VEER NARMAD SOUTH GUJARAT UNIVERSITY
M.Sc.-II (CHEMISTRY)
TO COME IN FORCE FROM JUNE-2008
PAPER-I (NATURAL AND ADVANCED ORGANIC CHEMISTRY)

Max. Marks: 70 **Total Periods: 120**

SECTION -I

UNIT-I : NATURAL PIGMENTS: (20 Periods)

Porphyrins: Structure, Spectral properties and Synthesis.

Haemoglobin, Chlorophyll and Bilirubin:

General and structure determination (no synthesis), Synthesis of cryptopyrrole, Phytopyrrole, Opsopyrrole and Haemopyrrole and their carboxylic acid derivatives.
Structure of Morphine, Reserpine, Colchicine, , L.S.D. (Analytical evidence only) and their and physiological properties.

UNIT-II : STEROIDS: (20 Periods)

Introduction, Sterols; Structures of cholesterol and ergosterol (No synthesis), Stereochemistry of steroids, Bile acids general and structure.

SEX HORMONES:

Androgens, Oestrogens and Gestogens, their structure and synthesis and biochemical role – Adrenocortical hormones, Partial synthesis of cortisone.

UNIT-III : (20 Periods)

A) VITAMINS:

Introduction, Structure, Synthesis and biochemical functions of Vitamin A_1, A_2, Vitamins B_1, B_2, Vitamin E –, Vitamin K group and Biochemical importance of Vitamin B_{12}.

B) TERPENOIDS AND CAROTENOIDS:

Classification, nomenclature, occurrence, isolation, general methods of structure determination, isoprene rule. Structure determination, stereochemistry, synthesis of the following molecules:

Farnesol, Zingiberene, Cadinene, Abietic acid, Squalene and Eudesmol.

SECTION-II

UNIT-IV: **(20 Periods)**

A) VERSATILE IONIC LIQUIDS AS GREEN SOLVENTS (ALTERNATIVE SOLVENTS)

- Introduction
- Green Solvents
- Reaction in Acidic Ionic Liquids
- Reaction in Neutral Ionic Liquids

B) GREEN CHEMISTRY: AQUEOUS PHASE REACTIONS:
GENERAL INTRODUCTION

- Wittig-Horner Reaction
- Claisen-Schmidt Condensation
- Heck Reaction
- Strecker Synthesis
- Wurtz Reaction
- Photochemical Reactions
- Miscellaneous Reaction in aqueous phase

UNIT-V : **(20 Periods)**

A) ORGANIC SYNTHESIS: MULTISTEP SYNTHESIS:

Need of protecting groups – Hydroxy protective groups – Amino protective groups – Carbonyl protective groups – Carboxylic acid protective groups – Synthetic equivalent groups – Synthetic analysis and planning – Control of stereochemistry. Introduction of functional groups by nucleophilic substitution: -General solvent effects,Introduction of azide group,

B) DISCONNECTION APPROACH

- Synthons and synthetic equivalent disconnection approach, functional group.
- **One group C-C disconnections** –alcohols and carbonyl compounds,regioselectivity,alkene synthesis.
- **Two group C-C disconnections-** 1-3 di functionalized compounds, α,β-unsaturated carbonyl compound ,1-5 di functionalized compounds,
- **Aromatic Heterocycles with two heteroatoms** : Pyrimidine, pyrazine ,pyridazine
- Synthesis of Juvabione, Reserpine and Cortisone.

UNIT-VI : **(20 Periods)**

A) OXIDATION AND REDUCTION:

(a) Oxidation with Cr(VI), Mn(VII), Mn(IV), OsO_4, Peroxidic reagents – Cleavage of ethylenic double bonds – Cleavage of glycols (with mechanism).

(b) Reduction of carbonyl and other functional groups:
Reduction of carbonyl group with $LiAlH_4$, $NaBH_4$ (with mechanism) – The Shapiro Reaction, mechanism and applications – The Birch reduction of aromatic rings , Mechanism and applications.

