# VEER NARMAD SOUTH GUJARAT UNIVERSITY

## Third Year B. Sc. Semester -VI Chemistry

## Paper-VI (Inorganic Chemistry)

## Proposed syllabus from July 2021

**50 Marks (External)** **Total: 30 Hrs**

**20 Marks (Internal)** **Time: 2 Hrs. (Uni. Exam)**

### UNIT - I

**Topic-1: Molecular Symmetry:** **10Hrs**

Introduction and importance of symmetry, Symmetry elements and Symmetry operations, Classification of molecules in to point groups. Point group of simple molecules like $CO_2$, HCl, $H_2O$, $NH_3$, $BF_3$, $[PtCl_4]^{-2}$, $PF_5$, $C_6H_6$, $C_5H_5^-$, $CH_4$, $SF_6$,**Bromo benzene($C_6H_5Br$), Cyclobutane, Boric acid ($H_3BO_3$),** Cis and Trans Dichoroethylene ($C_2H_2Cl_2$), Staggered and Eclipsed Ethane ($C_2H_6$). Law of multiplications, Construction of multiplication table for $C_{2v}$, $C_{3v}$,$C_{2h}$

### UNIT - II

**Topic-1: Metal Complexes (Inorganic Reaction Mechanism):** **6 Hrs**

Reaction mechanisms of ligand substitution in octahedral complexes (i) $SN_1$ (ii) $SN_2$ Acid hydrolysis &Base hydrolysis -Redox (Single Electron Transfer) reactions,**Substitution reaction without breaking M-L bond.**

**Topic-2: Hybridization:** **4 Hrs**

**Introduction. Rules for hybridization, Bond angles, bond strength, and co-efficient**insp, $sp^2$ and $sp^3$ hybrid orbital using wave function (fully mathematical calculations).

### UNIT-III

**Topic-1: Organo-metallic compounds:** **5 Hrs**

Definition, classification, Structure and bonding in ferrocene, dibenzene chromium, Zeise ion andgaseous dimethyl beryllium,**Tetramethyl lead.**

**Topic-2: Water Pollution:** **5 Hrs**

Types of water pollutants, Trace elements in water and their effects; Determination ofBOD, COD, DO, Total hardness, Total dissolved solids, Ozonetreatment process for wastewater.

**Reference Books:**


(1) Introduction to quantum chemistry, by A. K. Chandra, Tata Mc. Graw Hill, Delhi,

(2) Quantum mechanics in chemistry by M. H. Hanna

(3) Theoretical Inorganic chemistry by Day & Selbin, Affiliated East West

(4) Advanced Inorganic Chemistry by Cotton and Wilkinson, John Wiley

(5) Uni. Chemistry by B. H. Mahan

(6) Structural Inorganic chemistry by A. F. Wells.

(7) Chemical Bonding- an introduction By Rawal, Patel & Patel. Sugumar.

(8) Environmental Chemistry by Amritha Anand

(9) Basic Inorganic Chemistry by Cotton and Wilkinson

(10) A Text book of Inorganic Chemistry by P.L.Soni

(11) Introduction to Inorganic Chemistry by Durrant and Durrant

(12) Modern Co-ordination Chemistry by R. Lewis and R.G. Wilkinson.

(13) Inorganic Chemistry- Principles of structure and reactivity by J.E. Huhhey and E.A. Keiter.

(14) Application of Group Theory to Chemistry by P.K.Bhattacharya., Himalaya Pub. House, Mumbai.

(15) Quantum Rasayan, University Granth Nirman Board (Gujarat).

(16) Environmental Chemistry by A.K. De. U.R. (1961), Amold, London.

(17) The corrosion and oxidation of metals by Evans

(18) Corrosion, Causes and Prevention, Speller. F., Mc Graw Hill, New york.

(19) DhatvikKsharan, Part-I & II by M.N. Desai, Uni, Granth Nirman Board (Gujarat).

(20) Corrosion and Corrosion Control, Uhlig H. Wiley.

(21) Corrosion Engineering by Fontana M.G. and Green N.D., Mc Graw Hill. Publ. Pvt. Ltd.

(22) Wiley online library.

# VEER NARMAD SOUTH GUJARAT UNIVERSITY

## Third Year B. Sc. Semester -VI Chemistry

## Paper-VII (Organic Chemistry)

## Proposed syllabus from July 2021

**50 Marks (External)** **Total: 30 Hrs**

**20 Marks (Internal)** **Time: 2 Hrs. (Uni. Exam)**

### UNIT - I

**Topic : 1 : MolecularRearrangements** **6Hrs**

Mechanism of rearrangements involving C to C migrations as illustrated by Wagner – Meerwein and Pinocol-Pinacolone rearrangements.

Mechanism of rearrangements involving C to N migrations as illustrated by Hoffmann, Curtius, and Beckmann rearrangements.

