b) What are anaesthetics? Give a detailed description of their mode of action and mechanism on CNS.

UNIT-IV

10. (a) What are Antiseptics? Give the structure of chlorophene. (3M)
(OR)
(b) Explain sulpha drugs with an example.
11. (a) Give the synthesis and activity of chinifon. (7M)
(OR)
(b) Give the synthesis and activity of Paludrin.
12. (a) Explain in detail the structure and fungicidal activities of 1,8-dihydroxy anthranol and Griseofulvin. (10M)
(OR)
(b) What are Antimalarials? Explain the structure and activity of chloroquin and pamaquin.

MODEL QUESTION PAPER

ACHARYA NAGARJUNA UNIVERSITY

M.Sc.(FINAL) SEMESTER-IV(BATCH: 2010-2011)

PAPER-IV: TECHNIQUES FOR MODERN INDUSTRIAL APPLICATIONS (C4.4 (O)-10)

Time: 3 hours

Max.Marks:80

Answer All Questions

UNIT-I

1. (a) Classify different methods of purification? (3M)
(OR)
(b) What is meant by Seeding? Explain.
2. (a) Give the basic principle involved distillation and also explain process of distillation with neat diagram. (7M)
(OR)
(b) Name different types of extractions and describe briefly about Soxhlet extraction.
3. (a) Write an account on the following (10M)
(i) Continuous distillation
(ii) Centrifugation
(iii) Vacuum distillation
(OR)
(b)(i) Describe any two industrial applications for distillation.
(ii) Explain the following
(a) Basic principles & selection of solvents in solvent extraction.
(b) Avoiding of emulsion formation.

UNIT-II

4. (a) Define adsorbents and give two examples. (7M)
(OR)
(b) What is meant by chromatography?
5. Explain the terms Stationary phase, Mobile phase, packing of column in respect of column chromatography. (7M)
6. (a) Explain the development of TLC plates. How do you choose the solvents for the development of TLC plates? (10M)
(OR)
(b) How is quantitative analysis carried out by TLC ? Give the applications of TLC in Organic chemistry?

UNIT-III

7. (a) Give the principle involved in Gas chromatography. (3M)
(OR)
(b) How do you select the column in HPLC?
8. (a) Describe the instrumentation in Gas chromatography. (7M)
(OR)
(b) Explain the concepts of HPLC method development.
9. (a) Describe the principle , working and applications of HPLC. (10M)
(OR)
(b) Explain the applications of Gas chromatography in separation identification and quantitative analysis of organic compounds.

UNIT-IV

10. (a) Give the preparation of Cross-linked polystyrene resin? (3M)
(OR)
(b) Give the basic principle involved in electrophoresis.
11. (a) Give an account on anion exchange resin.How are they useful for the separation of Amino group compounds. (7M)
(OR)
(b) Explain the mechanism involved in capillary electrophoresis.
12. (a) Write the applications of electrophoresis. (10M)
I
(OR)
(b). What are cation exchange resins? Explain their working in purification.

MODEL QUESTION PAPER

ACHARYA NAGARJUNA UNIVERSITY
M.Sc.(FINAL) SEMESTER-III(BATCH: 2010-2011)
PAPER-I: ORGANIC SPECTROSCOPY (C3.1 (O)-10)

Time: 3 hours

Max.Marks:80

Answer All Questions
UNIT-I

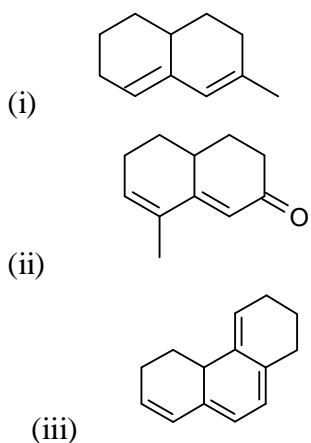
1. (a) Explain the following terms:

- (i) Bathochromic shift
- (ii) Chromophore
- (iii) Auxochrome

(3M)

(OR)

(b) By using wood ward rules calculate the λ_{\max} values for the following compounds.



2 (a) What are cotton effect curves? How do they change in R-methyl cyclohexanone?

(7M)

(OR)

(b) Predict the sign of cotton effect curves for the following compounds

- (i) Trans-10-methyl-2-decalone
- (ii) 5 α -cholestane-3-one

3. (a) Explain the solvent effects in UV absorption of carbonyl compounds.