B) COMBINATORIAL CHEMISTRY:

- Introduction,
- Combinatorial synthesis for drug optimization
- Combichem for drug discovery
- Combichem- solid phase techniques

- Solid supports, the Anchor/Linker
- Methods of parallel synthesis: Houghton's tea bag procedure, Automated parallel synthesis
- Methods in mixed combinatorial synthesis
- General principles, The mix and split method, mix and split in the production of positional scanning libraries.
- Isolation of active component in a mixture- Deconvolution.
- Structure determination of Active compound
- Limitation of Combinatorial synthesis
- Examples of Combinatorial Chemistry.

REFERENCES:

1. Organic Chemistry, Vol. I & II (Sixth edition), I. L. Finar.
2. Chemistry of Organic Natural Products, Vol. I & II, O. P. Agrawal.
3. Organic Chemistry of Natural Products, Vol. I & II, Chatwal.
4. Chemistry of Vitamins – S. F. Dyke.
5. Protective Groups in Organic Synthesis (Second edition), Theodora W. Greene, Peter G. M. Wuts (A Wiley Interscience Publication).
6. Advanced Organic Chemistry (3rd ed.) by Carey & Sundberg (Part A & B), Plenum Press.
7. Wilson and Gisvold's Text book of Organic Medicinal and pharmaceutical chemistry , by John H. Block. And John M. beale Jr. 11th edition.
8. Foye's Principles of Medicinal Chemistry, by David A. Williams and Thomas L. Lenke, 5th edition.
9. Organic synthesis: The Disconnection Approach, by Stuart Warren, John Wiley and sons.
10. New Trends in Green Chemistry, 2nd edition, V.K.Ahluwalia and M. Kidwai, Anamaya Publisheres, New Delhi.
11. Green Chemistry, Theory and Practice, Pual T. Anastas and John C. Warner, Oxford University Press, 2000, New York, USA.
12. Green Chemistry : An Introductory Text, Mike Lancaster, Green Chemistry Netweork, University of York, RSC, 2002.
13. Handbook of Green Chemistry and Technology, edited by: james Clark and Duncan Macquarrie, Blackwell publishing.

VEER NARMAD SOUTH GUJARAT UNIVERSITY
M.Sc.-II (CHEMISTRY)
TO COME IN FORCE FROM JUNE-2008
PAPER-II (INDUSTRIAL CHEMICALS AND INDUSTRIAL ANALYSIS)

Max. Marks:70 **Total Periods: 120**

SECTION-I

UNIT-I : UNIT PROCESSES IN ORGANIC CHEMISTRY: (20 Periods)

(A). UNIT PROCESSES:

Nitration, Sulphonation and Alkylation Methods, and Industrial Chemicals derived from Benzene, Naphthalene and Anthracene using these processes.

Halogenation, Hydroxylation and Amination Methods,

Industrial Chemicals derived from Benzene, Naphthalene and Anthracene

using these processes.

(B) STUDY OF FEW CLASSES OF DYES:

- **Disperse dyes.**

Introduction- Chemical constitution, Azo, Anthraquinone and other chromophoric systems. Application of disperse dyes on polyester and other manmade fibers .

- **Reactive dyes.**

Introduction, Chemical constitution of reactive systems, Classification,

Dyeing techniques for the application of reactive dyes on different fibers.

(C) DYES FOR NON-TEXTILE USES:

Leather, fur, paper, hair, food and photographic dyes .Dyes used in Ink and indicators etc.

UNIT-II : PETROLEUM AND POLYMER INDUSTRY (20 Periods)

A) PETROLEUM INDUSTRY :

Refining processes – Manufacturing of petrochemicals from C_1, C_2, C_3, C_4 cuts and aromatics.

B) POLYMER INDUSTRY:

Techniques of polymerization, Industrial manufacture and uses of polyolefins, PVC, polyesters, polyvinyl chloride, Polyacrylates, Elastomers, Polyethylene Terphthalate (PET).