**Topic : 2 : Catalysis andGreenChemistry** **4Hrs**

Catalysis in organic reaction, nucleophilic catalysis, Metal-ion catalysis, Intermolecular catalysis, Phase transfer catalysis. Green Chemistry: Fundamental Principle of GreenChemistry.

Green synthesis of(i) Ibuprofen (ii) Paracetamol

### UNIT-II

**Topic : 1 : Terpenoids (Isoprenoids) :** **5 Hrs**

Their occurrence, classification, isoprene and special isoprene rule, general methods to determine their structure, analytical and synthetic evidences for the structure of Camphor & Citral.

**Topic : 2 :** Polymers: **5 Hrs**

1. Synthetic Polymer:Basic concepts, Degree of polymerization, Classification of polymerization reaction. Mechanism of Addition or chain growth polymerization, free radical vinyl polymerisation and Ionic vinyl polymerisation, Ziegler – Natta Polymerisation and Vinyl polymers, Condensation or step growth Polymerization, Polyesters, Polyamides,
2. Biodegradable polymers- Introduction, classification and application. Polylatic acid and polyglycolic acid.

## UNIT-III

**Topic : 1 Plant pigments :** 5 Hrs

(a) Classification.

(b) General introduction of Carotenoids. Analytical and synthetic evidence of B-carotene.

(c) General introduction of anthocynines and anthocyanidines. Analytical and Synthetic evidences of cyanidine chloride.

(d) Introduction of flavones and flavonols. General method of determining. Structure of flavones. Synthesis of flavones. Analytical and synthetic evidences of quercetin.

**Topic : 2 Synthetic dyes: (Colour and constitutionelectronicconcepts)** **5 Hrs**

Definition and difference between dyes and pigments, classification of dyes, color and constitution – Witt's theory, synthesis and uses of Crystal violet, Indigo, Alizarine,Phenolphthalein, Tartrazine, Acriflavine, Procoin Brilliant Red M-2B

**Reference Books:**


**(1)** Mechanism and Structure in organic chemistry-Goulde.S.
**(2)** Reaction mechanism in organic chemistry by Mukhejee & Singh
**(3)** Principles of reaction mechanism in organic chemistry by Dharmaraha&Chawla
**(4)** Organic reaction mechanism by Bansal Tata Mac.Hill
**(5)** Organic Chemistry by Hendrickson, Cram &Hammond
**(6)** Organic Chemistry by Brown R.F.
**(7)** Organic Chemistry by Solomon W.Graham
**(8)** Principles of Organic Synthesis- R. O. C.Norman
**(9)** Basic Principles of Organic chemistry, by R. Y. Caserio, W. A.Benjamin
**(10)** May's Chemistry of synthetic Drugs byDyson.
**(11)** Chemistry of drugs, Ener and Caldwell
**(12)** Synthetic drugs by TyagiandYadav.
**(13)** Chemistry of synthetic Dyes Vol. I & II byVenkatraman
**(14)** Synthetic Organic Chemistry by O. P.Agarwal
**(15)** Synthetic Dyes by Chatwal &Anand
**(16)** Chemistry of synthetic Dyes by I. G.Vashi
**(17)** Organic Chemistry by Morrison andBoyd.
**(18)** Chemistry of organic Natural Product Vol. I & II by O. P.Agarwal.

(19) Chemistry of synthetic drugs byTrivedi

(20) Green Chemistry, Environmentally Vergin Reactions by V. K. Ahuwalia pub. by AnebooksIndia.

(21) PrinciplesofMedicinalChemistryVol.I&IIbyS.S.Kadam,K.R.Mahadik,K.G.Bothara (NiraliPrakashan)

(22) Medicinal Chemsitry By Asuthosh kar4/e

(23) Organic reactions & their mechanism by P. S. Kalsi, New age internationalpublishers.

(24) Polymer Science Gowariker

(25) Handbook of biodegradable polymer, isolation, synthetic charactrisation and application by Andras, Lendiein and adamsissom.

(26) Stereochemistry Conformation and Mechanisam, 10th Ed. by P. S. Kalsi, New age internationalpublishers

# VEER NARMAD SOUTH GUJARAT UNIVERSITY

## Third Year B. Sc. Semester -VI Chemistry

## Paper-VIII (Physical Chemistry)

## Proposed syllabus from July 2021

**50 Marks (External)** **Total: 30 Hrs**

**20 Marks (Internal)** **Time: 2 Hrs. (Uni. Exam)**

### UNIT - I

**Topic : 1 : PHASE EQUILIBRIA** **6Hrs**

Statement and meaning of the terms phase, component, degree of freedom, phase rule, phase equilibria, of one component system- water, $CO_2$,Sulphur system, phase equilibria of two component system- simple eutectic-, Pb-Ag systems, desilverisation of lead, KI- Water system, freezing mixtures. Solid solutions: compounds with congruent and incongruent melting point (Only definition and example), Three component solid-liquid systems p.no 690-691*

