VIVEKANANDHA

COLLEGE OF ARTS AND SCIENCES FOR WOMEN [AUTONOMOUS]

An ISO 9001:2008 Certified Institution,
Affiliated to Periyar University, Salem,
(Approved by AICTE and Re-Accredited with 'A' Grade by NAAC,
Recognized Under 2(f) and 12(b) of UGC Act, 1956).
Elayampalayam, Tiruchengode - 637 205, Namakkal Dt., Tamilnadu, INDIA.

DEPARTMENT OF CHEMISTRY

BACHELOR OF SCIENCE (B.Sc.)

VICAS

CHEMISTRY

B.Sc., CHEMISTRY

REGULATIONS AND SYLLABUS

[FOR CANDIDATES ADMITTED FROM 2018-19 ONWARDS UNDER AUTONOMOUS – CHOICE BASED CREDIT SYSTEM (CBCS) & OUTCOME BASED EDUCATION (OBE) PATTERN]

VIVEKANANDHA EDUCATIONAL INSTITUTIONS FOR WOMEN * 1992 * WOMEN EMPOWERMENT

SPONSORED BY

ANGAMMAL EDUCATIONAL TRUST

Elayampalayam – 637 205, Tiruchengode Tk., Namakkal Dt., Tamil Nadu.
Veerachipalayam - 637 303, Sankari Tk., Salem Dt., Tamil Nadu.
Tel. : 04288 234670 (4 lines), Mobile : 64437 34670, Fax : 04288 234894
Website : www.vivekanandha.ac.in email : vivekaadmission@gmail.com

About the College

Vivekanandha College of Arts and Sciences for Women (Autonomous) was established and hailed into Women's Educational Service in the Year 1995. Angammal Educational Trust Chaired by the great Educationalist 'Vidhya Rathna' Prof. Dr. M. KARUNANITHI, B.Pharm., M.S., Ph.D., D.Litt., sponsors this college and other institutions under the name of the great Saint Vivekanandha. Our institutions are situated on either side of Tiruchengode-Namakkal Main Road at Elayampalayam, 6 kms away from Tiruchengode. This is biggest women's college in India with more than 7500 girl students and more than 18 departments. The strength of the college was just 65 at the time of its establishment. With the dedication, work, sacrifice and long vision of the chairman, this institution has grown into a Himalaya stage. As a result of which UGC, New Delhi, awarded 2f and 12b, extended Autonomous status for second cycle. The National Assessment and Accreditation Council reaccredited with grade 'A' for its successful performance.

As an Autonomous Institution, academic professionals of the college framed Curriculum and Syllabi in consultation with all its stakeholders to cater the needs of the young women to fulfill the women empowerment and present Industrial needs to the local benefits. The students are empowering with confidence and required skills to face the society.

Quality Policy

To provide professional training by establishing a high level center of learning that provides quality education at par with the international standards and Provide excellence education with well equipped infrastructure to all the rural women.

Our Vision

To be an academic institution exclusively for women, in dynamic equilibrium with the social and economic environment, strive continuously for excellence in education, research and technological service to the nation.

Our Mission

The mission of our institution is to discover, teach and apply knowledge for the intellectual, cultural, ethical, social and economic growth of women students.

REGULATIONS

I SCOPE OF THE COURSE

The uniqueness of the B.Sc. (Chemistry) program is its content and topic coverage, the teaching methodology and the faculty. The program expects a serious commitment of the students to take up challenging study schedules and assignments. The course involves a blend of theoretical education and practical training which run concurrently for a period of three years and equips a student with knowledge, ability, skills and other qualities.

The teaching methodologies include classroom lectures, industrial visits, orientation and internship. The new syllabus may help the students to understand the newer aspects of chemistry and apply the same to the real life situations. Thus the students turn more relevant and resourceful to the society. It may enable the young minds think differently and forms a link between old ideas and new ideas in chemistry and gives comprehensive approaches to the very learning process and the learners. To have academic flexibility we have chosen and implemented Choice Based Credit System (CBCS) in our syllabus. To enhance the quality of students from 2018-2019, we have implemented Outcome Based Education (OBE) education system for I UG students. The OBE pattern will be extended for the II UG and III UG students forth coming years.