(b) Briefly explain the theory of electronic excitation spectroscopy of organic compounds. (10M)

(OR)

- (c) Write a note on the following :
- Beers and Lamberts law
 - Hyperchromic and hypochromic effect
 - Hypsochromic shift.

UNIT-II

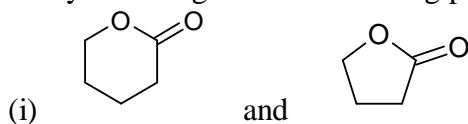
4. (a) What are the functional group and finger print region in the IR spectrum and what type of group vibrations are identified by them.

(3M)

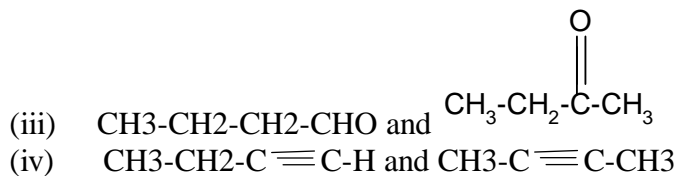
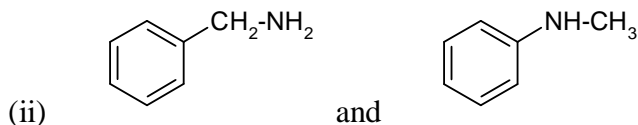
(OR)

- (b) Explain various kinds of vibration of molecules. What are overtones and Combination bands?

5. (a) How do you distinguish the following pairs of compounds by IR spectroscopy?.



(7M)



(OR)

- (b) Compound A with MF $\text{C}_{13}\text{H}_{12}\text{O}$ on oxidation with CrO_3 in acetic acid gave compound-B. Their IR data.

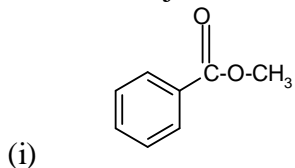
Comp-A : 3450, 3125, 2941, 1600, 1490, 1450, 1175, 1036

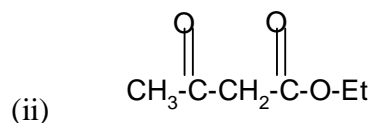
Comp-B : 3125, 166, 1612, 1449, 1315, 1265, 1176, 943

Predict the structures of Comp-A and Comp-B.

6. (a) How do you distinguish the inter and intra molecular hydrogen bonding in hydroxyl compounds by IR spectroscopy.

- (b) Find out the major IR absorption in the following compounds



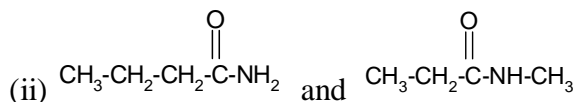
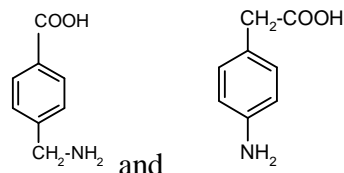


(10M)

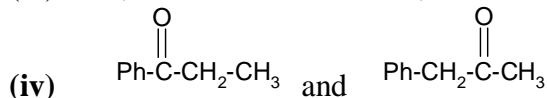
(OR)

(d) Discuss what features of their IR spectra could help in distinguishing the following pairs of compounds.

(i)



(iii) 2,5-Hexanedione and 2,4-Hexanedione



UNIT-III

7. (a) In 60 MHz NMR spectrum of $\text{CH}_3-\text{O}-\text{H}$, the $-\text{OMe}$ and $-\text{OH}$ group signals are found at 210 Hz and 288 Hz respectively higher frequency than TMS. How much higher frequency do they occur when the spectrum is recorded in 200 MHz and 300 MHz instrument and calculate their δ values.

(3M)

(OR)

(b) Explain the terms :

- (i) Chemical shift
- (ii) Chemical exchange

8. (a) Predict the number of signals and their chemical shift and spin-spin coupling in each of the following compounds

- (i) $\text{CH}_3-\text{CH}_2-\text{Cl}$
- (ii) $\text{CH}_3-\text{CH}(\text{Cl})-\text{CH}_3$
- (iii) $\text{Br}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{Br}$

(7M)

(OR)

(b) What is anisotropic effect? Explain the paramagnetic anisotropy of alkene, aldehydic and aromatic protons.

