

**PANDIT RAVISHANKAR TRIPATHI GOVERNMENT COLLEGE BHAIYATHAN,
DIST. SURAJPUR CG**

(Affiliated to Sant Gahira Guru Vishwavidyalaya Sarguja Abmikapur)

SYLLABUS

B.Sc. PART ONE

Zoology
B.Sc. Part I 2018-19
Paper I
(Cell Biology and Non-chordata)

Unit:I

1. The cell (Prokaryotic and Eukaryotic)
2. Organization of Cell: Extra-nuclear and nuclear
Plasma membrane, Mitochondria, Endoplasmic reticulum, Golgi body, Ribosome and Lysosome).
3. Nucleus, Chromosomes, DNA and RNA

Unit:II

1. Cell division (Mitosis and Meiosis).
2. An elementary idea of Cancer cells And Cell transformation.
3. An elementary idea of Immunity: Innate & Acquired Immunity, Lymphoid organs, Cells of Immune System, Antigen, antibody and their interactions

Unit:III

- General characters and classification of Phylum Protozoa, Porifera, and Coelenterata up to order.
- 2. Protozoa: Type study - Paramecium,
- 2. Porifera: Type study - Sycon.
- 3. Coelenterata: Type study - Obelia

Unit: IV

- General characters and classification of Phylum Platyhelminthes, Nematelminthes, Annelida and Arthropoda up to order.
- 2. Platyhelminthes and Nematelminthes: Type Study – Fasciola, Ascaris
- 3. Annelida: Type Study - Pheretima.
- 4. Arthropoda: Type Study - Palaemone.

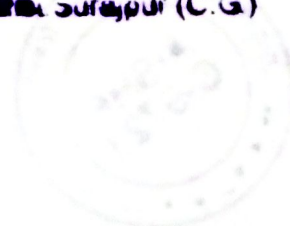
Unit:V

- General characters and classification of Phylum Mollusca and Echinodermata up to order.
- 2. Mollusca: Type Study - Pila.
- 3. Echinodermata- Type Study- Asterias (Starfish).




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Zoology
B.Sc. Part I 2018-19
Paper II
(Chordata and Embryology)

Unit:I

1. Classification of Hemichordata
2. Hemichordata- Type study-Balanoglossus
3. Classification of Chordates upto orders..
4. Protochordata-Type study - Amphioxus.
5. A comparative account of Petromyzon and Myxine.

Unit-II

1. Fishes-Skin & Scales, migration in fishes, Parental care in fish.
2. Amphibia-Parental care and Neoteny.
3. Reptilia- Poisonous & Non-poisonous Snakes, Poison apparatus, snake venom and Extinct Reptiles

Unit-:III

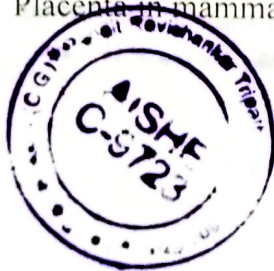
1. Birds- Flight Adaptation, Migration, and Perching mechanism, Discuss-Birds are glorified reptiles.
2. Mammals-Comparative account of Prototheria, Metatheria, Eutheria and Affinities.
3. Aquatic Mammals and their adaptations.

Unit:IV

1. **Fertilization**
2. Gametogenesis, Structure of gamete and Types of eggs
3. Cleavage
4. Development of Frog up to formation of three germ layers.
5. Parthenogenesis

Unit:V

1. Embryonic induction, Differentiation and Regeneration.
2. Development of Chick (a) up to formation of three germ layers, (2) Extra-embryonic membranes.
3. Placenta in mammals.




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Zoology
B.Sc. Part I 2018-19
Practical

The practical work will, in general be based on the syllabus prescribed in theory and the candidates will be required to show knowledge of the following:-

- Dissection of Earthworm, Cockroach, Palaemon and Pila
- Minor dissection—appendages of Prawn & hastate plate, mouth parts of insects, radulla of Pila.

(Alternative methods: By Clay/Thermacol/drawing/Model etc.)