**Topic : 2 : BINARY LIQUID MIXTURES** **4Hrs**

Liquid-liquid mixtures, ideal liquid mixtures, Raoult's law, non-ideal orreal solutions, positive and negative deviations from Raoult's law, temperature composition curves for ideal and non-ideal binary solutions of miscible liquids, azeotropes, partially miscible liquids: Phenol-water systems, immiscible liquids, steam distillation. Chemical Potential of Ideal and non-ideal solutions, p.no 756-757* **Numerical problems.**

**57 th edition, Principal of physical Chemistry, By Puri, Sharma, Pathania**

**Vishal Publishing co.**

### UNIT-II

**Topic:1: APPLICATION OFELECTROMOTIVEFORCE** **10 Hrs**

Application of measurements of EMF in the determination of

(1) Solubility product and solubility of sparingly solublesalts

(2) Ionic product of water by galvaniccell

(3) Transport number of ions

(4) Equilibrium constant

(5) pH by Hydrogen, Glass and Quinhydroneelectrodes

(6) Energy sources Ni-Cd Cell and Li- ion Cell, Lithium - Polymer Cell,

**Numerical problems.**

## UNIT-III

**Topic:1:APPLICATIONS OFNUCLEARCHEMISTRY** **10 Hrs**

Application of radio isotopes as tracers in medicines, agriculture, in studying reaction mechanism in photosynthesis and age determination by Carbon- Dating method.Geiger Muller Counter, Q-value of nuclear reactions, Chemical and physical atomic weight scale, Mass defect and Binding energy, Packing fraction and its relation with the stability of the nucleus, Nuclear fission, Atom bomb, Nuclear reactor for power generation and Critical mass,Nuclear fusion,Stellar energy and Hydrogen bomb, Hazards of nuclear radiation. **Numerical problems on** Q- value, Binding energy, Packing fraction, and Energy released during nuclear reactions.

**Reference Books:**


**(1)** Elements of physical chemistry by Glasstone andLewis

**(2)** Physical chemistry by G.M.Barrow

**(3)** Physical chemistry by W.Moore

**(4)** Physical chemistry byAtkins

**(5)** Physical chemistry byG.K.Vemulapalli

**(6)** Physical chemistry byB.K.Sharma

**(7)** Physical chemistry by Gurdeepraj

**(8)** Physical chemistry by Puri, Pathania,Sharma

**(9)** Essential of Physical chemistry by BahlandBahl

**(10)** Physical chemistry by NegiandAnand

**(11)** Physical chemistry by K.L. KapoorVol1-5.

**(12)** Physical chemistry by Baliga,Dhavale and ZaveriVol1-3.

**(13)** Physical chemistry by Dr. S.Pahari

**(14)** Nuclear chemistry byArnikar

**(15)** Electro chemistry by S.Glasstone

**(16)** Electrochemistry by B.K.Sharma

**(17)** Modern Electrochemistry by J'omBockrisandRedd

# VEER NARMAD SOUTH GUJARAT UNIVERSITY

## Third Year B. Sc. Semester -VI Chemistry

## Paper-IX (Industrial Chemistry)

## Proposed syllabus from July 2021

**50 Marks (External)** **Total: 30 Hrs**

**20 Marks (Internal)** **Time: 2 Hrs. (Uni. Exam)**

### UNIT - I

**Topic:1 : Fermentation Industry** **6 Hrs.**

Definition, condition favorablefor fermentation process (pH, temperature, presence of othersubstances, absence of preservatives, concentration). Manufacture of ethanol, citric acid, acetone andbutanol, Acetic acid, Lactic acid from molasses, manufacture of penicillin-G.

**Topic: 2: Pulp and Paper industry** **4 Hrs**

Type of pulp, Manufacture of chemical pulp by Sulphate pulp process, Sulphite pulp process, manufacture ofpaper (conversion of pulp into paper, beating process, importance of fillings, sizing, colouring materials inmanufacture of paper and calendaring).

### UNIT-II

**Topic : 1 : Insecticides and Fungicides** **5 Hrs.**

Introduction,Inorganicinsecticides,Naturalandsyntheticinsecticides,organicinsecticides ,Eldrin,Dieldrin, BHC, Tetra ethyl pyrophosphate (TEPP), Introduction of Fungicides likeBordeauxmixture, Dithiocarbamates, Baygon , Termik, Zineb

**Topic : 2 : Detergents:**

Introduction, Principles detergency, classification of surface active agents, Anionic detergents,Cationicdetergents,Non-ionicdetergents,Amphotericdetergents,Sudsregulators,BuildersandAdditives.

### UNIT-III

**Topic : 1 : SugarIndustry** **5 Hrs.**

Introduction,Manufactureofsugarfromsugarcane:Extractionofjuice,Purificationofjuice, Concentration&crystallizationofpurifiedjuice,Refiningof sugar.

