

Books Suggested:

1. Physical Methods for Chemistry, R.S. Drago, Saunders Compnay.
2. Structural Methods in Inorganic Chemistry, E.A.V. Ebsworth, D.W.H. Rankin and S. Cradock, ELBS.
3. Infrared and Raman Spectral : Inorganic and Coordination Compounds K. Nakamoto, Wiley.
4. Progress in Inorganic Chemistry vol., 8, ed., F.A. Cotton, vol., 15 ed. S.J. Lippard, Wiley.
5. Transition Metal Chemistry ed. R.L. Carlin vol. 3 dekker.
6. Inorganic Electronic Spectroscopy, A.P.B. Lever, Elsevier.
7. NMR, NQR, EPR and Mossbauer Spectroscopy in Inorganic Chemistry, .V. Parish, Ellis Haywood.
8. Practical NMR Spectroscopy, M.L. Martin. J.J. Deepish and G.J. Martin, Heyden.
9. Spectrometric Identification of Organic Compounds, R.M. Silverstein, G.C. Bassler adn T.C. Morrill, John Wiley.
10. Introduction to NMR spectroscopy, R.J. Abraham, J. Fisher and P. Loftus, Wiley.
11. Application of Spectroscopy of Organic Compounds, J.R. Dyer Prentice Hall.
12. Spectroscopic Methods in Organic Chemistry D.H. Williams, I. Fleming, Tata McGraw-Hill.
13. Structural Methods in Inorganic Chemistry, E.A.V. Ebsworth, D.W.H. Rankin and S. Cradock, ELBS.
14. Introduction to NMR spectroscopy, R.J. Abraham, J. Fisher and P. Loftus, Wiley.

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DEVI AHILYA VISHWAVIDYALAYA, INDORE
M.Sc. CHEMISTRY (SEMESTER –IV)

Paper No. : **III (Code-MCH-512)**
 Compulsory / Optional : **Compulsory**
 Max. Marks : **100**

PAPER III: BIOCHEMISTRY

Unit-1	<p>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.</p> <p>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.</p> <p>Transport and Storage of Dioxygen Heam proteins and oxygen uptake structure and function of haemoglobin's, myoglobin, haemocyanms and hemerythrin, model synthetic complexes of iron, cobalt and copper.</p>
Unit-2	<p>Electron Transfer in Biology Structure and function of metal of proteins in electron transport processes cytochrome's and ion-sulphure proteins, synthetic models.</p> <p>Nitrogen fixation Biological nitrogen fixation, and its mechanism, nitrogenase, Chemical nitrogen fixation.</p>
Unit-3	<p>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 fit hypothesis, 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.</p> <p>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.</p> <p>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.</p>
Unit-4	<p>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 B12. 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, cyclodextrin-based enzyme models, clixarenes, ionospheres, micelles synthetic enzymes or synzymes.</p>

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	<p>Biotechnological Applications of Enzymes large-scale production 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 corn starch, enzymes as targets for drug design. Clinical uses of enzymes, enzyme therapy, enzymes and recombinant DNA Technology.</p>
Unit-5	<p>Biological Cell and its Constituents Biological cell, structure and functions of proteins, enzymes, DNA and RNA in living systems. Helix coils transition.</p> <p>Bioenergetics Standard free energy change in biochemical reactions, exergonic, endergonic. Hydrolysis of ATP, synthesis of ATP from ADP.</p> <p>Biopolymer Interactions Forces involved in biopolymer interactions. Electrostatic charges and molecular expansion, hydrophobic forces, dispersion force interactions. Multiple equilibrium and various types of binding processes in biological systems. Hydrogen ion titration curves.</p> <p>Cell Membrane and Transport of Ions Structure and functions of cell membrane, ion transport through cell membrane, irreversible thermodynamic treatment of membrane transport. Nerve conduction.</p>

Books Suggested :