II. SALIENT FEATURES

- ✓ Course is specially designed for a higher level career placement.
- ✓ Special guest lectures from industrialists will be arranged.
- ✓ Exclusively caters to students interested in pursuing higher studies.
- ✓ Special industry orientations and training are parts of the degree course.

III. OBJECTIVES

The new syllabus throws light on the recent and emerging areas of

chemistry.

- ✓ Enable the students to understand chemistry and make them more relevant to the society.
- ✓ Develop the analytical ability in students so that they themselves prepared in solving problems.
- ✓ Help the students to learn practical skills in a better way.
- ✓ Inculcate research aptitude among the students.
- ✓ Enable the students to go to higher levels of learning chemistry.
- ✓ Improve the employability of the students.
- ✓ Inspire the students to apply their knowledge gained for the development of society in general and individuals in particular.

IV. ELIGIBILITY FOR ADMISSION

A candidate who has passed Higher secondary examination of Tamil nadu Higher secondary board or an examination of some other board accepted by the syndicate as equivalent there to with Chemistry and Physics and any one of the subjects namely Maths, Botany, Zoology or Biology, Home science shall be eligible for admission into B.Sc., course in chemistry.

V. DURATION OF THE COURSE

- ➢ The course shall extend over a period of three academic years consisting of six semesters. Each academic year will be divided into two semesters. The first semester will consist of the period from July to November and the second semester from December to April.
- ➢ The subjects of the study shall be in accordance with the syllabus prescribed from time to time by the Board of Studies of Vivekanandha College of Arts and Sciences for Women (Autonomous), Tiruchengode with the approval of Periyar University, Salem.
- ➢ Each subject will have required hours of lecture per week apart from practical training.

VI ASSESSMENT

Assessment of the students would be made through Continuous Internal Assessment (CIA) and External Assessment (EA) for passing each subject both theory and practical papers.

A candidate would be permitted to appear for the External Examination only on earning 75 % of attendance and only when her conduct has been satisfactory. It shall be open to grant exemption to a candidate for valid reasons subject to conditions prescribed.

A. CONTINUOUS INTERNAL ASSESSMENT (CIA)

The performance of the students will be assessed continuously by the teacher concern and the Internal Assessment Marks will be as follows:

Distribution Of Continuous Assesment Marks (Theory-25/Practical-40)

Activity (Theory)	Period (WD)	Marks (25)	Activity (Practicals)	Marks (40)
Attendance	90	5	Attendance	5
CA Test I	30 to 35	2.5	Review I	5
CA Test II	60 to 65	2.5	Review II	5
Model	After 90	10	Model Practical Examination	10
Assignment	15 to 20	1	Observation note	10
Poster	30 to 35	1	Results in lab/Work	5
PowerPoint	45 to 50	1		
Skit	60 to 65	1		
Group discussion	65 to 70	1		
Total		**25**		**40**

Distribution of attendance mark

S. No.	Percentage	Marks	
		Theory	Practical
1	76-80	1	2
2	81-85	2	4

3	86-90	3	6
4	91-95	4	8
5	96-100	5	10

B. EXTERNAL ASSESSMENT (EA)

The performance of the students would be assessed by examination at the end of each semester with a written test for theory for three hours and practical examination at the end of even semesters for six hours. Question papers would be set by the selected external examiners in the prescribed format and valuated by the external examiners with the help of the teacher concern.

The pattern of assessment is as follows:

Distribution Of Final Assesment Marks (75/60)

Section	**Activity**	**Marks (75)**	**Activity**	**Marks (60)**
A	One mark (20)	20	Record work	5
B	Five marks (Either or)	25	Viva Voce	5
C	Ten marks (3/5)	30	Spotter	20
			Major (Performance)	5
			Major (Result)	5
			Major (Writeup)	10
			Minor (Performance)	2
			Minor (Result)	3
			Minor (Writeup)	5
Total		**75**	**Total**	**60**

VII. PASSING MINIMUM

INTERNAL

There is no passing minimum for CIA

EXTERNAL

In the End Semester Examinations, the passing minimum shall be 30 out of 75 Marks for theory (40 %) and 24 out of 60 marks for practical (40 %).

