Chhindwara University, Chhindwara (M.P.)

SYLLABUS OF M.A./M.Com./M.Sc./M.H.Sc. PREVIOUS/FINAL OR SEMESTER ---- IV

Name of Paper	Title of paper	Max. Marks			Minimum Marks			
		Theory	CCE	Practical	Theory	CCE	Practical	Total Marks
I	Application of Spectroscopy II 510	40	10		15	04		50
II	Solid State Chemistry 511	40	10		15	04		50
III	Bio-Chemistry 512	40	10		15	04		50
IV	Organic Synthesis 513	40	10		15	04		50
Group A	2. Analytical Chemistry 514	40	10		15	04		50
	3. Electro Chemistry 515	40	10		15	04		50
V Group B	1. Chemistry of Natural products 516	40	10		15	04		50
	2. Medicinal Chemistry 517	40	10		15	04		50
	3. Industrial Chemistry – Pesticides and Glass Industry 518	40	10		15	04		50

Board of Studies :

I. Chairman

II. Subject Expert –

1.
2.
3.
4.
5.
6.
7.

Practicals	Max.	Min
Inorganic	34	13
organic	33	13
Physical	33	13

Chhindwara Univeristy, Chhindwara (M.P.)

(Session 2020-21 Onwards)

Class/ कक्षा : M.Sc. Chemistry

Semester/ सेमेस्टर : IV

Title of Subject / विषय का शीर्षक : APPLICATION OF SPECTROSCOPY - II

Paper/प्रश्न पत्र : I Code : MCH-510

Max. Marks/अधिकतम अंक : 40+10 CCE Min. Marks/न्यूनतम अंक : 15+04 CCE

	Particulars/विवरण
Unit I	**Ultraviolet and Visible spectroscopy Various electronic transitions (185-800 nm)** Beer-Lambert law, Effect of solvent on electronic transitions, ultraviolet bands for carbonyl compounds, unsaturated carbonyl compounds, dienes, conjugated polyenes, Fieser Woodward rules for conjugated dienes and carbonyl compounds, ultraviolet spectra of aromatic compounds. Steric effect in biphenyls.
Unit II	**Infrared Spectroscopy** Characteristic vibrational frequencies of alkanes, alkenes, alkynes, aromatic compounds, alcohols,,ethers, phenols and amines. Detailed study of vibrational frequencies of carbonyl 'compounds (ketones, aldehydes, esters, amides, acids, anhydrides, lactones, lactams and conjugated carbonyl compounds). Effect of hydrogen bonding and solvent effect on vibrational frequencies, overtones, combination bands and fermi resonance.
Unit III	**Nuclear Magnetic Resonance of Paramagnetic Substances in Solution** The contact and Pseudo contact shifts, factors affecting nuclear relaxation, some applications including biochemical systems, an overview of NMR of metal nuclide with emphasis on 195Pt and 119Sn NMR.
Unit IV	**Carbon-13 NMR Spectroscopy** General considerations, chemical shift (aliphatic olefinic, alkyne, aromatic, heteroaromatic and carboynl carbon), coupling constants. Two dimension NMR spectroscopy-COSY, NOESY, DEPT:II-NBC and HMQC techniques.
Unit V	**Mass Spectrometry** Introduction production EI, CI, FD, E-3,1 and FAB, factors affecting fragmentation, ion analysis, ion abundance Mass spectral fragmentation of organic compounds, common functional groups, molecular ion peak, metastable peak. Me Lafferty rearrangement. Nitrogen rule. High resolution mass spectrometry. Structure elucidation of simple molecules using UV — Visible, IR, NMR and mass spectral techniques.

Chhindwara Univeristy, Chhindwara (M.P.)