- Adaptive characters of Aquatic, terrestrial, aerial and desert animals.
- Museum specimen invertebrate
- Slides- Invertebrates, frog embryology, Chick embryology and cytology,

Scheme of Practical Exam

Time: 3hrs

1. Major Dissection	10 Marks
2. Minor Dissection	05 Marks
3. Comments on Excercise based on Adaptation	04 Marks
4. Cytological Preparation	05 Marks
5. Spots-8 (Slides-4, Specimens-4)	16 Marks
6. Sessional	10 Marks



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Zoology
B.Sc. Part – II 2018-19
Paper – I
(Anatomy and Physiology)

Comparative Anatomy of various organ systems of vertebrates:

Unit: I

- Integument and its derivatives: structure of scales, hair and feathers
- Alimentary canal and digestive glands in vertebrates
- Respiratory organs : Gills and lung , air-sac in birds

Unit: II

- Endoskeleton: (a) Axial Skeleton- Skull and Vertebrae, (b) Appendicular Skeleton
Limbs and girdles
- Circulatory System: Evolution of heart and aortic arches
- Urinogenital System: Kidney and excretory ducts

Unit: III

- Nervous System: General plan of brain and spinal cord
- Ear and Eye: structure and function
- Gonads and genital ducts

Unit: IV

- Digestion and absorption of dietary components
- Physiology of heart, cardiac cycle and ECG
- Blood Coagulation
- Respiration: mechanism and control of breathing

Unit: V

- Excretion: Physiology of excretion, osmoregulation
- Physiology of muscle contraction
- Physiology of nerve impulse, Synaptic transmission




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B.Sc. - I (BOTANY) PAPER-I

BACTERIA, VIRUSES, FUNGI, LICHENS AND ALGAE

UNIT-I

VIRUSES: General characteristics, types of viruses based on structure and genetic material. Multiplication of viruses (General account), Lytic and Lysogenic cycle. Economic importance. Structure and multiplication of Bacteriophages. General account of Viroids, Virusoids, Prions, and Cyanophages. Mycorrhiza-Types and Significance.

UNIT -II

BACTERIA: General characteristics and classification (on the basis of morphology), fine structure of bacterial cell, Gram positive and Gram negative bacteria, mode of nutrition and reproduction vegetative, asexual and recombination (Conjugation, transformation and transduction), Economic importance. Microbial Biotechnology, *Rhizobium*, *Azotobacter*, *Anabena*.

UNIT-III

FUNGI: General account of habit and habitat, structure (range of thallus organization), cell wall composition, nutrition and reproduction in fungi. Heterothallism and Parasexuality. Outlines of classification of fungi. Economic importance of fungi. Life cycles of *Saprolegnia*, *Albugo*, *Aspergillus*, *Peziza*, *Agaricus*, *Ustilago*, *Puccinia*, *Alternaria* and *Cercospora*. VAM Fungi

UNIT-IV

ALGAE: Algae: General characters, range of thallus organization, Gaidukov phenomenon, reproduction, life cycle patterns and economic importance. Classification, Systematic position, occurrence, structure and life cycle of following genera : *Nostoc*, *Gloeocapsa*, *Volvox*, *Oedogonium*, *Vaucheria*, *Chara*, *Ectocarpus*, *Polysiphonia*.

UNIT -V

Lichens- General account, types, structure, nutrition, reproduction and economic importance. Mycoplasma: Structure and importance. Blue Green Algae (BGA) in nitrogen economy of soil and reclamation of Ushar land. Mushroom Biotechnology

Books Recommended:

- Dubey R.C. and Maheshwari D.K. *A text book of Microbiology*, S. Chand Publishing, New Delhi
- Presscott, L. Harley, J. and Klein, D. *Microbiology*, 7th edition, Tata Mc Graw-Hill Co. New Delhi.
- Sharma P.D., *Microbiology and Plant pathology*, Rastogi Publication. New Delhi.