VIII. CLASSIFICATION OF SUCCESSFUL CANDIDATES

1. Successful candidates passing the examination of core and allied papers and securing
   - **a)** 75 % and above shall be declared to have passed the examination in first class with distinction provided they pass all the examinations prescribed for the course at first appearance itself.
   - **b)** 60% and above shall be declared to have passed the examinations in first class.
   - **c)** 50% and above but below 60% shall be declared to have passed the examinations in second class.
2. All the remaining successful candidates shall be declared to have passed the examinations in third class.
3. Candidates who pass all the examinations prescribed for the course at the first appearance itself and within a period of three consecutive academic years from the year of admission only will be eligible for ranking purpose.

IX. ELIGIBILITY FOR AWARD OF THE DEGREE

A candidate shall be eligible for the award of the degree only if she has undergone the above degree for a period of not less than three academic years comprising of six semesters and passed the examinations prescribed and fulfiled the conditions prescribed.

X. PROCEDURE IN THE EVENT OF FAILURE

If a candidate fails in a particular subject, she may reappear for the End Semester Examination in the concerned subject in subsequent semesters and shall pass the examination.

XI. COMMENCEMENT OF THESE REGULATIONS

These regulations shall take effect from the academic year 2017-18.

XII. COURSE PATTERN

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)
SYLLABUS FRAME WORK

Subjects	Inst. Hour/Week	Credit	Exam Hours	Internal	External	Total Marks	Subjects	Inst. Hour/Week	Credit	Exam Hours	Internal	External	Total Marks
YEAR I													
Semester I							**Semester II**						
Language I & 18U1LT01	4	3	3	25	75	100	Language II & 18U2LT02	4	3	3	25	75	100
English I & 18U1LE01B	4	3	3	25	75	100	English II & 18U2LE02B	4	3	3	25	75	100
Core I & 18U1CHC01	5	5	3	25	75	100	Core II & 18U2CHC02	4	5	3	25	75	100
Core I Practical & 18U2CHCP01	4	0	3	40	60	100	Core I Practical & 18U2CHCP01	4	4	3	40	60	100
Allied I & 18U1PHA01	5	5	3	25	75	100	Allied II & 18U2PHA02	4	5	3	25	75	100
Allied I Practical & 18U2PHAP01	4	0	3	40	60	100	Allied I Practical & 18U2PHAP01	4	4	3	40	60	100
Valued added course & 18U1VE01	2	2	3	25	75	100	Valued added course &18U2ES01	4	4	3	25	75	100
Library	1	0	0	0	0	0	Library	1	0	0	0	0	0
Sports	1	0	0	0	0	0	Sports	1	0	0	0	0	0
Total	**30**	**18**	**21**	**205**	**495**	**700**	**Total**	**30**	**28**	**21**	**205**	**495**	**700**
I YEAR TOTAL									**46**	**42**	**410**	**990**	**1400**
YEAR II													
Semester III							**Semester IV**						
Language III & 18U3LT03	4	3	3	25	75	100	Language IV & 18U4LT04	4	3	3	25	75	100
English III & 18U3LE03B	4	3	3	25	75	100	English IV & 18U4LE04B	4	3	3	25	75	100
Core III & 18U3CHC03	5	5	3	25	75	100	Core IV & 18U4CHC04	5	5	3	25	75	100
Core II Practical & 18U4CHCP02	4	0	3	40	60	100	Core II Practical & 18U4CHCP02	4	4	3	40	60	100
Allied III & 18U3MAA01	5	5	3	25	75	100	Allied IV & 18U4MAA02	5	5	3	25	75	100
Allied II Practical & 18U4MAAP01	4	0	3	40	60	100	Allied II Practical & 18U4MAAP01	4	4	3	40	60	100
NMEC I & 18U3PHN01	2	2	3	25	75	100	NMEC II & 18U4PHN02	2	2	3	25	75	100
Library	1	0	0	0	0	0	Library	1	0	0	0	0	0
Sports	1	0	0	0	0	0	Sports	1	0	0	0	0	0