(Session 2020-21 Onwards)

Class/ कक्षा : M.Sc. Chemistry

Semester/ सेमेस्टर : IV

Title of Subject / विषय का शीर्षक : SOLID STATE CHEMISTRY

Paper/प्रश्न पत्र : II Code : MCH-511

Max. Marks/अधिकतम अंक : 40+10 CCE Min. Marks/न्यूनतम अंक : 15+04 CCE

	Particulars/विवरण
Unit I	**Solid State Reactions** General principles, experimental procedure, co-precipitation as a precursory to solid state reactions, kinetics of solid state reactions.
Unit II	**Crystal Defects and Non-Stoichiometry** Perfect and imperfect crystals, intrinsic and extrinsic defects-point defects, line and plane defects, vacancies-Schottky detects and Frenkel defects. Thermodynamics of Schottky and Frenkel defect formation, colour centres, non-stoichiometry and defects.
Unit III	**Electronic Properties and Band Theory** Metals insulators and semiconductors, electronic structure of solidsband theory band structure of metals, insulators and semiconductors, Intrinsic and extrinsic., semiconductors, doping semiconductors, p-n junctions, super conductors. Optical properties-Application of optical and electron microscopy. Magnetic Properties- . Classification of materials : Effect of temperature calculation of magnetic moment, mechanism of ferro and anti ferromagnetic ordering super exchange.
Unit IV	Organic Solids Electrically conducting solids. organic charge transfer complex, organic metals, new superconductors.
Unit V	Liquid Crystals: Types of liquid crystals: Nematic, Smectic, Ferroelectric, Antiferroelectric, Various theories of LC, Liquid crystal display, New materials.

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(Session 2020-21 Onwards)

Class/ कक्षा : M.Sc. Chemistry

Semester/ सेमेस्टर : IV

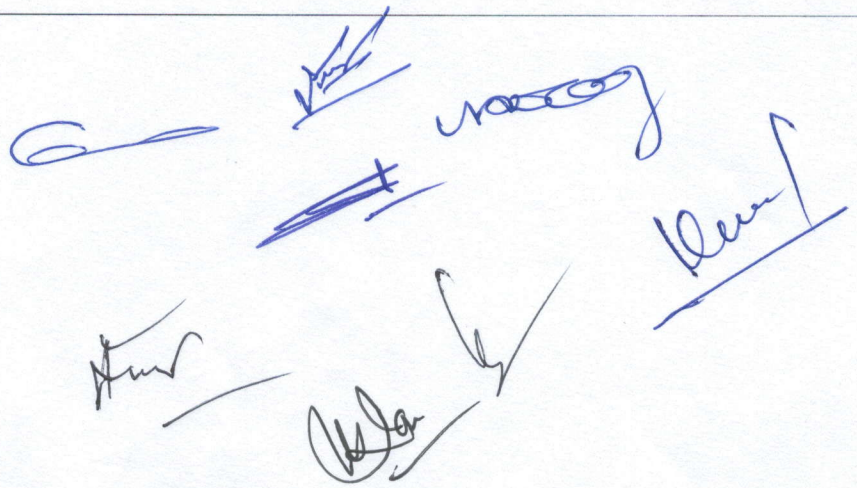
Title of Subject / विषय का शीर्षक : BIOCHEMISTRY

Paper/प्रश्न पत्र : III Code : MCH-512

Max. Marks/अधिकतम अंक : 40+10 CCE Min. Marks/न्यूनतम अंक : 15+04 CCE

	Particulars/विवरण
Unit I	**Metal Ions in Biological Systems** Bulk and trace metals with special reference to Na, K, Mg, Ca, Fe, Cu, Zn, Co, and K+/Na+ pump. Bioenergetics and ATP Cycle. DNA polymerisation, glucose storage, metal complexes in transmission of energy; chlorophyll's, photosystem I and photosystem II in cleavage of water. **Transport and Storage of Dioxygen** Heam proteins and oxygen uptake structure and function of haemoglobin's, mygolobin, haemocyanms and hemerythilin, Model synthetic complexes of iron, cobalt and copper.
Unit II	**Electron Transfer in Biology** Structure and function of metal of proteins in electron transport processes cytothrome's and ion-sulphure proteins, synthetic models. Nitrogen fixation Biological nitrogen fixation, and its mechanism, nitrogenase, Chemical nitrogen fixation.
Unit III	**Enzymes** Introduction and historical perspective, chemical and biological catalysis, remarkable properties of enzymes like catalytic power, specificity and regulation. Nomenclature and classification, extraction and purification. Fischer's lock and key and Koshalnd's induced fithypothesis, concept and identification of active site by the use of inhibitors, affinity labeling and enzyme modification by site-directed mutagenesis. Enzyme kinetics, Michael's-Menten and Lineweaver Burk plots, reversible and irreversible inhibition. Mechanism of Enzyme Action. Transition-state theory, orientation and Steric effect, acid-base catalysis, covalent catalysis, strain or distortion. Examples of some typical enzyme mechanisms for chemotrypsin, ribonuclease, lysozyme and carboxypeptidase. **Kinds of Reactions Catalysed by Enzymes** Nucleophilic displacement on a phosphorus atom, multiple displacement reactions and the coupling of ATP cleavage to endergonic processes. Transfer of sulphate, addition and . elimination reactions, enolic intermediates in Isomerisations reactions, b-Cleavage and condensation, some isomerization and rearrangement reactions. Enzyme catalyzed carboxylation and decarboxylation.