UNIT-III : (20 Periods)

(A) MANUFACTURE AND USES OF IMPORTANT CHEMICALS:

a) **Agrochemicals:** DDT, Gammaxene, Alarin, Malathion, 2-4D, Heptachlor.

b) **Explosives:** Cellulose nitrate, Pentaerythritol tetranitrate (PETN), TNT,

Trinitroglycerine dynamite, RDX, Pentryl, Dinol.

(B) Synthesis Involving Basic principles of Green Chemistry:

- Synthesis of Styrene
- Synthesis of Adipic Acid, Catechol and 3-dehydroshikimic acid
- Synthesis of Methyl Methacrylate
- Selective alkylation of Active Methylene group
- Free Radical Bromination
- Synthesis of Ibuprofen
- Synthesis of Paracetamol

SECTION – II

UNIT-IV : SPECTROSCOPY: (20 Periods)

(a) UV-Visible Spectrophotometry:

Review of different electronic transition, Woodward's rules for α,β-unsaturated ketones, Diene systems, Effect of solvent on absorption bands – Elementary idea of double beam automatic recording, Spectrophotometer.

(b) IR Spectrophotometry:

Spectrophotometer – Components of IR spectrophotometer – Sample handling – Calibration of wavelength – Interpretation of IR spectra using correlation charts – Study of few representative spectra, n-hexane, 2-methyl petane, n-hexyl amine, n-butyl methyl ether, butyramide, n-hexanol, acetophenone, n-butyl-acetate, ethyl benzoate, n-hexanoic acid, benzoic acid, phenol, Effect of H-bonding on absorption bands – Elementary idea about FT-IR spectrophotometer.

(c) NMR Spectroscopy:

Review of theory, Chemical shift, Reference and solvents used – Elementary idea about NMR spectrometer – Spin-spin coupling – Magnetic anisotropy – Chemical equivalence, Magnetic equivalence – Structure elucidation from NMR spectra – Study of NMR spectra of some illustrative compounds.

(d) Mass Spectrometry:

Principle of mass spectra – Parent peak – Net stable ions – Base peak – Isotope effect of arrive at correct molecular formula – Fragmentation rules – McLafferly rearrangement – Use of mass spectra to elucidate structure of organic compounds – Mass spectra of some illustrative compounds

(Problems covering all above techniques).

UNIT-V : SEPARATION TECHNIQUES: (20 Periods)

(a) Thin-Layer Chromatography:

Selection of stationary and mobile phase – Detection techniques – Elementary idea of HPTLC.

(b) Gas Chromatography:

Selection of mobile phase – Selection of stationary phase in GLC and GSC – Detectors : FID (with modifications), TCD and ECD, Their comparison, Packed column, WCOT, SCOT (advantages and disadvantages) –Temperature programming – Derivatisation in GC – Quantitative Analysis.

(c) High Performance Liquid Chromatography:

Review of components of Instrument – Criteria in selection of mobile phase –

Stationary phases including bonded phase supports used in LSC and LLC – Normal phase and Reversed phase chromatography – Isocratic and Gradient Elution.
Detectors: UV absorption and RI detector – Method of introducing sample.

UNIT-VI : POLLUTION TESTING AND EFFLUENT TREATMENT: (20 Periods)

(a) Environmental chemistry: Introduction, Aquatic pollution – Inorganic, Organic, Pesticide, Agricultural, Industrial and Sewage, Detergents, Oil spills and Oil pollutants.
Water quality parameters – dissolved oxygen, biochemical oxygen demand.
Analytical methods for measuring DO, BOD and COD. Purification and treatment of water.

(b) Chemical and photochemical reactions in atmosphere, smog formation, oxides of N, C, S, O and their effect. Analytical methods for measuring air pollutants.

(c) Industrial pollution of sugar, Distillery, drug, Paper and pulp and polymer industries and their analysis. Effluent treatment plants of above industries.