1. Principles of Bioinorganic Chemistry, S.J. Lippard and J.M. Berg, University Science Books.
2. Bioinorganic Chemistry, I. Bertini, H.B. Gray, S.J. Lippard and J.S. Valentine, University Science Books.
3. Inorganic biochemistry vol. I and II ed. G.L. Eichhorn, Elsevier.
4. Progress in Inorganic Chemistry, Vol 18 and 38 ed J.J. Lippard, Wiley.
5. Bioorganic Chemistry : A chemical Approach to Enzyme Action, Hermann Dugas and C. Penny, Springer Verlag.
6. Understanding Enzymes, Trevor Palmer, Prentice Hall.
7. Enzyme Chemistry : Impact and applications, Ed. Collin J suckling, chemistry.
8. Enzyme Mechanisms Ed. M.I. Page and A Williams, Royal Society of Chemistry.
9. Fundamentals of Enzymology, N.C. Price and L. Stevens. Oxford University Press.
10. Immobilized Enzymes : An Introduction and Applications in Biotechnology, Michael ID. Trevan, Hohn Wiley.
11. Enzymatic Reaction Mechanisms. C. Walsh. W.H. Freeman.
12. Enzyme Structure and Mechanism, A Fersht, W.H. Freeman
13. Biochemistry : The Chemical Reactions of Living Cells, D.E. Metzler, Academic Press.

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OPTIONAL PAPERS

Out of the following select any two papers :

- OPT-1 MCH-514 Organic Synthesis
- OPT-2 MCH-515 Chemistry of Natural Products
- OPT-3 MCH-516 Analytical Chemistry
- OPT-4 MCH-517 Electrochemistry
- OPT-5 MCH-518 Medicinal Chemistry

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DEVI-AHILYA VISHWAVIDYALAYA, INDORE

M.Sc. CHEMISTRY (SEMESTER -IV)

Paper No. : OPT-1 Code- MCH-514
 Compulsory / Optional : Optional
 Max. Marks : 100

Optional Paper : Organic Synthesis

Unit-1	<p>Disconnection Approach An introduction to synthons and synthetic equivalents. Disconnection approach, functional group inter-conversions, the importance of the order of 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.</p>
Unit-2	<p>One Group C-C Disconnections Alcohols and carbonyl compounds, regioselectivity, alkene synthesis, use of acetylenes and aliphatic Nitro compounds in organic synthesis.</p> <p>Two Group C-C Disconnections Diels-Alder Reaction, 1,3-difunctionalised compounds, a-b- unsaturated carbonyl compounds, control in carbonyl condensations, 1,5-difunctionalised compounds. Micheal addition and Robinson annelation.</p>
Unit-3	<p>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 tetroxide, iodobenzene diacetate and thallium. (III) Nitrate.</p> <p>Reduction Introduction, Different reductive processes. Alkanes, alkenes, alkynes, and aromatic rings. Carbonyl compounds-aldehydes, ketones, acids and their derivatives. Epoxides. Nitro, nitroso, azo and oxime groups. Expoxide, Nitro, Nitroso, azo and oxime groups. Hydrogenolysis.</p>
Unit-4	<p>Organometallic Reagents Principle, preparations, properties and applications of the following in organic synthesis with mechanistic details. Group I and II metal organic compounds Li, Mg, Hg, Cd, Zn and Ce Compounds.</p>
Unit-5	<p>Synthesis of some complex molecules: Application of the above in the synthesis of following compounds: Canphor, longifoline, cartisone, reserpine, vitamin D, juvabion, aphidicolin and fredericamycin. A</p>

Books Suggested:

1. Designing Organic Synthesis, S. Warren. Wiley.
2. Organic Synthesis-Concept, Methods and Starting Materials, J. Fuhrhop.
3. Some Modern Methods of Organic Synthesis. W. carruthers, Cambridge Univ. Press.
4. Modern Synthetic Reactions H.O. House, W.A Benjamin.
5. Advanced Organic Chemistry : Reactions, Mechanisms and Structure, J. March. Wiley.
6. Principles, of Organic Chemistry Part B. F.a. Carey and R.J. Sundberg, Plenum Press.

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DEVI AHILYA VISHWAVIDYALAYA, INDORE

M.Sc. CHEMISTRY (SEMESTER -IV)

Paper No. : OPT-2 Code- MCH-515
 Compulsory / Optional : Optional
 Max. Marks : 100

Optional Paper : Chemistry of Natural Products

Unit-1	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 : Citral, Geraniol α -Terpeneol, Menthol, Farnesol, Zingiberene, Santonin, Phytol, Abietic acid and β -Carotene.
Unit-2	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-3	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-4	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, Cyanidin, Hirsutidin, Biosynthesis of flavonoids: Acetate pathway and Shikimic acid pathway. Prophyrins Structure and synthesis of Haemoglobin and Chlorophyll.
Unit-5	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).