Unit IV	**Co-Enzyme Chemistry** Cofactors as derived from vitamins, coenzymes, prosthetic groups, apoenzymes. Structure and biological functions of coenzyme A, thiamine pyrophosphate, pyridoxal phosphate, NAD+, NADP+, FMN, FAD, lipoic acid, vitamin B 12. Mechanisms of reactions catalyzed by the above cofactors. **Enzyme Models** Host-guest chemistry, chiral recognition and catalysis, molecular recognition, molecular asymmetry and prochirality Biometric chemistry, crown ether, cryptates. Cyclodextrins, cyclodextrion-based enzyme models, clixarenes, ionospheres, micelles synthetic enzymes or synzymes. **Biotechnological Applications of Enzymes** large-scale prodcution and purification of enzymes, techniques and methods of immobilization of enzymes, effect of immobilization on enzyme activity, application of immobilized enzymes, use of enzymes in food and drink industry-brewing and cheese-making, syrups from cron starch, enzymes as targets for drug design. Clinical uses of enzymes, enzyme therapy, enzymes and recombinant DNA Technology.
Unit V	**Biological Cell and its Constituents** Biological cell, structure and functions of proteins, enzymes, DNA and RNA in living systems. Helix coils transition. **Bioenergetics** Standard free energy change in biochemical reactions, exergonic, endergonic. Hydrolysis of ATP, synthesis of ATP from ADP. **Biopolymer Interactions** Forces involved in biopolymer interactions. Electrostaric charges and molecular expansion, hydrophobic forces, dispersion force interactions. Multiple equilibrium and various type of bidning processes in biological systems. Hydrogen ion nitration curves. **Cell Membrane and Transport of Ions** Structure and functions of cell membrane, ion transport through cell membrane, inrreversible thermodynamic treatment of membrane transport. Nerve conduction.



Chhindwara Univeristy, Chhindwara (M.P.)

(Session 2020-21 Onwards)

Class/ कक्षा : M.Sc. Chemistry

Semester/ सेमेस्टर : IV

Title of Subject / विषय का शीर्षक : ORGANIC SYNTHESIS

Paper/प्रश्न पत्र : IV Optional – (I) Code : MCH-513

Max. Marks/अधिकतम अंक : 40+10 CCE Min. Marks/न्यूनतम अंक : 15+04 CCE

	Particulars/विवरण
Unit I	**Disconnection Approach** An introduction to synthons and synthetic equivalents. Disconnection approach, functional group inter-conversions, the importance of the order events in organic synthesis, one group C-X and two group C-X disconnections, chemoselectivity, reversal of polarity, cyclisation reaction, amine synthesis. Protection of groups, chemo, region and stereo selectivity.
Unit II	**One Group C-C Disconnections** Alcohols and carbonyl compounds, regioselectivity, alkene synthesis, use of acetylenes and aliphatic Nitro compounds in organic synthesis. Two Group C-C Disconnections Diels-Alder Reaction, 1,3-difunctionalised compounds, a-b-unsaturated carbonyl compounds, control in carbonyl condensations, I,5-difunctionalised compounds. Micheal addition and Robinson annelation.
Unit III	**Oxidation** Introduction, Different oxidative processes. Hydrocarbons-alkenes, aromatic rings, saturated C-H groups (activated and unactivated) Alcohols, diols, aldehyde's, ketones, ketals and carboxylic acids. Amines, hydrazines, and sulphides. Oxidations with ruthenium tetraoxide, iodobenzene diacetate and thallium. (III) Nitrate. **Reduction** Introduction, Different reductive processes. Alkanes, alkenes, alkynes, and aromatic rings. arbonyl compounds-aldehydes, ketones, acids and their derivatives.Epoxic10. Nitro, nitroso, azo and oxime groups. Expoxide, Nitro, Nitroso, azo and oxime groups.
Unit IV	**Organometallic Reagents** Principle, preparations, properties and applications of the following in organic synthesis metallic Reagents with mechanistic details. Group I and II metal organic compounds Li, Mg, Hg, Cd, Zn and Ce.Compounds.
Unit V	**Synthesis of some complex molecules:** **Application of the above in the synthesis of following compounds : Camphor, longifoline, cartisone, reserpine, vitamin D, juvabion aphidicolin and fredericamycin. A**