Total	30	18	21	205	495	700	Total	30	26	21	205	495	700
II YEAR TOTAL									**90**	**84**	**820**	**1980**	**2800**
YEAR III													
Semester V							**Semester VI**						
Core V & 18U5CHC05	5	5	3	25	75	100	Core VIII & 18U6CHC08	5	5	3	25	75	100
Core VI & 18U5CHC06	5	5	3	25	75	100	Core IX & 18U6CHC09	5	5	3	25	75	100
Core III Practical & 18U6CHCP03	3	0	3	40	60	100	Core III Practical & 18U6CHCP03	3	4	3	40	60	100
Core IV Practical & 18U6CHCP04	5	0	3	40	60	100	Core IV Practical & 18U6CHCP04	4	5	3	40	60	100
Core VII & 18U5CHC07	5	5	3	25	75	100	Core X & 18U6CHC10	5	5	3	25	75	100
EC I & 18U5CHE01	3	3	3	25	75	100	Elective II & 18U6CHE02	4	3	3	25	75	100
SBEC I & 18U5CHS01	3	2	3	25	75	100	SBEC II & 18U6CHS02	3	2	3	25	75	100
Library/Sports	1	0	0	0	0	0	Library/Sports	1	0	0	0	0	0
							Extension work	0	1	0	0	0	100
Total	**30**	**20**	**29**	**245**	**555**	**800**	**Total**	**30**	**30**	**23**	**21**	**205**	**495**
TOTAL CREDIT FOR THE COURSE									**140**	**126**	**1230**	**2970**	**4200**

Distribution Of Duration And Credit Under Different Papers

Part	Paper	Hours/Week	Weeks/Semester	Hour/Paper	No. of Papers	Credit/Paper	Total Hours	Total credit
I	**Language**	4	15	60	4	3	240	12
II	**English**	4	15	60	4	3	240	12
III	**Core paper**	5	15	75	10	5	600	50
III	**Core practical**	4	15	75	4	4/5	600	17
III	**Allied**	5	15	60	4	5	240	20
III	**Allied practical**	4	15	60	2	4	240	8
IV	**Value Education**	6	15	15	2	3	30	6
IV	**SBEC**	3	15	30	3	2	120	6
III	**Elective**	4	15	60	1	4	120	4
IV	**NMEC**	2	15	30	2	2	60	4
IV	**Extension work**	1	15	15	1	1	15	1
TOTAL								**140**

XIII. BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN

K1-Remember; **K2**- Understanding; **K3**- Apply; **K4**-Analyze; **K5**- Evaluate

1. Theory: 75 Marks

(i)Test - I & II and ESE:

Knowledge Level	Section	Marks	Description	Total
K1	A (Answer all)	20 x 01 =20	MCQ/Define	75
K2	B (Either or pattern)	05 x 05=25	Short Answers	
K3& K4	C (Answer 3 out of 5)	03 x 10=30	Descriptive/ Detailed	

Programme Outcomes

PO1:Disciplinary knowledge:Capable of demonstratingcomprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.

PO2:Communication Skills:Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one‟s views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.

PO3: Critical thinking:Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefson the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theoriesby following scientific approach to knowledge development.

PO4:Problem solving:Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one‟s learning to real life situations.

PO5: Analytical reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesise data from a variety of sources; drawvalid conclusions and support them with evidence and examples, and addressing opposing viewpoints.

PO6: Research-related skills: A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesising and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.

PO7:Cooperation/Team work: Ability to work effectively and respectfully with diverse teams;facilitate cooperative or coordinated effort on the part of a group,and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.

PO8:Scientific reasoning: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.

PO9:Reflective thinking: Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.

PO10: Information/digital literacy: Capability touse ICT in a variety of learning situations, demonstrate abilityto access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.

PO11:Self-directed learning: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.

PO12: Multicultural competence: Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.

PO13: Moral and ethical awareness/reasoning: Ability toembrace moral/ethical values in

conducting one‟s life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstratingthe ability to identify ethical issues related to one‟s work, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adoptingobjective, unbiased and truthful actions in all aspects of work.

PO14: Leadership readiness/qualities: Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth andefficient way.

PO15: Lifelong learning:Ability to acquire knowledge and skills, including „learning how to learn‟, that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed atpersonal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling

Programme Specific Outcomes

PS01: To foster a theoretical and practical knowledge on chemistry and its applications and to make responsible citizenships.

PS02: To deliver core and advanced courses on the applied chemistry.

PS03: To deepen learner-capacity for productive scientific thinking both within and beyond the classroom through extensive programmes.

PS04: To cultivate problem solving skills through chemical knowledge to address environmental problems, and to complement and reflect on social needs.

PS05: To develop innovative thinking, generate creative ideas towards scientific knowledge through well-structured seminars and assignments.