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Alexopolous, C.J. Mims, C.W. and Blackwell, MM. *Introduction to Mycology*, John Wiley & Sons.
 Dubey H.C. *An Introduction to Fungi*, Vikas Publishing, New Delhi
 Mehrotra R.S. & Agrawal A., *Plant Pathology*, Tata McGraw, New Delhi
 Sharma P.D. *Plant Pathology*, Rastogi Publishers, Meeruth.
 Sristava, H.N. *Fungi*, Pradeep Publications, Jalandhar
 Webster, J. & Weber, R. *Introduction to Fungi*, Cambridge University Press, Cambridge
 Kumar H.D. *Introduction to phycology*, Aff. East-west Press, New Delhi
 Lee RE, *Phycology*, Cambridge University Press U.K.
 Srivastava, H.N., *Algae*, Pradeep Publications, Jalandhar
 Pandey S.K. Quick *Concept of Botany*, Lambert Academic publishing, Germany
 Pandey S.N., Mishra S,P. & Trivedi P.S. *A Text Book of Botany* (Vol.-I), Vikas Publishing, New Delhi
 Singh, Pandey and Jain, *A Text book of Botany*, Rastogi Publication, Meerut.

(Dr. J.N. Verma)
 Proff. & Head
 Govt. D.B. Girls PG College
 Raipur, (C.G.)

(Dr. Rekha Pimpalgaonkar)
 Proff. & Head
 Govt. N PG Science College
 Raipur, (C.G.)

(Dr.Ranjana Shrivastava)
 Proff. & Head
 Govt. VYTPG Science College
 Raipur, (C.G.)

(Mrs. Sanchal Moghe)
 Govt. Bilasa Girls College, Bilaspur

(Mr. Shivakant Mishra)

(Mr Sudheer Tiwari)



Pandit Ravishankar Tripathi, Govt. College
 Anandvanan, Dist. Surajpur (C.G.)

NEW CURRICULUM OF B.Sc. PART I

CHEMISTRY

The new curriculum will comprise of Three theory papers of 33, 33 and 34 marks each and practical work of 50 marks. The curriculum is to be completed in 180 working days as per the UGC norms & conforming to the directives of the Govt. of Chhattisgarh. The theory papers are of 60 hrs each duration and the practical work of 180 hrs duration.

PAPER I

INORGANIC CHEMISTRY

M.M.33

UNIT-I

A. ATOMIC STRUCTURE

Bohr's theory, its limitation and atomic spectrum of hydrogen atom. General idea of de-Broglie matter-waves, Heisenberg uncertainty principle, Schrödinger wave equation, significance of Ψ and Ψ^2 , radial & angular wave functions and probability distribution curves, quantum numbers, Atomic orbital and shapes of s, p, d orbitals, Aufbau and Pauli exclusion principles, Hund's Multiplicity rule, electronic configuration of the elements.

B. PERIODIC PROPERTIES

Detailed discussion of the following periodic properties of the elements, with reference to s and p-block. Trends in periodic table and applications in predicting and explaining the chemical behavior.

- Atomic and ionic radii,
- Ionization enthalpy,
- Electron gain enthalpy,
- Electronegativity, Pauling's, Mulliken's, Allred Rochow's scales.
- Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table.

UNIT-II

CHEMICAL BONDING I

~~Ionic bond~~ Ionic Solids - Ionic structures, radius ratio & co-ordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy Born- Haber cycle, Solvation




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energy and solubility of ionic solids, polarising power & polarisability of ions, Fajans rule, Ionic character in covalent compounds: Bond moment and dipole moment, Percentage ionic character from dipole moment and electronegativity difference, Metallic bond-free electron, Valence bond & band theories.

UNIT-III

CHEMICAL BONDING II

Covalent bond: Lewis structure, Valence bond theory and its limitations, Concept of hybridization, Energetics of hybridization, equivalent and non-equivalent hybrid orbitals. Valence shell electron pair repulsion theory (VSEPR), shapes of the following simple molecules and ions containing lone pairs and bond pairs of electrons: H_2O , NH_3 , PCl_3 , PCl_5 , SF_6 , H_3O^+ , SF_4 , ClF_3 , and ICl_2^- Molecular orbital theory. Bond order and bond strength, Molecular orbital diagrams of diatomic and simple polyatomic molecules N_2 , O_2 , F_2 , CO , NO .