Chhindwara Univeristy, Chhindwara (M.P.)

(Session 2020-21 Onwards)

Class/ कक्षा : M.Sc. Chemistry

Semester/ सेमेस्टर : IV

Title of Subject / विषय का शीर्षक : ANALTICAL CHEMISTRY

Paper/प्रश्न पत्र : IV Optional – (II) Code : MCH-514

Max. Marks/अधिकतम अंक : 40+10 CCE Min. Marks/न्यूनतम अंक : 15+04 CCE

	Particulars/विवरण
Unit I	**Introduction** Role of analytical chemistry Classification of analytical methods classical and instrumental. Types of instrumental analysis. Selecting an analytical method. Neactness and cleanliness. laboratory operations and practices. Analytical balance. Techniques of weighing, errors. Volumetric glassware cleaning and calibration of glassware. Sample Volumetric glassware cleaning and Calibration of glassware. Sample preparation-dissolution and decompositions. Gravimetric techniques. Selecting and handling or reagents. Laboratory notebooks. Safety in the analytical laboratory. **Errors and Evaluation** Definition of terms in mean and median. Precision-standard deviation, relative standard deviation. Accuracy-absolute error, relative error. Types of error in experimental data determinate (systematic), indeterminate (or random) and gross. Sources of error and the effects upon the analytical results. Methods for reporting analytical data. Statistical evaluation of data-indeterminate errors. The uses of statistics.
Unit II	**Food analysis** Moisture, ash, crude protein, fat crude fiber, carbohydrates, calcium, potassium, sodium and phosphate. Food adulteration-common adulterants in food, contamination of foods stuffs. Microscopic, examination of foods for adulterants. Pesticide analysis in food products. Extraction and purification of sample. HPLC. Gas chromatography for organophosphates. Thin-layer chromatography for identification of chlorinates pesticides in food products.
Unit III	**Analysis of Water Pollution** Origin of Waste water, types, water pollutants and their effects. Sources of water pollution-domestic, industrial agricultural soil and radioactive wastes as sources of pollution. Objectives of analysis-parameter for analysis-colour, turbidity, total solids, conductivity, acidity, alakalinity, hardness, chloride, sulphate, fluoride, silica, phosphates adn different forms of nitrogen, Heavy metal pollution-public health significance of tadmium, chromium, copper, lead, zinc, managanese, mercurry and arsenic. General survey of instrumental technique for the analysis of heavy metals in aqueous systems'. Measurements of DO, BOD, and COD. Pesticides as water pollutants and analysis. Water pollution law; and standards.
Unit IV	**Analysis of soil, Fuel, Body Fluids and Drugs** **(a) Analysis of Soil, moisture pH total nitrogen, phosphorus, silica, lime, magnesia, manganese, sulphur and alkali salts.**

	Fuel analysis : liquid and gas. Ultimate and proximate analysis-heating values-grading of coal. Liquid fuels-flash point, aniline point, octane number and carbon residue. Gaseous fuels-produced gas and water gas-calorific value.
Unit V	**(a) Clinical Chemistry : Composition of blood-collection and preservation nr samples. Clinical analysis. Serum electrolytes, blood glucose, blood urea nitrogen, uric acid, albumin, globulins, barbiturates, acid and alkaline phosphates. Immunoassay: principles of radio immunoassay (RIA) and applications. The blood gas analysis trace elements n the body** **(b) Drug analysis : Narcotics and dangerous drug. Classification of drugs. Screening by gas and thin-layer chromatography and spectrophotometerio measurements.**

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(Session 2020-21 Onwards)