SEMESTER I

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Chemistry)	
Course Code	18U1CHC01	**Title**	**Batch**	2018-2021
		Part III Group-A. Core I – General Chemistry - I	**Semester**	I
Hrs/Week	6		**Credits**	05

Course Objective

1. To learn about the fundamentals of chemistry and principles of various topics.
2. To learn about the outline of basic concepts of organic chemistry.
3. To critique errors and titrimetry.

Course Outcomes (CO)

K1,k3	CO1	Students understand the periodic properties and electronic configurations of s, p, d and f block elements.
K2	CO2	Students gain an insight into basic chemical concepts in organic chemistry.
K3	CO3	Students apply the different chemical concepts to different gaseous system and real time problems.
K4	CO4	Students analyze the various atom models.
K5	CO5	Students evaluate the magnitude of various possible errors in volumetric analysis.

UNIT–I Electronic structure and periodic properties (15 Hours)

Quantum numbers and their significance, Pauli's exclusion principle, Hund's rule, Aufbau principle, Extra stability of half-filled and completely filled orbital, Electronic configuration of atoms. Modern periodic law, Long form of periodic table, cause of periodicity, division of elements into s, p, d, and f blocks. Variation of atomic radius, ionic radius, ionization energy, electron affinity and electro negativity along the periods and the groups- Factors affecting ionization energy and electro negativity.

SELF-STUDY: Various scales of electronegativity

PRACTICAL WORK: List out elements having half filled and completely filled orbital

UNIT–II Basic concepts in organic chemistry (15 Hours)

Covalent bonding – Concept of hybridization – Structure of organic molecules based on sp^3, sp^2 and sp hybridization – Covalent bond properties of organic molecules: bond length, bond angle, bond energy, bond polarity, dipole moment. Electron Displacement effects: Inductive, Mesomeric, Electromeric and Hyperconjugative effects. Reactive intermediates – carbocations – carbanions – free radicals with examples.

SELF-STUDY: Acid character of different acid on the basis of inductive effect.
PRACTICAL WORK: Find out the hybridization and geometry of benzene and ethane.

UNIT–III Gaseous State (15 Hours)

Postulates of kinetic theory of gases, derivation of kinetic gas equation, ideal gas equation, Boyle's law, Charles law, Graham's law of gaseous diffusion and Dalton's law of partial pressure. Maxwell's distribution of molecular velocities (no derivation), Root mean square, average and most probable velocity, Collision diameter, collision frequency, collision number and mean free path.

Deviations of real gases from ideal behavior - Derivation of Vander Waal's equation for real gases. Critical phenomena: PV isotherms of real gases, continuity of states, critical constants, relationship between critical and Vander Waal's constants, determination of critical volume, the principle of corresponding states, liquefaction of gases.

SELF-STUDY: Work out problem on collosion diameter ,frequency and number.
PRACTICAL WORK: Write gas equations for real gas other than Van der Waals equation.

UNIT–IV Basic Quantum Chemistry (15 Hours)

CGS and SI units – Basic units – derived units – subsidiary units –Quantum theory and atomic spectra – Bohr's model of atom – Limitations of Bohr model –Somerfield's model – photoelectric effect -Compton effect – de Broglie equation –Davisson and Germer experiment – Heisenberg's uncertainty principle – Schrodinger's wave equation (statement only) – Eigen values - Eigen function –Significance of ψ and ψ^2 – Radial and angular distribution function – Concept and Shapes of orbital - Differences between orbit and orbital.

SELF-STUDY: Practice to write Electronic configuration
PRACTICAL WORK: Write the expression for particle in 1D & 3D box.

UNIT–V Error Analysis (15 Hours)

Errors and its types - Significant figure, Definitions of molarity, molality, normality and mole fraction. Titration - Back titration - Equivalence point – Indicator – Standard solution - Primary and secondary standards - Types of titrations - Acid-base and redox. Analysis of basic radicals: Group separation and confirmatory tests for basic radicals.

SELF-STUDY: Basics of volumetric titrations
PRACTICAL WORK: How to prepare 0.1M HCl and 0.5N NaOH.

TOTAL: **75 Hrs.**

Power point Presentations, Seminar ,Quiz, Assignment

TEXT BOOKS

1. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (33rd edition), Vishal publishing co., (2017).
2. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry, (47th edition), Vishal publishing co., (2017).
3. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (22nd edition), New Delhi, S. Chand & Co., (2016).