UNIT-IV

A. s-BLOCK ELEMENTS

General concepts on group relationships and gradation properties, Comparative study, salient features of hydrides, solvation & complexation tendencies including their function in biosystems and introduction to alkyl & aryls, Derivatives of alkali and alkaline earth metals

B. p-BLOCK ELEMENTS

General concepts on group relationships and gradation properties. Halides, hydrides, oxides and oxyacids of Boron, Aluminum, Nitrogen and Phosphorus. Boranes, borazines, fullerenes, graphene and silicates, interhalogens and pseudohalogens.

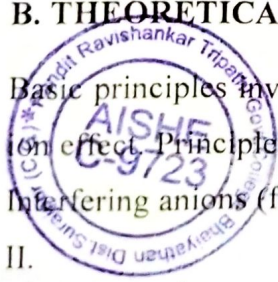
UNIT-V

A CHEMISTRY OF NOBLE GASES

Chemical properties of the noble gases, chemistry of xenon, structure, bonding in xenon compounds

B. THEORETICAL PRINCIPLES IN QUALITATIVE ANALYSIS (H_2S SCHEME)

Basic principles involved in the analysis of cations and anions and solubility products, common ion effect. Principles involved in separation of cations into groups and choice of group reagents. Interfering anions (fluoride, borate, oxalate and phosphate) and need to remove them after Group II.




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REFERENCE BOOKS:

1. Lee, J. D. Concise Inorganic Chemistry ELBS, 1991.
2. Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry Oxford, 1970
3. Atkins, P.W. & Paula, J. Physical Chemistry, 10th Ed., Oxford University Press, 2014.
4. Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications, 1962.
5. Rodger, G.E. Inorganic and Solid State Chemistry, Cengage Learning India Edition, 2002.
6. Puri, B. R., Sharma, L. R. and Kalia, K. C., Principles of Inorganic Chemistry, Milestone Publishers/ Vishal Publishing Co.; 33rd Edition 2016
7. Madan, R. D. Modern Inorganic Chemistry, S Chand Publishing, 1987.

PAPER: II

ORGANIC CHEMISTRY

UNIT-I BASICS OF ORGANIC CHEMISTRY

Hybridization, Shapes of molecules, Influence of hybridization on bond properties. Electronic Displacements: Inductive, electromeric, resonance and mesomeric effects, hyperconjugation and their applications; Dipole moment. Electrophiles and Nucleophiles; Nucleophilicity and basicity; Homolytic and Heterolytic cleavage, Generation, shape and relative stability of Carbocations, Carbanions, Free radicals, Carbenes and Nitrenes. Introduction to types of organic reactions: Addition, Elimination and Substitution reactions.


UNIT-II INTRODUCTION TO STEREOCHEMISTRY

Optical Isomerism: Optical Activity, Specific Rotation, Chirality/Asymmetry, Enantiomers, Molecules with two or more chiral-centres, Diastereoisomers, meso compounds, Relative and absolute configuration: Fischer, Newmann and Sawhorse Projection formulae and their interconversions; Erythrose and threose, D/L, d/l system of nomenclature, Cahn-Ingold-Prelog system of nomenclature (C.I.P rules), R/S nomenclature. Geometrical isomerism: cis-trans, syn-anti and E/Z notations.

UNIT-III CONFORMATIONAL ANALYSIS OF ALKANES

Conformational analysis of alkanes, ethane, butane, cyclohexane and sugars. Relative stability and Energy diagrams. Types of cycloalkanes and their relative stability, Baeyer strain theory: strainless rings, Chair, Boat and Twist boat conformation of cyclohexane with energy diagrams. Relative stability of mono-substituted cycloalkanes and disubstituted cyclohexane.




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UNIT-IV CHEMISTRY OF ALIPHATIC HYDROCARBONS

A. Carbon-Carbon sigma (σ) bonds

Chemistry of alkanes: Formation of alkanes, Wurtz Reaction, Wurtz-Fittig Reaction, Free radical substitutions: Halogenation-relative reactivity and selectivity.