**Topic : 2 : Industrial manufacturing process with flow diagram & their uses** **5 Hrs.**

(1) Preparationofmethanolfromsynthesisgas.

(2) Preparationoflsopropanolfrompropylene.

(3) Preparationofacetonefromisopropanol.

(4) Preparationofformaldehydefrommethanolbyoxidationdehydrationprocess.

(5) Acetylenefromnaturalgas.

**Reference Books:**


**(1)** Shreve Chemical Process Industries, 5ed., George.T. Austin. MacGraw Hill, Book Agency

**(2)** Reigel's Industrial Chemistry, Ed. By James A. Kent.

**(3)** Unit Process in Organic Synthesis by D.H. Groggins.

**(4)** An Introduction to Industrial Chemistry, by Peter Wiseman, Applied Science Pub. Ltd. London.

**(5)** Industrial Chemistry by B.K.Sharma, Goel Pub.

**(6)** Quantitative Analysis by R.A.Day&ALUnderwood, 6th ed. Pub. Prentice Hall of India ltd.

**(7)** Vogel's Text Book Inorganic Quantitative Analysis, 6th ed.

# VEER NARMAD SOUTH GUJARAT UNIVERSITY

## Third Year B. Sc. Semester -VI Chemistry

## Paper-X (Analytical Chemistry)

## Proposed syllabus from July 2021

**50 Marks (External)** **Total: 30 Hrs**

**20 Marks (Internal)** **Time: 2 Hrs. (Uni. Exam)**

### UNIT - I

**SPECTROSCOPY:** **10 Hrs**

**Types of spectrum, Process involved in interaction with matter (Fluorescence, Phosphorescence),** Components of Spectrophotometer-Sources, Grating and Prism as dispersing device, Sample handling, Detectors- Photo tube, Photomultiplier tube. Block diagram and working of single beam and double beam spectrophotometer. Terms involved in Beer's law (no derivation). Causes of deviation from Beer's law. Analysis of unknown by calibration curves method, standard addition method, and ratio method.

Determination of $Cu^{+2}$, $Fe^{+3}$, $NO2^{-1}$, using spectrophotometer. (Only principles - no detailed method), Problems based on quantitative analysis.

### UNIT-II

**SEPARATION TECHNIQUE** **6 Hrs.**

**Topic : 1 : Gas Chromatography:**

Classification of chromatography, Principles of GC separation. Components of GC, **Sample introduction system, Columns: Packed column Capillary Column (WCOT, SCOT),** Carrier gas and its selection - stationary phases: Solid adsorbents, Inert supports **(Selection criteria, Diatomaceous earths)** and liquid stationary phases, Detectors: FID, TCD.Qualitative and quantitative analysis using GC.

**Topoic : 2 : Liquid Chromatography:** **4 Hrs.**

Limitation of conventional liquid chromatography (no detail method).Technique of HPLC. Elementary idea about technique and layout diagrams of instrument. Components of instrument of HPLC technique,

Elementary idea of TLC.

## UNIT-III

**Topic : 1 : Precipitation Titrations:** **5 Hrs.**

Titrations involving Silver salts.

Detection of end points by Mohr's method, Volhard's method, Adsorption indicators.Construction of titration curves. Problems.

**Topic : 2 : Redox Titrations:** **5 Hrs.**

**Formal Potential, Redox reaction: $FeSO_4$-$KMnO_4$, $Fe^{+2} - Ce^{+4}$,Principle of redox indicators, Structural chemistry of indicators (Diphenyl amine, Ferroin).** Construction of titration curves for titration of $Fe^{2+}$ with $Ce^{4+}$

Calculation of equilibrium constants for redox system, Types of indicators, Theory of true Redox indicators.(Numericals)

Oxidants – KMnO4, $K_2Cr_2O_7$. Reductants – Sodium thiosulphate , Sodium arsenite.

**Reference Books:**


(1) Quantitative Analysis by R. A. Day & A. L. Underwood, 6th ed. Pub. Prentice Hall of India ltd

(2) Vogel's Text Book Inorganic Quantitative Analysis, 6th ed.

(3) Analytical Chemistry (Principles & Technique) by Lary G. Hargis.

(4) Fundamental of Analytical Chemistry by Skoog D. A. & West D. M.

(5) Instrumental Methods of Analysis by B. K. Sharma

(6) Instrumental analysis by R.D.Braun Mc Graw Hill.

(7) Analytical Chemistry....Gary Christian

(8) Analytical Chemistry....Day and Underwood.