Books Suggested:

1. Natural Products : Chemistry and Biological Significance, J. Mann, R.S. Davidson, J.B. Hobbs, D.V. Banthrope adn J.B. Harbome, Longman, Esses.
2. Organic Chemistry : Vol. 2 IL. Finar, ELBS
3. Stereoselective Synthesis : A Practical Approach, M. Norgradi, VCH.
4. Rodd's Chemistry of Carbon Compounds, Ed. S. Coffey, Elsevier.
5. Chemistry, Biological and Pharmacological Properties of Medicinal Plants from the Americas, Ed. Kurt Hostettmann, M.P. Gupta and A. Marston. harwood Academic Publishers.
6. Introduction to Flavonoids, B.A. Bohm. Harwood Academic Publishers.
7. New Trends in Natural Product chemistry, Ataur Rahman and M.L. Choudhary, Harwood Academic Publishers.
8. Insecticides of Natural Origin, Sukh Dev, Harwood Academic Publishers.

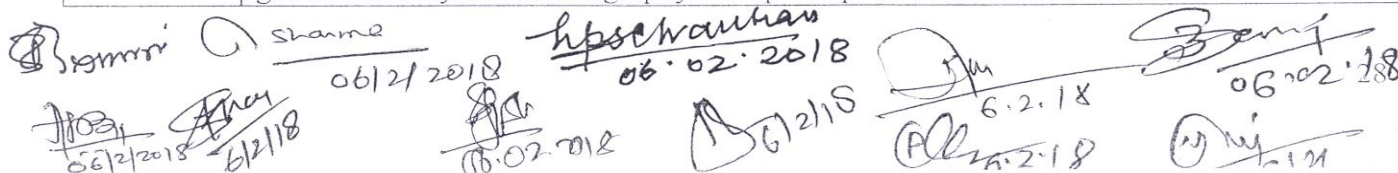
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DEVI AHILYA VISHWAVIDYALAYA, INDORE
M.Sc. CHEMISTRY (SEMESTER -IV)

Paper No. : OPT-3 Code- MCH-516
Compulsory / Optional : Optional
Max. Marks : 100

Optional Paper : Analytical Chemistry

Unit-1	<p>Introduction Role of analytical chemistry Classification of analytical methods classical and instrumental. Types of instrumental analysis. Selecting an analytical method. Neatness 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.</p> <p>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.</p>
Unit-2	<p>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 chlorinated pesticides in food products.</p>
Unit-3	<p>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, alkalinity, hardness, chloride, sulphate, fluoride, silica, phosphates and different forms of nitrogen, Heavy metal pollution-public health significance of cadmium, chromium, copper, lead, zinc, manganese, mercury 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 laws and standards.</p>
Unit-4	<p>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.</p>
Unit-5	<p>(a) Clinical Chemistry : Composition of blood-collection and preservation of 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 in the body (b) Drug analysis : Narcotics and dangerous drug. Classification of drugs. Screening by gas and thin-layer chromatography and spectrophotometric measurements.</p>



 Examiners: Sharma (06/2/2018), hpschawhan (06.02.2018), [Signature] (6.2.18), [Signature] (06.02.2018)

Books Suggested:

1. Analytical Chemistry, G.D. Christian, J.Wicy.
2. Fundamentals o analytical Chemistry. D.A. Skoog. D.M. West and F.J. Hooler, W.B. Saunders.
3. Analytical Chemistry-Principles. J.H. Kennedy. W.B. Saunders.
4. Analytical Chemistry-Principles and Techniques. LG. Hargis. Prentice Hall.
5. Principles of Instrumental analysis D.A. Skoog and J.L. Loary, W.B. Saunders.
6. Principles of Instrumental Analysis D.A. Skoog W.B. Saunders.
7. Quantitative Analysis, R.A. Day, Jr. and A.L. Underwood, Prentice Hall.
8. Environmental Solution, S.M. Khopkar, Wiley Eastern.
9. Basic Concepts of Analysis Chemistry, S.M. Khopkar, Wiley Eastern.
10. Handbook of Instrumental Techniques for Analytical Chemistry, F. Settle, Prentice Hall