B. Carbon-Carbon Pi (π) bonds:

Formation of alkenes and alkynes by elimination reactions, Mechanism of E1, E2, E1cb reactions. Saytzeff and Hofmann eliminations.

Reactions of alkenes: Electrophilic additions and mechanisms (Markownikoff/ Anti - Markownikoff addition), mechanism of oxymercuration-demercuration, hydroboration-oxidation, ozonolysis, reduction (catalytic and chemical), syn and anti-hydroxylation (oxidation), 1,2-and 1,4-addition reactions in conjugated dienes and, Diels-Alder reaction; Allylic and benzylic bromination and mechanism, e.g. propene, 1-butene, toluene, ethyl benzene.

Reactions of alkynes: Acidity, Electrophilic and Nucleophilic additions. Hydration to form carbonyl compounds, Alkylation of terminal alkynes.

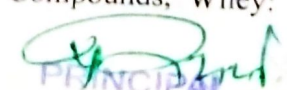
UNIT-V AROMATIC HYDROCARBONS

Aromaticity: Hückel's rule, aromatic character of arenes, cyclic carbocations/ carbanions and heterocyclic compounds with suitable examples. Electrophilic aromatic substitution: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their mechanism. Directive effects of the groups.

REFERENCE BOOKS:

1. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).
2. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
4. Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London.




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5. Kalsi, P. S. Stereochemistry Conformation and Mechanism, New Age International, 2005.
6. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
7. Organic Chemistry, Paula Y. Bruice, 2nd Edition, Prentice-Hall, International Edition (1998).
8. A Guide Book of Reaction Mechanism by Peter Sykes.

PAPER - III

PHYSICAL CHEMISTRY

M.M.34

UNIT-I

MATHEMATICAL CONCEPTS FOR CHEMIST

Basic Mathematical Concepts: Logarithmic relations, curve sketching, linear graphs, Properties of straight line, slope and intercept, Functions, Differentiation of functions, maxima and minima; integrals; ordinary differential equations; vectors and matrices; determinants; Permutation and combination and probability theory, Significant figures and their applications.

UNIT-II

GASEOUS STATE CHEMISTRY

Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; collision frequency; collision diameter; mean free path; Maxwell distribution and its use in evaluating molecular velocities (average, root mean square and most probable) and average kinetic energy, law of equipartition of energy, degrees of freedom and molecular basis of heat capacities. Joule Thompson effect, Liquification of Gases.

Behaviour of real gases: Deviations from ideal gas behaviour, compressibility factor (Z), and its variation with pressure and temperature for different gases. Causes of deviation from ideal behaviour. van der Waals equation of state, its derivation and application in explaining real gas behaviour, calculation of Boyle temperature. Isotherms of real gases and their comparison with van der Waals isotherms, continuity of states, critical state, relation between critical constants and van der Waals constants, law of corresponding states.

UNIT-III




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A. LIQUID STATE CHEMISTRY

Intermolecular forces, magnitude of intermolecular force, structure of liquids, Properties of liquids, viscosity and surface tension.

B. COLLOIDS and SURFACE CHEMISTRY

Classification, Optical, Kinetic and Electrical Properties of colloids, Coagulation, Hardy Schulze law, flocculation value, Protection, Gold number, Emulsion, micelles and types, Gel, Syneresis and thixotrophy, Application of colloids.

Physical adsorption, chemisorption, adsorption isotherms (Langmuir and Freundlich). Nature of adsorbed state. Qualitative discussion of BET.

UNIT-IV

SOLID STATE CHEMISTRY

Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, qualitative idea of point and space groups, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg's law, a simple account of rotating crystal method and powder pattern method. Crystal defects.

UNIT-V

A. CHEMICAL KINETICS

Rate of reaction, Factors influencing rate of reaction, rate law, rate constant, Order and molecularity of reactions, rate determining step, Zero, First and Second order reactions, Rate and Rate Law, methods of determining order of reaction, Chain reactions.