GENERAL REFERENCES :

(1) Unit process in Organic Synthesis by P. M. Groggins.
(2) Chemical Process Industries by R. N. Shreve.
(3) Riegel's Hand-Book of Industrial Chemistry, Ed. by James A. Kent.
(4) Industrial Chemicals by Faith, Keyes, Clark.
(5) Chemicals from petroleum by Weddams.
(6) Dryden's outlines of Chemical Technology by M. Gopal Rao and Marshall.
(7) Rubber Technology by Maurice, Norton.
(8) Organic Polymer Chemistry by K. J. Saunders.
(9) Handbook of synthetic dyes and pigments Vol.I &II by K.M.Shah, Multi-tech Publishing Co. (1998)
(10) Spectrometric Identification of Organic Compounds (4^{th} edition/5^{th} edition), Silverstein, Bassler & Morril, John Wiley & Sons.
(11) Modern Methods of Chemical Analysis (2^{nd} ed.), Pecsok, Shields, Cairns & McWilliom, John Wiley & Sons.
(12) Instrumental Analysis by R. D. Braun, McGraw-Hill.
(13) Modern Methods of Chemical Analysis (2^{nd} ed.), Pecsok, Shields, Cairns & McWilliom, John Wiley & Sons.
(14) New Trends in Green Chemistry, 2^{nd} edition, V.K.Ahluwalia and M. Kidwai, Anamaya Publisheres, New Delhi.
(15) Green Chemistry, Theory and Practice, Pual T. Anastas and John C. Warner, Oxford University Press, 2000, New York, USA.
(16) Green Chemistry : An Introductory Text, Mike Lancaster, Green Chemistry Netweork, University of York, RSC, 2002.
(17) Handbook of Green Chemistry and Technology, edited by: james Clark and Duncan Macquarrie, Blackwell publishing.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

M.Sc. – ORGANIC CHEMISTRY

M.Sc. Part-II

TO COME IN FORCE FROM JUNE-2008

I. Organic Separation: **40 Marks**

(i) Correct type and method of separation 08 Marks

(ii) Correct identification m.p. & C.T. 3 x 8 24 Marks

(iii) Derivative and Crystallization 2x4 08 Marks

II. Organic Preparation: **40 Marks**

(Marks should be divided equally in different stages-criteria (Yield, Purity and crystallization)).

III. Estimations: (Two) **30 Marks**

(i)For each estimation accuracy 12 Marks

(ii)Calculation 03 Marks

Error in reading:	**Marks**
± 0.1 ml	12
± 0.2 ml	10
± 0.3 ml	08
± 0.4 ml	06
± 0.5 ml	04
± 0.6 ml	02
± 0.7 ml	00

IV. Chromatographic Separation **10 Marks**

(i) Accuracy in R_f Values 3 x 3 = 9 Marks

(ii) Techniques = 1 Marks

V. Viva-voce examination **20 Marks**

Marks to be entered in marks-sheet

Organic Separation	Preparation	Estimation	Chromatography	Viva	Total Marks
40	40	30	10	20	140

VEER NARMAD SOUTH GUJARAT UNIVERSITY

M.Sc. - CHEMISTRY

M.Sc. Part -II

ORGANIC PRACTICALS

I. Organic Separation:

Separation and identification of components in mixtures containing three components. (Candidate will prepare at least **2** derivatives. Each student should carry out minimum **8** separations).

II. Organic Estimations: (Any Six)

1. To determination of percentage purity of the given sample of Isoniazide
2. To determination the amount of Glucose in the given solution (Iodometrically) in a measuring flask bearing your table number.
3. Carryout the assay of sodium chloride (NaCl) in the given solution in a measuring flask bearing your table number.
4. Determination of polyhydric alcohol iodometrically.
5. Determination of Sulphonamides with Silver Nitrate solution by volumetrically.
6. Determination of aromatic primary amines by either diazotization or indirect diazotization.
7. Determination of Amino acids by formal titration.
8. Estimation of Benzyl Penicillin.
9. Determination of coupling value (C.V.) of Dye intermediates.
10. Non-aqueous titration of Sodium Benzoate.
11. COD water sample.
12. Determination of molecular weight by Rast's method.
13. Dyeing of fabric, wool, nylon, cotton & exhaustion studies.
14. Estimation of Nitro group using $SnCl_2$.