9. (a) Explain the temperature dependent NMR spectra of the following compounds.

- (i) N, N- Dimethyl formamide
- (ii) 18-Annulene

(iii) Cyclohexane.

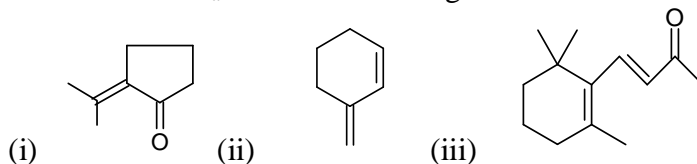
(10M)

(OR)

(b) Explain with suitable examples the A, B and AX; ABX and AMX type of non first order couplings in NMR spectra.

UNIT-IV

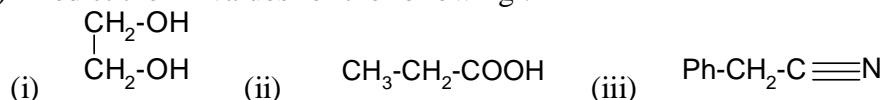
10. (a) Calculate the λ_{\max} for the following :



(3M)

(OR)

(b) Predict the IR values for the following :



11. (a) Deduce the structure of the compound with M.F $\text{C}_9\text{H}_8\text{O}$ which has the following spectral data

UV : 286 nm

IR : 3095, 2820, 2752, 1686, 1630, 1610, 970, 745 cm^{-1}

(7M)

$^1\text{H NMR}$: δ 6.60 (ddd, $J=16$ Hz); 7.41 (d, $J=16$ and 7 Hz, 1H); 7.40 (s, 5H); 9.60 (d, $J=7$ Hz, 1H)

(OR)

(b) A compound with a MF $\text{C}_6\text{H}_{13}\text{NO}_2$ has the following spectral data. IR = 1735 cm^{-1}

NMR = δ 1.3 (3H, t); 2.40 (6H, s); 3.21 (2H, s) and 4.2 (2H, q)

Find the structure with suitable explanation.

12. (a) An organic compound with a Mol.wt of 164, gives the following spectral data (IR and NMR)

IR : 1730, cm^{-1}

NMR: δ 2.10 (s, 3H); 2.94 (t, $J=7$ Hz, 2H)

4.30 (t, 2H $J=7$ Hz); 7.31 (s, 5H)

Deduce the structure with suitable explanation.

(10M)

(OR)

(b) An organic compound with a MF $\text{C}_8\text{H}_{14}\text{O}_4$ exhibits the following spectral data.

UV : No strong band

IR : 2950, 2885, 1730, 1250

NMR = δ 1.3 (d, 3H); 2.7 (q, 1H) 1.16 (t, 6H); 4.18 (q, 4H)

Deduce the structure of the compound with suitable explanation.

MODEL QUESTION PAPER
ACHARYA NAGARJUNA UNIVERSITY
M.Sc.(FINAL); SEMESTER-III(BATCH: 2010-2011)

PAPER – II: ORGANIC SYNTHESIS, MECHANISMS NANO CHEMISTRY (C3.2(O)-10)

Time: 3 hours

Max.Marks:80.

Answer All Questions

UNIT-I

1. (a) Differentiate intermediate & transition state by using energy profile diagram.

(3M)

(OR)

(b) Give any experimental method for the detection of free radicals.

2. (a) How isotopic labelling experiments are useful for the determination of mechanism of a reaction.

(7M)

(OR)

(b) Explain the decomposition of diacyl peroxides.

3. (a) How the following tools are useful for the determination of mechanism of a reaction

(10M)

(i) Trapping of intermediates

(ii) Reaction rate of rate limiting step

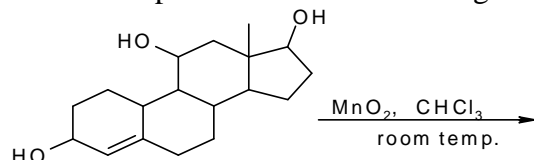
(OR)

(b) Write notes on halogenation and rearrangement reactions involving free radicals.