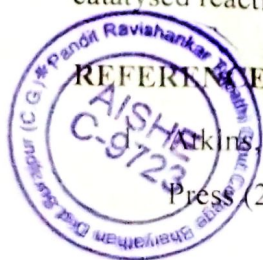
Temperature dependence of reaction rate, Arrhenius theory, Physical significance of Activation energy, collision theory, demerits of collision theory, non mathematical concept of transition state theory.

B. CATALYSIS

Homogeneous and Heterogeneous Catalysis, types of catalyst, characteristic of catalyst, Enzyme catalysed reactions, Micellar catalysed reactions, Industrial applications of Catalysis.

REFERENCE BOOKS:

Atkins, P. W. & Paula, J. de Atkin's Physical Chemistry 10th Ed., Oxford University Press (2014).



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- Ball, D. W. Physical Chemistry Thomson Press, India (2007).
- Castellan, G. W. Physical Chemistry 4th Ed. Narosa (2004).
- Mortimer, R. G. Physical Chemistry 3rd Ed. Elsevier: NOIDA, UP (2009).
- Engel, T. & Reid, P. Physical Chemistry 3rd Ed. Pearson (2013).
- Puri, B.R., Sharma, L. R. and Pathania, M.S., Principles of Physical Chemistry, Vishal Publishing Co., 47th Ed. (2016).
- Bahl, A., Bahl, B.S. and Tuli, G.D. Essentials of Physical Chemistry, S Chand Publishers (2010).
- Rakshit P.C., Physical Chemistry, Sarat Book House Ed. (2014).
- Singh B., Mathematics for Chemist, Pragati Publications.

PAPER - IV LABORATORY COURSE

INORGANIC CHEMISTRY

A. Semi-micro qualitative analysis (using H_2S or other methods) of mixtures - not more than four ionic species (two anions and two cations, excluding interfering, insoluble salts) out of the following:

Cations : NH_4^+ , Pb^{2+} , Bi^{3+} , Cu^{2+} , Cd^{2+} , Fe^{3+} , Al^{3+} , Co^{2+} , Ni^{2+} , Mn^{2+} , Zn^{2+} , Ba^{2+} , Sr^{2+} , Ca^{2+} , Na^+
 Anions : CO_3^{2-} , S^{2-} , SO_3^{2-} , $S_2O_3^{2-}$, NO_2^- , CH_3COO^- , Cl^- , Br^- , I^- , NO_3^- , SO_4^{2-}

(Spot tests may be carried out wherever feasible)

B. Acid-Base Titrations

- Standardization of sodium hydroxide by oxalic acid solution.
- Determination of strength of HCl solution using sodium hydroxide as intermediate.
- Estimation of carbonate and hydroxide present together in mixture.
- Estimation of carbonate and bicarbonate present together in a mixture.
- Estimation of free alkali present in different soaps/detergents

C. Redox Titrations

- Standardization of $KMnO_4$ by oxalic acid solution.
- Estimation of Fe(II) using standardized $KMnO_4$ solution.
- Estimation of oxalic acid and sodium oxalate in a given mixture.
- Estimation of Fe(II) with $K_2Cr_2O_7$ using internal (diphenylamine, anthranilic acid) and external indicator.

D. Iodo / Iodimetric Titrations

- Estimation of Cu(II) and $K_2Cr_2O_7$ using sodium thiosulphate solution iodimetrically.
- Estimation of (a) arsenite and (b) antimony iodimetrically.

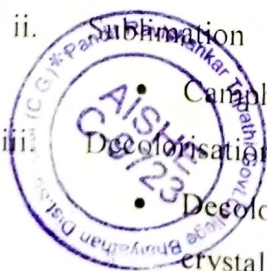


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- Estimation of available chlorine in bleaching powder iodometrically.
- Estimation of Copper and Iron in mixture by standard solution of $K_2Cr_2O_7$ using sodium thiosulphate solution as titrants.