REFERENCE BOOKS

1. Morrison R.T. and Boyd R.N., Organic Chemistry (7th Edition), Pearson Education, India (2010).
2. Madan. R. D., Inorganic Chemistry (3rd edition), New Delhi, S. Chand and Co., (2012).
3. Mukherji. S. M, Singh. S. P, Kapoor. R.P, Organic Chemistry volume – I (4th edition) New age International (p) limited (1998).

WEB SOURCES:

1. https://chem.libretexts.org/Core/Inorganic_Chemistry/Descriptive_Chemistry/Periodic_Trends_of_Elemental_Properties/Periodic_Properties_of_the_Elements.
2. unicorn.ps.uci.edu/M3LC/lectures/LectureWeek1.pdf

Mapping

PO/PSO AND CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1					S					
CO2					S					
CO3										S
CO4					S					
CO5			S			S				

SEMESTER – II

Programme code	B.Sc.,	Programme Title		Bachelor of Science (CHEMISTRY)
Course Code	18U2CHC02	Title	Batch	2018-2021
		Part III Group-A. Core II – General Chemistry - II	Semester	II
Hrs/Week	6		Credits	05

Course Objective

1. To gain knowledge about shapes of inorganic molecules and metallurgy.
2. Acquire the knowledge about hydrocarbons.
3. To study about liquids and liquid crystals.

Course Outcomes (CO)

K1	CO1	Students evaluate the shapes of simple covalent molecules.
K2	CO2	Students design the methods of extraction, separation and purification of metals from its corresponding ore.
K3	CO3	Students identify the methods of preparation and properties of alkanes and alkenes.
K4	CO4	Students assess the classification and reaction of dienes and alkynes.
K5	CO5	Students identify the various properties of liquids and liquid crystals.

UNIT–I Chemical bonding (15 Hours)

Ionic bond- factors influencing the formation of ionic bond- characteristics of ionic compounds- lattice energy and its determination using Born-Haber Cycle. Covalent bond- factors influencing the formation of bond- characteristics of covalent compounds -partial ionic character in covalent compounds- polarization of ions- Fajan's rule and its applications. VSEPR theory- explanation of shapes of simple covalent molecules such as NH_3, H_2O, CH_4. Molecular orbital theory- molecular orbital configuration of homo nuclear diatomic molecules- H_2, He_2, F_2, O_2 and hetero nuclear molecular orbital - CO and NO.

SELF-STUDY: Study geometry of molecules which is deviated from regular geometry.
PRACTICAL WORK: How to find out bond order, para- and dia-magnetic molecules.

UNIT II Metallurgy (15 Hours)

Occurrence of metals - various steps involved in the metallurgical processes. Concentration of ore by froth floatation-gravity separation-magnetic separation processes. Calcination- Roasting - smelting- Alumino thermic process. Purification of metals by electrolysis - zone refining. Extraction of Al, Cu, Fe and U.

SELF-STUDY: Terms of metallurgy like ore ,minerals ,Slag,matte etc..
PRACTICAL WORK: To study the chemical properties of Al, Cu and Fe.

UNIT – III Alkanes and Alkenes (15 Hours)

Petroleum source of alkanes – Methods of preparing alkanes – Chemical properties. Mechanism of free radical substitution in alkanes by halogenation - Uses – Conformational study of ethane and n-butane. Cycloalkanes – nomenclature – methods of formation – chemical reactions, Baeyer's strain theory and its limitations. Alkenes- orbital model of double bond, chemical reactions of alkenes- mechanism of Electrophilic and free radical additions- Markovnikoff's rule, peroxide effect, hydroboration, ozonolysis and allylic substitution by NBS. Diels-alder reaction. Elimination reactions-mechanisms of E1 and E2 reactions-Hofmann and saytzeff rule.

SELF-STUDY: Draw and practice conformational isomers of substituted alkanes.
PRACTICAL WORK: Write markovnikoff's addition product of hydroboration

UNIT–IV Alkadiene and Alkynes (15 Hours)

Dienes- classification of dienes- isolated, conjugated, cumulated dienes, structure of allene and butadiene, 1, 2 and 1,4 addition. Orbital model of triple bond- chemical reactions of alkynes- acidity of alkynes- formation of acetylides- mechanism of Electrophilic and nucleophilic addition reactions of alkynes - hydrogenation, halogenation, hydrohalogenation, hydration, hydroboration - oxidation, Oxymercuration – Demercuration, metal ammonia reduction, oxidation and polymerization.