III. Organic Preparations:

(i)One Step preparations: (Any Six)

1. Sulphanilic acid from Aniline.

2. Ethylacetoacetate from Ethyl acetate.
3. Orange-I / Orange-II from Sulphanilic acid.
4. Benzene Azo β-naphthol from Aniline.
5. Aniline to Diphenyl thiourea.
6. m-phenelyne diamine from m-nitro Aniline.
7. Benzoxazine from Anthranilic acid.
8. Benzalacetophenone from Acetophenone.
9. 1,2,3,4-tetrahydrocarbazole from Cyclohexane.
10. 2-amino-4-methylthiazole from Thiourea.

(ii) Two step preparations (Any Three)

1. Dibenzophenazine from o-nitro aniline via o- phenelyne diamine.
2. Imidazole from Tartric acid via Imidazole-4,5-dicarboxylic acid.
3. Aspirin from phenol via Salicylic acid.
4. Phenacetin from p-amino phenol.

(iii) Three step preparations (Any Ten)

1. Benzilic acid from benzaldehyde via benzoin and benzil.
2. Sulfanilamide from via p-acetamido benzene sulphonyl chloride and acetamido benzene-sulfonamide.
3. Anthranilic acid from phthalic acid via phthalic anhydride and phthalimide.
4. Acridone from anthranilic acid via o-chloro benzoic acid and N-phenyl anthranilic acid
5. Benzocaine from p-nitro toluene via p-nitro benzoic acid and p-amino benzoic acid.
6. Benzyl p-nitro benzoate from p-nitro toluene via p-nitro benzoic acid and p-nitro benzolyl chloride.
7. Eosin from phthalic acid via phthalic anhydride and fluorescein.
8. Benzanilide from benzene via Benzophenone and Benzophenonoxime.
9. p-Nitro chloro benzene from acetanilide via p-nitro acetanilide and p-nitro aniline.
10. p-Chloro bromo benzene from acetanilide via p-bromo acetanilide and p-bromo aniline.

11. m-Nitro phenol from Nitro benzene via m-dinitrobenzene and m-nitroaniline.
12. p-Chloro benzoic acid from p-nitro toluene via p-toluidine and p-chloro toluene.

OR p-Chloro benzoic acid from p-nitro benzoic acid & Pera amino Benzoic acid.

13. Anthrone from phthalic anhydride via o-benzoyl benzoic acid and anthraquinone.
14. 4-Methyl-7-hydroxy-8-acetyl coumarin from resorcinol via 4-methyl-7-hydroxy coumarin and 4-methyl-7-acetyl coumarin.
15. Diphenyl thiourea from Nitro benzene.

IV. Chromatographic Separations. (Any Two)

Paper chromatographic separation of sugars, dyes, amino acids:

(At least 4 Separations)

V. Viva-Voce examinations

Books Recommended for Practicals :

1. Elementry Practical Organic Chemistry Part-I Small Scale Preparations by A. I. Vogel.
2. Elementry Practical Organic Chemistry Part-II Qualitative Organic Analysis by A. I. Vogel.
3. Elementry Practical Organic Chemistry Part-III Quantitative Organic Analysis by A. I. Vogel.
4. Practical Pharmaceutical Chemistry by A. H. Bakett, Volume I & II.
5. Comprehensive Practical Organic Chemistry Qualitative Analysis by Ahluwalia & Aggarwal.
6. Organic Quantitative Analysis by Vogel's (ELBS)
7. Comprehensive Practical Organic Chemistry Preparation and Quantitative Analysis by Ahluwalia & Aggarwal.