ORGANIC CHEMISTRY

1. Demonstration of laboratory Glasswares and Equipments.
2. Calibration of the thermometer. $80^\circ-82^\circ$ (Naphthalene), $113.5^\circ-114^\circ$ (Acetanilide), $132.5^\circ-133^\circ$ (Urea), 100° (Distilled Water.)
3. Purification of organic compounds by crystallization using different solvents.
 - Phthalic acid from hot water (using fluted filter paper and stemless funnel).
 - Acetanilide from boiling water.
 - Naphthalene from ethanol.
 - Benzoic acid from water.
4. Determination of the melting points of organic compounds.
 Naphthalene $80^\circ-82^\circ$, Benzoic acid $121.5^\circ-122^\circ$, Urea $132.5^\circ-133^\circ$, Succinic acid $184.5^\circ-185^\circ$, Cinnamic acid $132.5^\circ-133^\circ$, Salicylic acid $157.5^\circ-158^\circ$, Acetanilide $113.5^\circ-114^\circ$, m-Dinitrobenzene 90° , p-Dichlorobenzene 52° , Aspirin 135° .
5. Effect of impurities on the melting point – mixed melting point of two unknown organic compounds.
 - Urea – Cinnamic acid mixture of various compositions (1:4, 1:1, 4:1).
6. Determination of boiling point of liquid compounds. (boiling point lower than and more than $100^\circ C$ by distillation and capillary method).
 - Ethanol 78° , Cyclohexane 81.4° , Toluene 110.6° , Benzene 80° .
 - i. Distillation (Demonstration)
 - Simple distillation of ethanol-water mixture using water condenser.
 - Distillation of nitrobenzene and aniline using air condenser.
 - ii. Sublimation
 - Camphor, Naphthalene, Phthalic acid and Succinic acid.
 - iii. Decolorisation and crystallization using charcoal.
 - Decolorisation of brown sugar with animal charcoal using gravity filtrations
 - Crystallization and decolorisation of impure naphthalene (100 g of naphthalene mixed with 0.3 g of Congo red using 1 g of decolorizing carbon) from ethanol.
7. Qualitative Analysis



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Detection of elements (N, S and halogens) and functional groups (Phenolic, Carboxylic, Carbonyl, Esters, Carbohydrates, Amines, Amides, Nitro and Anilide) in simple organic compounds.

PHYSICAL CHEMISTRY

1. Surface tension measurements.

- Determine the surface tension by (i) drop number (ii) drop weight method.
- Surface tension composition curve for a binary liquid mixture.

2. Viscosity measurement using Ostwald's viscometer.

- Determination of viscosity of aqueous solutions of (i) sugar (ii) ethanol at room temperature.
- Study of the variation of viscosity of sucrose solution with the concentration of solute.
- Viscosity Composition curve for a binary liquid mixture.

3. Chemical Kinetics

- To determine the specific rate of hydrolysis of methyl/ethyl acetate catalysed by hydrogen ions at room temperature.
- To study the effect of acid strength on the hydrolysis of an ester.
- To compare the strengths of HCl & H₂SO₄ by studying the kinetics of hydrolysis of ethyl acetate.

4. Colloids

- To prepare colloidal solution of silver nanoparticles (reduction method) and other metal nanoparticles using capping agents.

Note: Experiments may be added/ deleted subject to availability of time and facilities




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PRACTICAL EXAMINATION

05 Hrs.
M.M. 50

Three experiments are to be performed

1. Inorganic Mixture Analysis, four radicals two basic & two acid (excluding insoluble, Interfering & combination of acid radicals) OR Two Titrations (Acid-Bases, Redox and Iodo/Iodimetry)

12 marks

2. Detection of functional group in the given organic compound and determine its MPt/BPt.

8 marks

OR

Crystallization of any one compound as given in the prospectus along with the determination of mixed MPt.

OR

Decolorisation of brown sugar along with sublimation of camphor/ Naphthlene.

3. Any one physical experiment that can be completed in two hours including calculations.

14 marks

4. Viva

10 marks

5. Sessionals

06 marks

In case of Ex-Students two marks will be added to each of the experiments

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