Class/ कक्षा : M.Sc. Chemistry

Semester/ सेमेस्टर : IV

Title of Subject / विषय का शीर्षक : ELECTRO CHEMISTRY

Paper/प्रश्न पत्र : IV Optional – (III) Code : MCH-515

Max. Marks/अधिकतम अंक : 40+10 CCE Min. Marks/न्यूनतम अंक : 15+04 CCE

	Particulars/विवरण
Unit I	**1. Conversion and Storage of Electrochemical Energy Present status of energy** **Consumption:** Pollution problem. History of fuel cells, Direct energy conversion by electrochemical means. Maximum intrinsic efficiency of an electrochemical converter. Physical interpretation of the Carnot efficiency factor in electrochemical energy converters. Power output. Electrochemical Generators (Fuel Cells) : Hydrogen Oxygen cells, Hydrogen Air cell, Hydrocarbon air cell, Alkane fuel cell, Phosphoric and fuel cell, direct NaOH fuel cells, applications of fuel cells. **Electrochemical Energy Storage :** Properties of Electrochemical energy storage : Measure of battery performance, Charging and discharging of a battery, Storage Density, Energy Density. Classical Batteries. i (i) Lead Acid ii (ii) Nickel – Cadmium iii (iii) Zinc manganese dioxide, Modern Batteries : (i) Zinc-Air (ii) Nickel – Metal Hydride (iii) Lithium Battery, Future Electricity Stores : Storage in (i) Hydrogen (ii) Alkali Metals, (iii) Non aqueous solutions.
Unit II	Corrosion and stability of Metals: Civilization and Surface mechanism of the corrosion of the metals; Thermodynamics and the stability of metals, Potential –pH (or Pourbaix) Diaphragmsl; uses and abuses, Corrosion current and corrosion potential – Evans diagrams. Measurement of corrosion rate : (i) Weight Loss method (ii) electrochemical Method. Inhibiting Corrosion : Cathodic and Anodic Protection . (i) Inhibition by addition of substrates to the electrolyte environment (ii) by charging the corroding method form external source anodic Protection, Organic inhibitors, The Fuller Story Green inhibitors. Passivation : Structure of Passivation films, Mechanism of Passivation, Spontaneous Passivation Nature's method for stabilizing surfaces.

Unit III	Bio electrochemistry Bioelectrodics, Membrane Potentials, Simplistic theory, Modern theory, Electrical conductance in biological organism : Electronic, Protonic electrochemical mechanism of nervous systems, enzymes as electrodes. Kinetic of Electrode Process : Essentials of Electrode reaction : Current Density, Overpotential, Tafel Equation, Butler Volmer equation. Standard rate constant (KO) and Transfer coefficient (a), Exchange Current. Irreversible Electrode processes : Criteria of irreversibility, information from irreversible wave.
Unit IV	Methods of determining kinetic parameters for quasi-rversible and irreversible waves : Koutecky's methods, Meits Israel Method, Gellings method Electrocatalysis Chemical catalysts and Electrochemical catalysts with special reference to putostates, porphyrin oxides of rare earths. Electocatalysis in simple redox reactions, in reaction involving adsorbed species. Influence of various parameters.
Unit V	Potential Sweep Method : Linear sweep Voltammetry, Cyclic Voltammetry, theory and applications. Diagnostic criteria of cycli vltammetry. Controlled current microelectrode techniques : comparison with controlled potentials methods, chronopotentiometry, theory ad applications. Bulk Electrolysis Methods : Controlled potential coulometry, Controlled Coulometry, Electroorganic synthesis and its important applications. Stripping analysis : anodic and Cathodic modes, Pre electrolysis and Stripping steps, applications of Stripping Analysis.

Chhindwara Univeristy, Chhindwara (M.P.)

(Session 2020-21 Onwards)