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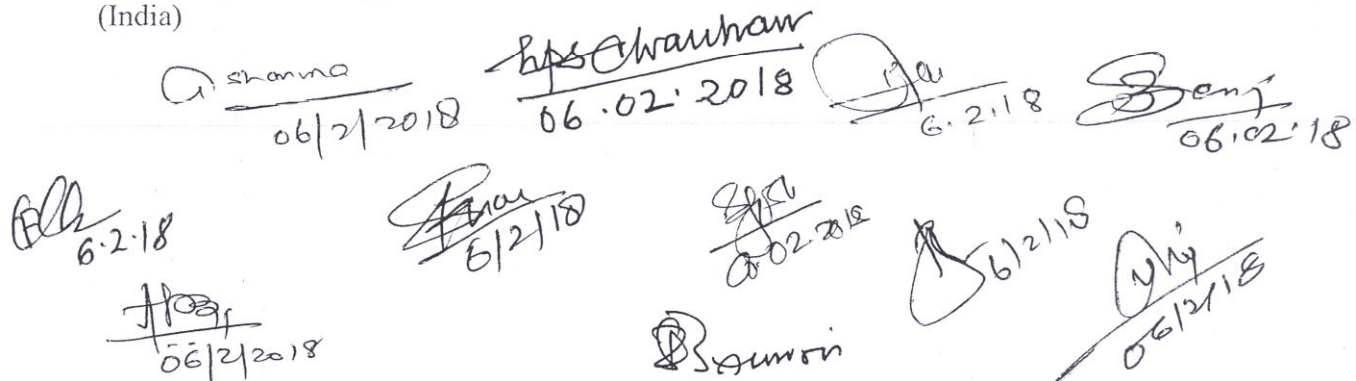
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Unit-5	<p>Potential Sweep Method : Linear sweep Voltammetry, Cyclic Voltammetry, theory and applications. Diagnostic criteria of cyclic voltammetry. Controlled current microelectrode techniques : comparison with controlled potentials methods, chronopotentiometry, theory and applications.</p> <p>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.</p>
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Books Suggested:

1. Modern Electrochemistry Vol. I, IIA, Vol. IIB J'OM Bockris and A.K.N. Reddy, Plenum Publication, New York.
2. Polarographic Techniques by L. Meites, Interscience.
3. "Fuel Cells : Their electrochemistry". McGraw Hill Book Company, New York.
4. Modern Polarographic Methods by A.M. Bond, Marcell Dekker.
5. Polarography and allied techniques by K. Zutshi, New age International publication. New Delhi.
6. "Electroanalytical Chemistry by Basil H. Vessor & Galen W. ; Wiley Interscience.
7. Electroanalytical Chemistry by Basil H. Vessor & Galen W. ; Wiley Interscience.
8. Topics in pure and Applied Chemistry, Ed. S. K. Rangrajan, SAEST Publication, Karaikudi (India)


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DEVI AHILYA VISHWAVIDYALAYA, INDORE

M.Sc. CHEMISTRY (SEMESTER –IV)

Paper No. : OPT-5 Code- MCH-518
 Compulsory / Optional : Optional
 Max. Marks : 100

Optional Paper : Medicinal Chemistry

Unit-1	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-2	Pharmacodynamics: Introduction, elementary treatment of enzymes stimulation, enzyme inhibition, sulfonamides, membrane active drugs, drug metabolism, xenobiotics, biotransformation, significance of drug metabolism in medicinal chemistry.
Unit-3	Antibiotics and antibacterials Introduction, Antibiotic β -Lactam type - Penicillins, Cephalosporins, Antitubercular – Streptomycin, Broad spectrum antibiotics – Tetracyclines, Anticancer - Dactinomycin (Actinomycin D)
Unit-4	Antifungal – polyenes, Antibacterial – Ciprofloxacin, Norfloxacin, Antiviral – Acyclovir Antimalarials : Chemotherapy of malaria. SAR. Chloroquine, Chloroguanide and Mefloquine
Unit-5	Non-steroidal Anti-inflammatory Drugs : Diclofenac Sodium, Ibuprofen and Netopam Antihistaminic and antiasthmatic agents : Terfenadine, Cinnarizine, Salbutamol and Beclomethasone dipropionate.

Books recommended

1. Introduction to medicinal chemistry, A. Gringuage, Wiley-VCH.
2. Wilson and Gisvold's Text Book of Organic Medicinal and Pharmaceutical Chemistry, Ed Robert F Dorge.
3. An Introduction to Drug Design, S.S. Pandeya and J.R. Dimmock, New Age Internaitonal.
4. Burger's Medicinal Chemistry and Drug Discovery, Vol-I (Chapter 9 and Chapter 14), Ed. M.E.Wolff, John Wiley.
5. Goodman and Gilman's Pharmacoloical Basis of Therapeutics, Mc GRaw-Hill.
6. The Organic Chemistry of Drug Design and Drug Action, R.B. Silverman, Academic Press.
7. Strategies for Organic Drug synthesis and Design, D.Lednicer, John Wiley.
8. Principles of Medicinal Chemistry W.O.Foye
9. Medicinal Chemistry; The Role of organic chemist in Drug Research, S.M. Roberts and B.J. Pricer.