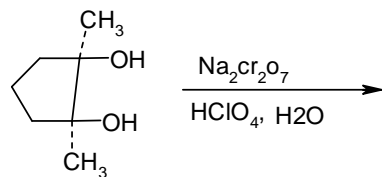
UNIT-II

4. Give the products for the following reactions

(3M)



(or)



5. How alcohols are oxidised by different reagents(any two reagents).

(7M)

(or)

How ketones are oxidized by thallium(III) nitrate, give the mechanism

6. Explain perhydroxylation of $\text{C}=\text{C}$ using KMnO_4 and OsO_4

(10M)

(or)

How the following reagents are useful in the oxidation different substrates

a. Peracids

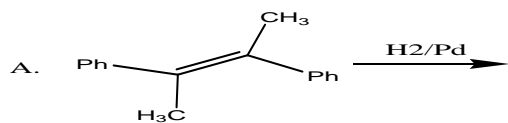
b. SeO_2

c. LTA

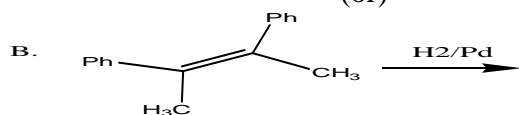
UNIT-III

7. Give the products for the following reactions

(3M)



(or)



8. Explain the mechanism involved in Birch reduction (7M)

(or)

How alkenes and aromatic compounds are hydrogenated.

9. How the following reagents serve as reducing agents

a. Diimide b. LiAlH_4 c. sodium cyano borohydride (10M)

(or)

Give an account on the following

a. Reduction with metal and acid.

b. Catalytic hydrogenation

c. Reduction by dissolving metals.

UNIT-IV

10. (a) Give the structure of single wall nanotubes. (3M)

(OR)

(b) Give the general properties of carbon nanotubes.

11. (a) Explain the synthesis of carbon nanotubes with controlled orientation.

(7M)

(OR)

(b) Give the properties and applications of nanotubes.

12. (a) Give the synthesis of carbon nanotubes by gaseous carbon source-based production techniques. (10M)

(OR)

(b) Explain the growth mechanism of carbon nanotubes both in catalyst free and Catalyst activated conditions.

MODEL QUESTION PAPER

ACHARYA NAGARJUNA UNIVERSITY
M.Sc.(FINAL) SEMESTER-III (Batch: 2010-11)
PAPER-IV: CHEMISTRY OF NATURAL PRODUCTS (C3.4 (O)-10)

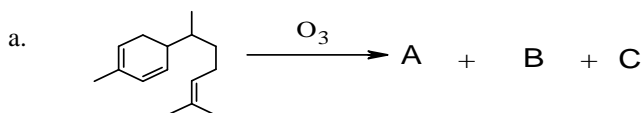
Answer All Questions

Max.Marks:80.

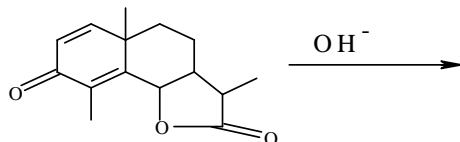
UNIT-I

1. Write the products of the following reactions

(3M)



b.



(OR)

a. Give the classification of flavonoids

2. How Robinson and Kostanecki methods are useful for the preparation of flavonoids and its analogs.

(7M)

(OR)

Write an account on biosynthesis of abietic acid.

3. Give explanation on chemistry of santonin.

(10M)

(OR)

Write the synthesis and chemistry for Kaempferol.

UNIT-II

4. Write the procedure for the isolation of Oestrone.

(3M)

(OR)

Give the structures for Oxytocin and Tetraiodothyronin.

5. Elucidate the structure of

a. androsterone.

(7M)

(OR)

b. Thyroxine

6. Give the synthesis and properties for a. Progesterone

(10M)

(OR)

b. Oxytocin.

UNIT-III

7. Give any two examples for fat soluble vitamins with structures. (3M)
(OR)

Differentiate enzymes and coenzymes

8. Outline the biosynthesis for vitamin C. (7M)
(OR)

Describe citric acid cycle.

9. Write the synthesis and uses for vitamin A₁. (10M)

(OR)

Discuss briefly about the sources and biological importance of prostagladins; also give the chemistry of PGE₁ and PGE₂ prostagladins.

UNIT-IV

10. Write the procedure for the isolation of Jasmolin I. (3M)
(OR)

Give structures for Spilanthol and Pachyrrhizin.

11. Furnish the chemistry of the following (7M)
a. Cinerolone.

(OR)

b. Anacyclin.

12. Give the synthesis for the following (10M)

a. Pyrethrin I & II

(OR)

b. Rotenone.