SELF-STUDY: Discuss the reaction of aliphatic diene and aromatic diene
PRACTICAL WORK:Alkynes are show acid nature-Why?

UNIT–V Liquid State (15 Hours)

Structure of liquids-Vapour pressure-Trouton's rule- Determination of Vapour pressure –dynamic and static method –Effect of temperature on vapour pressure -Surface tension-Surface energy surface active reagents-Some effects of surface tension-Viscosity-Effect of temperature on viscosity (Experimental determination of surface tension and viscosity not necessary). Refractive index - Specific refraction - Molar refraction - Optical activity. Liquid crystals (The mesomorphic state) - classification of liquid crystal smectic-nematic and cholestric liquid crystals.

SELF-STUDY: Basics of boilling point,freezing point and melting point.

PRACTICAL WORK: To know Effect of temperature on vapour pressure and Surface tension of different liquids.

TOTAL: **75 Hrs.**

Power point Presentations, Seminar ,Quiz, Assignment

TEXT BOOKS

4. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (33rd edition), Vishal publishing co., (2017).
5. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry, (47th edition), Vishal publishing co., (2017).
6. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (22nd edition), New Delhi, S. Chand & Co., (2016).

REFERENCE BOOKS

4. Morrison R.T. and Boyd R.N., Organic Chemistry (7th Edition), Pearson Education, India (2010).
5. Madan. R. D., Inorganic Chemistry (3rd edition), New Delhi, S. Chand and Co., (2012).
6. Mukherji. S. M, Singh. S. P, Kapoor. R.P, Organic Chemistry volume – I (4th edition) New age International (p) limited (1998).

WEB SOURCES:

1. https://www.khanacademy.org/science/biology/chemistry--of-life/chemical-bonds-and-reactions/v/ionic-covalent-and-metallic-bonds
2. https://www.cliffsnotes.com/study-guides/chemistry/organic-chemistry-i/structure-and-properties-of-alkanes/alkanes-physical-properties
3. https://chem.libretexts.org/
4. http://www.chem.tamu.edu/class/fyp/mcquest/mcquest.html
5. http://nptel.ac.in/courses/104103069/15

Mapping

PO/PSO AND CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S					S				
CO2			S				S			
CO3			S					S		
CO4		S						S		
CO5			S							S

SEMESTER - II

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Chemistry)	
Course Code	**18U2CHCP01**	**Title**	**Batch**	2018-2021
		Part III Group-A.	**Semester**	II
Hrs/Week	3	Core Practical - I	**Credits**	05

Course Objective

1. To understand the principles of volumetric analysis.
2. To know about different types of volumetric titrations.
3. To enable the students to have hands-on training on preparation of simple inorganic complexes.

Course Outcomes (CO)

K1	CO1	Students will learn how to make solutions and do the titrations with different kinds.
K2	CO2	Students will understand reactions taking place during the experiment.
K3	CO3	The students will be able to apply the knowledge about nature, significance, and influence of errors and to be avoided or minimized during quantitative examination of experiment.
K4	CO4	Students will analyze the given samples volumetrically
K5	CO5	To evaluate the known techniques to prepare, recrystallize and finding melting point of simple inorganic compound.

VOLUMETRIC ESTIMATIONS

I. Acidimetry

1. Estimation of sodium hydroxide-standard sodium carbonate.
2. Estimation of hydrochloric acid- standard oxalic acid.
3. Estimation of Oxalic acid –standard-oxalic acid.

II. Permanganometry

4. Estimation of oxalic acid-std-Mohr's salt or ferrous sulphate.
5. Estimation of sodium nitrite-standard oxalic acid.
6. Estimation of ferrous ion.

III. Iodometry

7. Estimation of copper-standard Potassium dichromate.
8. Estimation of Potassium dichromate-standard potassium dichromate.

IV. Dichrometry

9. Estimation of ferric ion using diphenyl amine/N-Phenylanthranilic acid as indicator.

INORGANIC PREPARATIONS

1. Micro-Cosmic salt.
2. Potassium trioxalatochromate(III)
3. Ferrous Ammonium sulphate.
4. Tetramminecopper sulphate(II)
5. Tris thiourea copper chloride(I)

CONTENT BEYOND THE SYLLABUS

1. Estimate the hardness of water using EDTA.
2. Estimation of sulphuric acid- standard oxalic acid

TEXT BOOK

1. V. Venkateswaran, R. Veeraswamy and A.R.Kulandaivelu, Basic Principles of Practical Chemistry, New Delhi, S.Chand & Co, (1995).