**(9) Modern Analytical Chemistry by David Harvey, McGraw Hill Higher Education**

**(10) College Analytical Chemistry, Mangaonkar, Teckchandani, Sathe, Ghalsasi, Jain, Himalaya Publishing House**

**(11) Analytical Chemistry by Alka L. Gupta, PragatiPrakashan.**

**(12) Instrumental Methods of Chemical Analysis by H. Kaur, PragatiPrakashan.**

# VEER NARMAD SOUTH GUJARAT UNIVERSITY

## Third Year B. Sc. Semester -VI Chemistry

## Paper-XI (General Chemistry)

## Proposed syllabus from July 2021

**50 Marks (External)** **Total: 30 Hrs**

**20 Marks (Internal)** **Time: 2 Hrs. (Uni. Exam)**

### UNIT-I

**Topic : 1 : ChemistryinConsumerProtection:** **10 Hrs.**

DefineAdulteration;ReasonsofAdulteration,Typesof Adulterants,DiscussionMethods for detection of different adulterants in some common food items

(1) Milk

(2) Milk products: Sweet curd, Rabdi, Khoa& its product, Chhana or Paneer, Ghee, Cottage cheese,condensedmilk, Khoa,Ghee,Butter

(3) OilandFatsOilandFats,Mustardoil,Edibleoil,Coconutoil

(4) Sweeteningagents:Sugar,Pithisugar,Honey,Jaggery,Burasugar

(5) Foodgrainandtheirproduct:(Wheat,Rice, Maize,Jowar,Bajra,ChhanaandBarleyetc.), Maida,Wheatflour,Besan,Suji(Rawa)DalwholeandSpilt,pulses

(6) Spices:Wholespices,BlackPepper,Cloves,MustardseedandPowderedspices

(7) TurmericwholeandTurmeric powder

(8) Chillipowder,Asafoetida,

(9) MiscellaneousProduct:Commonsalt,Tea,Coffeepowder,

### UNIT-II

**Topic: 1 : Nanoparticles:/ Industrial Safety** **04 hours**

Introduction of nano particles, properties of nano particles, Semiconductors, Ceramic nano particles,Catalyticaspects ofnano particles, Carbonnano tubes.Applicationsof nanoparticles,

**Topic : 2 : Environmentalpollution:** **06hours**

IntroductiontypesofPollutions(1)Gaseouspollutioninair,Acidrain,Greenhouseeff ectandozonedepletion.( 2) radiation pollution cause, effect and control, (3) Noise pollution and their effect andcontrol(4) Oilpollution and their control.

### UNIT-III

**Topic : 1 : NMRspectroscopy** **10 Hrs.**

NuclearMagneticResonanceSpectroscopy–ProtonMagneticResonance($^1$HNMR) Spectroscopy - Nuclear Shielding and Deshielding – Chemical Shift and Molecule Structure, Spin-Spinsplitting and Coupling constants- Intensities of signals – Interpretation of NMR spectra of simple organicmolecule such as Ethyl bromide, Acetaldehyde, 1,1,2-tribromoethane,Ethylacetate, Toluene, Acetophenone, Nitrobenzene, Cyclopropane, Isomers of Pentane, Hexane and Dibromo propane.

**Reference Books:**


**(1)** QuantitativeanalysisbyR.A.DayandA.L.Underwood

**(2)** ElementsofAnalyticalChemistrybyR.Gopalan;P.S.SubramanianandK.Rengarajan

**(3)** ElementaryOrganicSpectroscopybybyY.L.Sharma

**(4)** OrganicSpectroscopybybyB.K.Sharma

**(5)** EnvironmentalChemistryby H.Kaur.

**(6)** .http://www.fssi.gov.in/Portals/0/pdf/Final-test-manual-part-II

**(7)** Vogel'squalitativeInorganicanalysis

**(8)** Vogel'squalitative Organicanalysis

# VEER NARMAD SOUTH GUJARAT UNIVERSITY

## Third Year B. Sc. Semester -VI Chemistry

## Chemistry-Generic elective subject–Petrochemicals

## Proposed syllabus from July 2021

**50 Marks (External)** **Total: 30 Hrs**

**20 Marks (Internal)** **Time: 2 Hrs. (Uni. Exam)**

### UNIT – I

**Topic : 1 : Petrochemicals obtained from C3-cut of petroleum.** **6 Hrs.**

Manufacture and industrial applications of chemicals obtained from Propylene: Isopropyl alcohol, Acetone (Wacker-Chemieprocess), Propyleneoxide (Halcon process), Acrylonitrile, Glycerol and Isoprene, Propylene tetramer, Acrylic acid, n-Butyraldehyde (Oxoprocess), Methyl isobutyl ketone, Methylmethacrylate.

**Topic : 2 :** **4 Hrs.**

General account of petrochemicals used as monomers in the manufacture of polyester fibers, manufacture of DMT, Terphthalic acid, Phthalic anhydride, Maleic anhydride, 1:4 Butanediol and other monomers like Pentaerithritol and Di-isocyanates.