8. Practical Physical Chemistry by J. B. Yadav.

VEER NARMAD SOUTH GUJARAT UNIVERSITY
M.Sc.-II (CHEMISTRY)
TO COME IN FORCE FROM JUNE-2008
PAPER-III (DYES AND INTERMIDIATES)

Max. Marks: 70 **Total Periods: 120**

SECTION-I

UNIT-I : THEORIES OF COLOUR: (20 Periods)

(a) Colour and Chemical Constitution:

Theories of colour – Bathochromic and hypsochromic effect – Hyper chromic and Hypo chromic effect – Witt's theory – Armstrong's theory – Nietzki's theory – Resonance theory – M.O. theory.

(b) Colour Science:

Subjective colour attributes – Hue, Lightness and Chroma (or saturation) – Objective colour measurements – CIE Illuminant sources, CIE standard observer, reflection spectra of object – CIE tristimulus values of colour – Chromaticity diagram and coordinates – Correlation with visual perception of colour dimetamerism – CIELAB colour and colour difference tolerance limit, shade sorting, Additive and substractive colour mixing – Kubelka-Munk theory (conceptual introduction and useful equation only – No derivation), K-M function – K-M absorption and scattering coefficient – Dye strength evaluation – Colour control system – Outline of construction and working of spectrophotometer – Conceptual introduction of computer colour matching (no theory).

UNIT-II : (20 Periods)

A) (a) Classification of dyes based on chemical constitution,

(b) Classification of dyes based on methods of application .

B) Fluorescent Whitening Agents:

Introduction, Theory of fluorescence – Classification of FWA and synthesis of important member of each class and their uses.

UNIT-III : AZO DYES (20 Periods)

General Introduction: Diazotisation, mechanism and different methods of diazotization and laws of coupling, Monoazo dyes, Bisazo dyes and Azoic dyes :General introduction,classification and synthesis.

Evaluation of dyes.

SECTION – II

UNIT-IV: ANTHRAQUINONE DYES (20 Periods)

Vat Dyes and Solubilized Vat dyes, Acid dyes, Mordant dyes and dyes for cellulose acetate.

UNIT-V: HETEROCYCLIC DYES AND SYNTHETIC PIGMENTS (20 Periods)

A) Heterocyclic Dyes:

Pyrazolone dyes, cyanine dyes, dyes containing azine, oxazine and thiazine ring systems. Thiazole dyes.

B) INDUSTRIAL ORGANIC PIGMENTS:

(i) Azo Pigments

-Monoazo pigment

-Disazopigment

-β-Napthol pigment

-Napthol as pigment

-Azo pigment lakes (Salt type pigments)

-Benzimidazolone pigment

-Disazo condensation pigment

-Metal complex pigment

-Isoindolinone & Isoindolinine pigment

(ii) Polyclic Pigments

-Phathalocyanine pigment

-Quinacridone pigment

-Perylene & Perinone pigment

-Diketo pyrrolo, pyrrole(DPP) pigment

-Thioindigo pigment

(iii) Anthraquinone Pigments

-Anthra pyrimidine pigment
-Flavanthrone pigment
-Pyranthrone pigment
-Anthranthrone pigment
-Dioxazine pigments
-Triaryl carbonioum pigment
-Quinophthalone pigment

UNIT-VI: (20 Periods)

A) General nature, classification, structural variation, synthesis and application of the following classes of dyes:

(i) Sulphur dyes: General introduction,classification and synthesis.

(ii) Triphenyl methane dyes: General introduction,classification and synthesis.

B) Functional dyes- Dyes for high tech applications

Introduction, Application- Imaging, Laser printing and Photo coping, Thermal Printing, Ink Jet printing, Optical data storage, Liquid Crystal display, Organic light emitting devices, Electrochromic display, Electronic materials, Semiconductors, Solar cells and Bio medical applications.

REFERENCES:

(1) Instrumental colour measurement and computer aided colour matching for textiles by H.S. Shah and R. S. Gandhi, Pub. Mahajan Book Distributors, (1990), Ahmedabad.

(2) Industrial practice in colour measurements by H. S. Shah, (1998), Pub. Mahajan Publishers Pvt. Ltd., Ahmedabad.