Class/ कक्षा : M.Sc. Chemistry

Semester/ सेमेस्टर : IV

Title of Subject / विषय का शीर्षक : CHEMISTRY OF NATURAL PRODUCTS

Paper/प्रश्न पत्र : V Optional – (I) Code : MCH-516

Max. Marks/अधिकतम अंक : 40+10 CCE Min. Marks/न्यूनतम अंक : 15+04 CCE

	Particulars/विवरण
Unit I	**Terpenoids and Carotenoids** Calcifications, nomenclature, occurrence, isolation, general methods of structure determination, isoprene rule. Structure determination, stereochemistry, biosynthesis and synthesis of the following representative molecules: Chitral, Geraniol α-Terpinol, Menthol, Faniesol, Zingiberene, Santonin, Phytol, Abietic acid and β-Carotene.
Unit II	**Alkaloids** Definition, nomenclature and physiological action, occurrence, isolation, general methods of structure elucidation, degradation, classification based on nitrogen heterocyclic ring, role of alkaloids in plants. Structure, stereochemistry, synthesis and biosynthesis of the following: Ephedrine, (+)- Coniine,-Nicotine, Atropine, Quinine and Morphine.
Unit III	**Steroids** Occurrence, nomenclature, basic skeleton, Diel's hydrocarbon and stereochemistry, Isolation, Structure determination and synthesis of Cholesterol, Bile acids, Androsterone, Testosterone, Estrone, Progesterone, Aldosterone, Biosynthesis of Steroids.
Unit IV	**Plant Pigments** Occurrence, nomenclature and general methods of structure determination. Isolation and synthesis of Apigenin, Luteolin Quercetin, Myrcetin, Quercetin 3-glucoside, Vitexin, Diadzein, Aureusin, Cyanidin-7arabinoside, Cyaniidin, Hirsutidin, Biosynthesis of flavonoids: Acetate pathway and Shikimic a pathway. **Prophyrins** Structure and synthesis of Hemoglobin and Chlorophyll.
Unit V	**Prostaglandin** Occurrence, nomenclature, classification, biogenesis and physiological effects. Synthesis of PGE2 and PGF2a. **Pyrethroids and Rotenones** Synthesis and reactions of Pyrethroids and Rotenones. (For structure elucidation, emphasis is to be placed on the use of spectral parameters wherever possible).

Chhindwara Univeristy, Chhindwara (M.P.)

(Session 2020-21 Onwards)

Class/ कक्षा : M.Sc. Chemistry

Semester/ सेमेस्टर : IV

Title of Subject / विषय का शीर्षक : Medicinal Chemistry

Paper/प्रश्न पत्र : V Optional – (II) Code : MCH-517

Max. Marks/अधिकतम अंक : 40+10 CCE Min. Marks/न्यूनतम अंक : 15+04 CCE

	Particulars/विवरण
Unit I	**Structure and activity:** Relationship between chemical structure and biological activity (SAR). Receptor Site Theory. Approaches to drug design. Introduction to combinatorial synthesis in drug discovery. Factors affecting bioactivity. QSAR-Free-Wilson analysis, Hansch analysis, relationship between Free-Wilson analysis and Hansch analysis.
Unit II	**Pharmacodynam:** Introduction, elementary treatment of enzymes stimulation, enzyme inhibition, sulfonamides, membrane active drugs, drug metabolism, xenobiotics, biotransformation, significance of drug metabolism in medicinal chemistry.
Unit III	**Antibiotics and antibacterials** Introduction, Antibiotic β-Lactam type - Penicillins, Cephalosporins, Antitubercular — Streptomycin, Broad spectrum antibiotics — Tetracyclines, Anticancer – Dactinomycin (Actinomycin D)
Unit IV	**Antifungal —** polyenes, Antibacterial — Ciprofloxacin, Norfloxacin, Antiviral — Acyclovir **Antimalarials :** Chemotherapy of malaria. SAR. Chloroquine, ,Chloroguanide and Mefloquine
Unit V	**Non-steroidal Anti-inflammatory Drugs :** Diclofenac Sodium, Ibuprofen and Netopam Antihistaminic and antiasthmatic agents : Terfenadine, Cinnarizine, Salbutamol and Beelomethasone dipropionate.

Chhindwara Univeristy, Chhindwara (M.P.)