### UNIT-II

**Topic : 1 : The method for the large scale production with flow diagram and uses of:** **5 Hrs.**

(i)Acetoacetanilide (ii) Anthraquinone (iii) β-naphthol from naphthalene (iv) Bon acid (v) Aspirin (vi) Chloramphenicol (vii) Paracetamol (viii) p-Aminophenol.

**Topic : 2 : Miscellaneous petrochemicals** **5 Hrs.**

Definition of synthetic detergents, hard and soft detergents. Synthesis of DDBS. Synthesis of Fluoresein, Malachite Green, Chrysoidine and Indigo. Definition of Explosive, list of basicraw materials for explosives and list of explosives derives from these raw materials. Synthesis of Tetryl, PETN and Dynamite. Definition insecticides, classification of insecticides on basis of mode of action. Synthesis of Methoxychlor, Captan, Parathion, Malathion.

## UNIT-III

**Topoic : 1 : Chemicals obtained from C4 & C5 cut of petroleum.** **4 Hrs.**

Manufacture and industrial applications of Butadiene, Butylalcohols, Methylterbutyl ether (MTBE), Cyclopentadiene, Sulpholane.

**Topic : 2 : BTX aromatic :** **6 Hrs.**

Recovery process of BTX, manufacture and industrial applications of benzene, toluene, xylene, naphthalene, phenol, styrene.

**Reference Books:**


(1) Introduction to petrochemicals by SukumarMaiti, Oxford and IBH Pubs Co. New Delhi.

(2) A text on petrochemicals by Dr.B.K. Bhaskar Rao, Khanna Pubs. New Delhi.

(3) Chemicals from petroleum by A.L.Wadams (ELBS and John Murray London)

(4) Petrochemicals by S.L.Venkatewarn (Colour Pubs. Pvt. Ltd. Bombay)

(5) PetrochemicalsdigestbyMGKManon(AsiaPublishinghouseBombay)

(6) Hand book of industrial chemicals Vol-I by K. M. Shah (Multi tech publishing co. 15 yogesh,hingwala lane, ghatkoper (E) Bombay-400077)

(7) Industrial chemistry including chemical engineering by B.K.Sharma, Goel Pubs. House, Meerut.

(8) Hand Book of Synthetic Dyes and Pigments (Vol.II) By K.M.Shah, Multi-tech Publishing Co.

# VEER NARMAD SOUTH GUJARAT UNIVERSITY

## Third Year B. Sc. Semester -VI Chemistry

## Chemistry-Generic elective subject–Drugs

## Proposed syllabus from July 2021

**50 Marks (External)** **Total: 30 Hrs**

**20 Marks (Internal)** **Time: 2 Hrs. (Uni. Exam)**

### UNIT – I

**Topic – 1: Sedatives, Hypnotics and Anticonvulsant drugs** **5 Hrs.**

Definition; Introduction; Classification and Structural variations of Sedatives, Hypnotics and Anticonvulsant drugs; Synthesis and Therapeutic Uses of Luminal (Phenobarbital), Diazepam, Meprobamate, Imipramine, Veronal.

**Topic – 2: Anaesthetics** **5 Hrs.**

Definition; Introduction of General and Local Anaesthetics, Name and Structures of different General Anaesthetics, Classification and Structural Variation among Local Anaesthetics; Synthesis and Therapeutic Uses of Alpha-Eucaine, Benzocaine, Orthocaine, Lidocaine, Halothane.

### UNIT-II

**Topic – 1: Antihistamines (Anti-allergic drugs)** **4 Hrs.**

Definition; Introduction; General account of Histamine and Anti-allergic drugs; Classification and Structural Variations among Antihistamines; Synthesis and Therapeutic Uses of Antergan, Benadryl (Diphenhydramine), Promethazine (Phenergan), Pyribenzamine, Chlorpheniramine.

**Topic – 2: Antidiabetic Drugs (Hypoglycemic agents)** **3 Hrs.**

Definition; Introduction; Hypoglycemia; Role of insulin in diabetes; Oral Hypoglycemic agents; Structural Variations among Biguanide and Sulfonylurea derivatives showing Hypoglycemic activity; Synthesis and Therapeutic Uses of Tolbutamide, Metformin.

**Topic – 3: Antitubercular and Antileproticdrugs** **3 Hrs.**

Definition; Introduction; General account of Tuberculosis and Leprosy; Structural Variations among Antitubercular and Antileprotic Drugs; Synthesis and Therapeutic Uses of Isoniazid, Ethambutol, Dapsone (DDS).

## UNIT-III

**Topic – 1: Antimalarial drugs** **4 Hrs.**

Definition; Introduction; Name and modes of transition of Plasmodium Parasites responsible for Malaria in Human;GeneralClassification of Antimalarial Drugs; Synthesis and Therapeutic Uses of Chloroquine, Mafloquine, Amodiaquine (Camoquine), Primaquine.