(3) Principles of Colour Technology by Fred W. Billmeyer and Max Saltzman, John Wiley & Sons.

(4) The Chemistry of Synthetic Dyes, Vol. I to VII by Venkataraman, Academic Press, New York.

(5) Chemistry of Synthetic Dyes & Pigments by Lubs.

(6) Dyes and their intermediates by E. N. Abrahart.

(7) Technology of Textile Processing by V. A. Shehnai, Sevak Publications, Bombay.

(8) Industrial Dyes by Klans Hunger, Germany by Wiley-VCH.

(9) Development in the Chemistry and Technology of Organic Dyes by J.Griffiths, Blackwell Sci. Pub., Oxford, London.

(10) High-Technalogy Application of Organic Colorants by Peter Gregory, Plenum Press, New York.

VEER NARMAD SOUTH GUJARAT UNIVERSITY
M.Sc.-II (CHEMISTRY)
TO COME IN FORCE FROM JUNE-2008
PAPER-III (Medicinal Chemistry)

Max. Marks:70 **Total Periods: 120**

General classification, structural variations, synthesis and medicinal uses of the following classes of drugs.

In addition to the above structure Activity Relationships and Mode of Action should be discussed in classes wherever it is mentioned.

[**Note:** In topic **'Antibiotics'** discuss structural variations among *penicillins* and *cephalosporins* (beta-lactam antibiotics) and *Tetracyclines* (non-lactam antibiotics). In other cases of non-lactam antibiotics give structural formula and discuss medicinal importance only of antibiotics specified in syllabus].

SECTION-I

UNIT-I : **(20 Periods)**

(A) Drug Design:

Procedure followed in drug design, concepts of prodrugs and soft drugs, Theories of drug activity : Occupation theory, rate theory, induced fit theory. Concepts of drug receptors. Elementary treatment of drug receptor interactions.
LD-50, ED-50.

(B) Pharmacokinetics:

Introduction of drug absorption, disposition, elimination using pharmacokinetics, important pharmacokinetics parameters in defining drug disposition and in therapeutics. Mention of uses of pharmacokinetics in drug development process (5 hrs.).

(C) Pharmacodynamics:

Introduction, elementary treatment of enzyme stimulation, enzyme inhibition, , drug metabolism, significance of drug metabolism in medicinal chemistry.

UNIT-II : ANTIBIOTICS: **(20 Periods)**

- Antibiotics that interfere with the biosynthesis of bacterial cell-wall.
  A. The β-lactam antibiotics:
     a. The Penicillin
     b. The Cephalosporins
  B. The non-lactam antibiotics:
  C. Bacitracin, Vancomycin and Cycloserine

- Antibiotics that interfere with the protein biosynthesis in micro-organisms:
  The non-lactam antibiotics:

  A. Macrolide antibiotics: Erythromycin
  B. Tetracyclines
  C. Lincomycin
  D. Chloramphenocol

- Structural formulae and therapeutic uses of following non-lactam antibiotics:
  A. Aminoglycoside antibiotics

B. Non-classifiable antibiotics

Novobiocin, Nalidixic acid, Norfloxacin, Ciprofloxacin

- Structure activity relationships (SAR) among Penicillin and Tetracyclines.
- Synthesis of Penicillin V, Ampicillin, Cephalosporin, Chloramphenicol

UNIT-III : (20 Periods)

(A) Psychoactive Drugs – The Chemotherapy of Mind:

- CNS Depressants:

(1)General anaesthetics
(2)Sedatives and Hypnotics

Antipsychotic Drugs:

(1) Antidepressants (2) The neuroleptics

- Synthesis of only the following:

Thiphental (pentothal), Amobarbital (Amytal), Diazepam, Chlorazepam, alprazolam, glutethimide, Nikethamide

(B) Local Anaesthetics:

Synthesis of only the following drugs:
Cocaine, Procaine, Lidocaine (xylocaine), Dibucaine (Nupercaine).
SAR and Mode of Action of Local anaesthetic

(C) Analgesics:

Synthesis of only the following:
Meperidine (Pethidine), Ibuprofen, Meclofenamate sodium, Oxyphenbutazone, Paracetamol, Novalgin.