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DEVI AHILYA VISHWAVIDYALAYA, INDORE
M. Sc. CHEMISTRY PRACTICALS (SEMESTER – IV)

Practical examination shall be conducted separately for each branch : (Duration : 6-8 hrs in each branch).

Inorganic Chemistry	
Preparation / Ion – Exchange Chromatography	12
Spectrophotometric / Flame Photometric Determinations	12
Record	04
Viva Voce	<u>05</u>
Total :	33

Preparation :

1. Synthesis of metal acetylacetonate
2. Metal complex of DMSO
3. Determination of Cr (III) complex
4. $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$
5. Trans – $[\text{Co}(\text{NH}_3)_5(\text{NO}_2)_2]\text{Cl}$
6. Synthesis of metal – ethylene diamine complex.

Ion Exchange Chromatography

- (a) Capacity of cation / anion exchange resin.
- (b) Separation of cobalt & nickel on anion exchange resin & their estimation volumetrically.

Spectrophotometric Determinations / Spectroscopic identification of recorded spectra like IR, NMR, ESR & Mass

- a. Manganese / Chromium in steel sample
- b. Nickel by extractive spectrophotometric method
- c. Flouride / Nitrite / Phosphate

Flame Photometric Determinations

- A. Sodium & Potassium when present together.
- B. Lithium / Calcium / Barium / Strontium.

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Organic Chemistry

Synthesis of Organic compounds	10
Spectrophotometric Estimations or Isolation	10
Identification of Organic compounds (Spectral data)	04
Record	04
Viva Voce	<u>05</u>
Total :	33

Organic Synthesis (may involve multi – steps) :

1. Friedel Crafts reaction.
2. Beckmann's reaction.
3. Synthesis of symmetrical tribromobenzene from aniline.
4. Enzymatic reduction of ethylacetoacetate using Baker's yeast to yield enantiomeric excess of S-ethyl-3-hydroxybutanoate & determine its optical density.
5. Biosynthesis of ethanol from sucrose.
6. Preparation of soap from fat with isolation of glycerol.

Spectroscopic Estimations :

- (1) Amino acids
- (2) Proteins
- (3) Carbohydrates
- (4) Aspirin
- (5) Caffeine

Isolations :

1. Casein from milk
2. Lycopine from tomato
3. Piperine from black pepper
4. Caffeine from tea leaves
5. Lactose from Milk
6. Preparation of Rose water using steam distillation

Identification of Organic compounds by the analysis of their spectral data (UV, IR, & MS).

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Physical Chemistry

Any one Experiment / Exercise from Section – A	12
Any one Experiment / Exercise from Section – B	13
Record	04
Viva Voce	<u>05</u>
Total :	34

Section - A

Spectroscopy

1. Determination of pKa of an indicator (e.g., methyl red) in (a) aqueous & (b) micellar media.
2. Determination of stoichiometry & stability constant of Ferric isothiocyanate ion complex in solution.
3. Determination of rate constant of alkaline bleaching of Malachite green & effect of ionic strength on the rate of reaction.

Polarography / Electronics

1. Identification & estimation of metal ions such as Cd^{2+} , Pb^{2+} , Zn^{2+} & Ni^{2+} etc. Polarographically.
2. Study of a metal ligand complex polarographically (using Lingane's method).
3. Determination of the V – I characteristics of a given diode in :
 - (a) Forward based mode / function.
 - (b) Reverse based mode / function.

Section – B

Chemical Kinetics

1. Determination of rate constant & formation of an intermediate complex in the reaction of Ce (IV) & Hypophosphorous acid at ambient temperature.
2. Determination of energy & enthalpy of activation in the reaction of KMnO_4 & benzyl alcohol in acid medium.
3. Determination of energy of activation & entropy of activation from a single kinetic run.
4. Kinetics of an enzyme catalyzed reaction.

Thermodynamics

1. Determination of partial molar volume of solute (e.g., KCl) & solvent in a binary mixture.
2. Determination of the temperature dependence of the solubility of a compound in two solvents having similar intramolecular interactions (benzoic acid in water & in DMSO water mixture & calculate the partial molar heat of solution.

Books Suggested

1. Inorganic Experiments, J. Derek Woolings, VCH.
2. Microscale Inorganic Chemistry, Z. Szafran, R.M, Pike and M.M. Singh, Wiley.
3. Practical Inorganic Chemistry, G. Marr and B. W. Rockett, Van Nostrand.
4. The systematic Identification of Organic Compounds, R.L. Shriner and D.Y. Curtin.

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