**Topic – 2: Antiseptics and Disinfectants** **3 Hrs.**

Definition;Introduction; Classification and Structural variations among Antiseptics and Disinfectants; Synthesis and Therapeutic Uses of Mercurochrome (Merbromin), *n*-Hexylresorcinol, Halazone, Dichloramine-T.

**Topic – 3: Diuretics** **3 Hrs.**

Definition; Introduction; Classification and Structural Variations of Diuretics; Mercurial Diuretics and Non-Mercurial Diuretics; Synthesis and Therapeutic Uses of Sorbitol, Acetazolamide, Hydroflumethiazide.

**Reference Books:**


**(1)** May's Chemistry of synthetic Drugs by Dyson.

**(2)** Chemistry of drugs, Ener and Caldwell.

**(3)** Synthetic drugs by Tyagi and Yadav.

**(4)** Synthetic Drugs by G. R. Chatwal, Himalaya Publishers.

**(5)** The Organic Chemistry of Drug Synthesis by Daniel Lednicer&L.A.Mitscher.

**(6)** Medicinal Chemistry by V.K.Ahluwalia Pub. Ane Books Pvt. Ltd.

**(7)** Medicinal Chemistry by AshutoshKar, New Age International Publisher.

**(8)** Medicinal Chemistry by BalkishanRazdan, Pub. CBS Publishers.

**(9)** Pharmaceutical Organic Chemistry by S.K.Dewan, Pub. Narosa.

**(10)** Medicinal Chemistry - a Molecular and Biochemical Approach, by Thomas Nogrady&Donald F Weaver

**(11)** Pharmaceutical Organic Chemistry by Shyam Singh Pub. Himalaya Publishers.

**(12)** Medicinal Chemistry by G Patrick. Pub. Viva Books.

**(13)** Burger's Medicinal Chemistry & Drug Discovery. Ed. by D. J. Abraham.

# VEER NARMAD SOUTH GUJARAT UNIVERSITY

## Third Year B. Sc. (SEM –VI)

## Chemistry - Generic elective subject – DYES

## Proposed syllabus from November/December - 2021

**50 Marks (External)** **Total: 30 Hrs**

**20 Marks (Internal)** **Time: 2 Hrs (Uni. Exam)**

**UNIT – I**

**Topic –1: Fluorescent brightening agents:** **7 Hrs**

General account, classification of FBA base on chemical constitution with examples, Stillbene and Coumarin derivatives of FBA, synthesis of Tinopal BV, Blankophor-B, Blankophor-G, 3-Phenyl-7-methoxy coumarin, 4 Methyl –3 phenyl-7-amino coumarin, Brilliant Yellow, 3-Phenyl 7-Acetylamino coumarin, 4-Acetylamino-N-butyl Naphthalimide.

**Topic –2: Sulphur dyes:** **3 Hrs**

General account of Sulphur dyes. (a) Sulphur Black (b) Sulphur Brown (c) Sulphur Red (d) Sulphur Blue.

**UNIT – II**

**S**

**Topic –1: Reactive dyes:** **5 Hrs**

Definition, general account of reactive dyes based on monochlorotriazinyl, dichlorotriazinyl and vinyl sulphone system. Application of reactive dyes, Synthesis of Procion Brilliant red H-3B ,Procion Brilliant Yellow M-6G, Remazole Black B, Procion Brilliant – Blue M-R, Reactive Red-B.

**Topic –2: Mordant dyes:** **5 Hrs**

(i) Definition, classification of mordant dyes with examples, application of mordant dyes synthesis of alizarin and Mordant yellow 2 G

(ii) Heterocyclic Dyes: Introduction Azine dyes, Thiazine dyes, and Cyanine dyes. Synthesis of Safranine – T, Methylene blue, Astrazone pink-FG.

**UNIT – III**

**Topic –1: Azoic dyes:** **4 Hrs**

Definition, general account of azoic dyes, fast bases, fast salts, rapid fast colors, rapidogens and rapidazole, synthesis of naphthol AS, Fast blue B base (Dianisidine), Fast Orange GGD, Naphthol ASRL, Fast Orange LG- Base.

**Topic –2: Non-textile application of dyes:** **6 Hrs**

Food colors, Cosmetic dyes , Dyes for paper and printing inks , Dyes for paints, Dyes for leather and polishes, synthesis of Amaranth , LitholRubine, Lithol Red, Crystal violet, Bismark brown G, Eosin, Orange-I, Prontosil, Pyridium, Neutral Red, Mercurochrome. General account of medicinal dyes.

**Reference books:**

(1) Synthetic organic chemistry by O.P. Agrawal
(2) The chemistry of synthetic dyes and pigments by H. A. Lubes
(3) Chemistry of synthetic dyes VOL I to VII by K. Venkatraman
(4) An introduction to synthetic dyes by D. W. Ranghekar& P. P. Singh
(5) A hand book of synthetic dyes and their application by C. T. Bhastana& V. H. Raichura& others
(6) Chemistry of dyes & Principles of dyeing Vol II by V. A. Shehai
(7) Chemistry of synthetic dyes by I. G. Vashi
(8) Chemistry of dyes and pigments by K. M. Shah
(9) Synthetic dyes by G. R. Chatwal
(10) Synthetic dyes and pigments by E. N. Abrahart.