SECTION -II

UNIT-IV : LOCAL ANTIINFECTIVE DRUGS: (20 Periods)

(A) Antihistamine or Antiallergenic Drugs:

Synthesis of only the following drugs:

Diphenhydramine (Benadryl), Antazoline, Chlorpheniramine, Pyrilamine

(B) Antituberculosis and Antileprotic Agents:

* Synthesis of only the following drugs:
Isoniazid (INH), Ethionamide, Ethambutol, DDS (Dapsone)

(C) Sulfonamides:

Synthesis of only the followings:
Sulfacetamide, Sulfadiazine, Sulfamethoxine (Sufadoxine), Sulfamethoxy-Pyrazine (Sulfalene), Sulfathiazole, Succinyl sulfathiazole (Sulfasuxidine).
SAR and Mode of Action of Sulfonamides.

UNIT-V : (20 Periods)

(A) Antimalarials:

Synthesis of only the followings:

Mefloquine, Chloroquine, Primaquine, Pyrimethamine (Daraprim).

SAR and Mode of Action of Antimalarial drugs.

(B) Antineoplastic Agents (Cancer Chemotherapy):

Synthesis of only the following drugs:

Mechlorethamine, Cyclophosphamide, Melphalan, 6-Mercaptopyrine.

UNIT-VI : (20 Periods)

(A) (a) Diuretics:

Synthesis of only the following drugs:

Acetazolamide, Chlorothiazide, Hydroflumethiazide, Furosemide, Ethacrynic acid. Classification and Structural Variation of Diuretic drugs.

(b) Insulin and Oral Hypoglycemic Agents:
(Anti-diabetic agents or drugs affecting sugar metabolism)

Synthesis of only the followings:

Tolbutamide, Chlorporpamide, Glibenclamide, Phenformin.

(B) Cardiovascular Drugs:
Cardiotonic steroids

(1) Antiarrythmic agents:

(2) Antianginal drugs:

Synthesis of only the followings:

Amyl nitrate, Sorbitrate, Diltiazem, Verapamil, Methyldopa,Atenolol, Oxyprenolol.

Recommended Books:

1. Burger's Medicinal Chemistry and Drug Discovery (5/e), 1997, Vol. 1, 2, 3, 4,5, Edited by ManFred E. Wolff (John Wiley & Sons, inc., New York).
2. Principles of Medicinal Chemistry, Vol. I & II (5/e), by S. S. Kadam, K. R. Mahadik, K. G. Bothra (Nirali Prakashan).
3. Principles of Medicinal Chemistry by William O. Foye (ed.), Lea and Febiyer, Philadelphia.
4. Wilson and Gisvold's Text-book of Organic Medicinal and Pharmaceutical Chemistry (5/e, 1982) by Robert F. Doerge (J. B. Lippincott Company, Philadelphia/Toppan Co. Ltd., Tokyo).
5. Essential of Medicinal Chemistry (2/e) by Andrejus Korolkovas (A Wiley Interscience Publication, 1988, John Wiley & Sons, Canada).
6. Medicinal Chemistry by Ashutoshkar (Wiley Eastern Ltd., 1993).
7. The Pharmaceutical Basis of Therapeutics by Goodman and Gilman (The Macmillan Co.).
8. The Organic Chemistry of Drug Synthesis, Vol. I, II & III (1980), Ed. By D. Lednicer and L. A. Mitscher (John Wiley and Sons, New York).
9. Topics in Medicinal Chemistry, Vol. I & II by Rabinowitz and Myerson (Editor) (Interscience, 1968).
10. Adhunik Sanshleshit Aushodhonu Rasayanvighyan, Dr. Anamik Shah, University Granth Nirman Board, Ahmedabad, Price Rs. 135/-.