(Session 2020-21 Onwards)

Class/ कक्षा : M.Sc. Chemistry

Semester/ सेमेस्टर : IV

Title of Subject / विषय का शीर्षक : INDUSTRIAL CHEMISTRY – PESTICIDES AND GLASS INDUSTRIES

Paper/प्रश्न पत्र : V Optional – (III) Code : MCH-518

Max. Marks/अधिकतम अंक : 40+10 CCE Min. Marks/न्यूनतम अंक : 15+04 CCE

	Particulars/विवरण
Unit I	**Cleansing Agents** Cleansing Agents : Toilet and washing soaps; preparation and uses, Synthetic detergents; alkyl aryl sulfonates, fatty alcohol surfaces, ethanolamines , nonionic detergents.
Unit II	**Fertilizers and Inorganic Materials:** Fertilizers : Fertilizers Industries in India, Manufacture of Ammonium salts. Urea, Nitrates, Phosphates and Super phosphates, ,Nitrogen fixation. **Glass:** Types, their composition and properties testing glass. Manufacture of Glass Fibres. Optical Glass, Colored Glasses, Lead Glass and Neutron Absorbing Glass. **Ceramics:** Important clays and feldspar. Glazing and vitrification, Glass ceramics.
Unit III	**Cement :** Types and their manufacture, setting process. **Ferrous Industry:** Manufacture of steel and other important alloys. **Silicon :** Pre silicon, Electronics Industry.
Unit IV	**Pesticides and Food additives** **Pesticides and Food additives :** Classification, important categories of insecticides, fungicides, herbicides and rodenticial; Mode of action.
Unit V	**Chemistry and synthesis of corn i pesticides** : Such and Tabun. Sarin, Davgon, DDYP

INORGANIC - CHEMISTRY

Practical-Chemistry
MS.c Semester- IV

Analysis	-	8
Preparation	-	8
Spectral Compound	-	8
Record	-	5
Viva-Voce	-	5

Marks - 34

1- Analysis of cement :

Analysis of Ca^{2+} in cement

Estimation of Fe^{3+} in cement

Analysis of Alloys : Brass and bronze analysis

Analysis of Soldering Material

2- Preparation and spectral studies

1. Sodium tetra thionate
2. Metal complex of dimethyl Sulphoxid
3. Cis and trans $[Co(en)_2 Cl_2]$
4. $[Cr(H_2O)_6]NO_3$

3- Spectral studies of different unknown compounds and complexes .

Practical

M Sc. Semester – IV
Duration – 6-8 hours in each branch

Organic Chemistry **Max Marks – 33**

Multi Step Synthesis of Organic Compounds **Marks-6**

1.Biosynthesis of ethanol from sucrose.

2.Preparation of picric acid from phenol.

3.Preparation of malachite green.

4. Preparation of phenolphthalein

5. Preparation of fluorescein.

6. Preparation of eosin from fluorescein.

7. green synthesis of paracetamol, adipic acid ibuprophen Catachol.

Interpretation of spectra

- I R spectra of phenols & Alcohols, Naphthol's, Aldehydes, ketones and Acids and derivative.
- U.V. spectra of butadiene, acyclic diene, ketone, phenol, unsaturated corboxylic acid derivative.

Marks-4

Analysis **Marks-4**

Analysis of dyes, natural flowering material (flavones flavonols anthocyanin.

by chromatographic separation technique method (TLC, paper column chromatography.

Preparation of some commercial organic products and make their PPT.

1 Preparation of soap and detergent. Marks-6

2 Preparation of coloured candles.

3 Preparation of organic herbicides/ insecticide.

Communication Skills: **Marks-4**

1 Scientific writing: Writing a Scientific Report on a project undertaken or an experiment conducted. (theory+ practice)

2 Group discussion: Group discussion on some current scientific topics.

Record- 4
Viva-5

MSc IV Sem

Physical Chemistry Max marks : - 33

Practical III

Conductometry	**8**
Potentiometry/pH metry	**8**
Polarimetry/Spectrophotometry	**8**
Record	**4**
Viva Voce	**5**

Potentionmetry

1. Acid-base titration
2. Titration of mixture of acids
3. Redox titrations
4. Determination of redox potential of Fe(III)/Fe(II) System

Conductivity

5. Verification of Onsager equation for a strong electrolyte
6. Determination of dissociation constant of a weak acid
7. Acid-base titration,Determination of Solubility and solubility product
8. Replacement titration
9. Solubility of sparingly a soluble salt
10. Basicity of an organic acid

pH metry

11. Acid Base Titration
12. Determination of the dissociation constant and Activity and Activity Cofficient

Spectrophotometry

13. Verification of Beer-Lambert law
14. Determination of pka of an acid-base indicator such as Methyl Red

Polarimetry

15. Determination of rate constant for hydrolysis/inversion of sugar using a polarimeter.
16. Enzyme kinetics-inversion of sucrose.