# VEER NARMAD SOUTH GUJARAT UNIVERSITY
## Third Year B. Sc. Semester -VI
## Chemistry Practicals
## Proposed syllabus from July 2021
## 120 Marks (External) Total: 30 Hrs
## 60 Marks (Internal) Time: 6 Hrs. (Uni. Exam) Two Days

## 1. ORGANIC SEPARATION

Separation of binary mixture, identification of the components and its crystallization & preparation of onederivative and its purification.

| | | |
|---|---|---|
| **ACID** | : | Benzoic acid, Salicylic acid, Phthalic acid, Cinnamic acid, Phenyl acetic acid, |
| **BASE** | : | *o*–Nitroaniline, *m*–Nitroaniline, *p*–Nitroaniline, Aniline, *p*–Toluidine, *p*–Chloroaniline, Dimethylaniline, Diethylaniline, Diphenylamine (Not with Neutral) |
| **PHENOL** | : | Phenol, Alpha naphthol, Beta naphthol, O- Nitro Phenol |
| **NEUTRAL** | | |
| **Aldehyde** | : | Benzaldehyde |
| **Ketone** | : | Acetone, Methyl Ethyl ketone, Acetophenone, |
| **Ester** | : | Methyl acetate, Ethylacetate, |
| **Alcohol** | : | Methanol, Ethanol |
| **Hydrocarbon** | : | *p*-Xylene, Toluene, Anthracene, Naphthalene, Diphenyl |
| **Nitro hydrocarbon** | : | Nitro benzene, *m*–Dinitro benzene |
| **Halogenated hydrocarbon** | : | Chloroform, Carbon tetrachloride, Chlorobenzene, Bromobenzene, *p*– Dichlorobenzene |
| **Amide** | : | Benzamide |
| **Anilide** | : | Acetanilide |

**Note. Candidate should perform the analysis of at least 08 mixtures.**

## 2. GRAVIMETRIC ESTIMATION OF (ANY TWO)

1. $Fe^{+2}$ as $Fe_2O_3$ from Fe-$NH_4$-$SO_4$+ $CuSO_4$
2. $Ba^{+2}$ as $BaSO_4$ from $BaCl_2$ + $FeCl_3$
3. $Al^{+3}$ as $Al_2O_3$ from $Al_2(SO_4)_3$ + $CuSO_4$

**Estimation of Alloy (Any One)**

1. Brass - Zinc as $Zn_2P_2O_7$ gravimetrically & Copper by iodometrically(volumetric)
2. German silver - Nickel as Ni $(DMG)_2$ gravimetrically & Copper by iodometrically (volumetric)

## 3. VOLUMETRIC EXERCISE

1. To determine the percentage purity of potassium acid phthalate.
2. To determine the amount of Ammonium sulphate in the given solution.
3. To determine the amount of Bismuth by EDTA.
4. To determine the amount of Ferric by EDTA.
5. To determine the amount of Chromium by EDTA.
6. To determine the amount of Nickel with Magnesium by EDTA
7. To determine the amount of Chloride by Mohr's method OR Absorption indicator
8. To determine the amount of Bromide by Vohlard's method OR Absorption indicator
9. To determine the percentage purity of NaNO2 / KNO2

**Note: Any Four to be done**

## 4. PHYSICAL EXERCISE

1 To investigate rate of reaction between $KBrO_3$ and KI, a = b

2 To investigate rate of reaction between $KBrO_3$ and KI, a ≠ b

**(Any Four experiment from No.3 to 9)**

3 Surface Tension: To compare the cleansing power of two detergents by measuring surface tension of their solutions.

4 pH metry: To determine the dissociation constant of weak acid by titration of weak acid and strong base.

5 Conductometry: To determine the amount of vanillin in the given vanilla solution.

6 Conductometry: To determine the amount of HCl and $CH_3COOH$ in given mixture by std.NaOH/$NH_4OH$ solution.

7 Colourimetry: To determine the indicator constant of Phenolphthalin.

8 Colourimetry: To verify Lambert-Beer's law for $KMnO_4$ solution.

9 Refractometry:To determine the specific refractivities of the given liquids A,B and their mixtures containing 20%, 40% and 60% and unknown liquid by volume.

| No. | Exercise | Marks |
|---|---|---|
| 1 | Gravimetric Exercise | **30** |
| 2 | Volumetric Exercise | **25** |
| 3 | Physical Exercise | **30** |
| 4 | Organic Separation | **35** |
| | | |
| | **Total** | **120** |

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