REFERENCE BOOKS

1. Pandey O. P, Bajpai D. N., Giri S., Practical Chemistry, New Delhi, S.Chand & Co, (2012)

ONLINE SOURCES

1. https://byjus.com/chemistry/volumetric-analysis/
2. https://chem.libretexts.org

Mapping

PO/PSO AND CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1		S						S		
CO2			S			S				
CO3		S				S				
CO4			S				S			
CO5			S					S		

SEMESTER - I

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Biochemistry)	
Course Code	**18U1CHA01**	**Title**	**Batch**	2018-2021
		Part III Group-A. Allied Chemistry - I	**Semester**	II
Hrs/Week	5		**Credits**	05

OBJECTIVES

1. To impart knowledge in formation of molecule from atoms and various organic reaction mechanism.
2. To prepare students for a carrier in chemical industries.
3. To acquire basic knowledge in fundamental aspects of practical chemistry.

K1	CO1	Students learn about bonding, anti bonding, non bonding and Interhalogen compounds.
K2	CO2	Students acquire knowledge about the fundamental concepts of acid and base and to determine the hardness of water.
K3	CO3	Students able to apply the knowledge to prepare various concentration of solution.
K4	CO4	Students understand about the various antibiotics and drugs.
K5	CO5	Students evaluate the characteristics of soil, fertilizers and pesticides.

UNIT-I : Chemical bonding and Aromaticity (15 Hours)

1.1.Chemical Bonding –Definition- types -Ionic bond and covalent bond, hydrogen bond - formation and characteristics properties -bond order- magnetic properties.

1.2. Structure of NaCl, CaF_2

1..3 MO theory--bonding in H_2, O_2, N_2 using MO theory -bonding -bond order- magnetiic properties.

1..4 Aromaticity –Huckels rule-types –Examples.

SELF-STUDY: discuss chemical bonding types and aromatic characters
PRACTICAL WORK: bond order changes – why

UNIT-II: Acid and Base theory (15 Hours)

2.1. Arrhenius concept - Lowry-bronsted theory -Lewis acid and base theory – Conjugated Acid and base-Strength of an Acid and base.

2.2.Principle and Classification of Hard acid and Base –Soft Acid and base (HSAB) .

2.3 Acidity of water – Alkalinity-PH –hardness of water- types of hardness -methods RO and Zeolite process.

SELF-STUDY:concepts of acid and base
PRACTICAL WORK: water analysis

UNIT-III: Volumetric analysis (15 Hours)

3.1.Law of Volumetric analysis- Definitions of molarity, molality, normality and mole fraction.

3.2.Titration - Back titration - Equivalence point – Indicator – Standard solution - Primary and secondary standards- Types of titrations - Acid-base and redox.

SELF-STUDY: fundamentals of titrations
PRACTICAL WORK: standard solution preparation

UNIT-IV: Pharmaceutical Chemistry-I (15 Hours)

4.1.Definition of the terms – Drug, Pharmacy, Pharmacophore, Pharmacodynamics and Pharmacopoeia.

4.2.Antibiotics - Definition, classification – broad and narrow spectrum antibiotics. penicillin, chloramphenical and erythromycin - structure and uses (structure elucidation not needed).

4.3.Sulpha drugs- preparation of sulphaguanine and sulphathiazole. Mechanism and mode of action of sulpha drugs.

SELF-STUDY: antibiotics structures
PRACTICAL WORK: medical treatment

UNIT-V:**AgriculturalChemistry (15 Hours)**

5.1.Soil types-red soil, black soil, alluvial soil, desert soil, red soil; role of humus: Manures and their importance.

5.2.Chemical fertilizers: Natural and synthetic fertilizers: Classification of NPK fertilizer-Preparation of Urea, Ammonium sulphate, Triple super phosphate potassium nitrate; role of macronutrients and micronutrients.

5.3.Pesticides: classification-insecticides, herbicides and fungicides; Structure of important pesticides: DDT, BHC.

SELF-STUDY: soil and fertilizers details
PRACTICAL WORK: analysis of natural

CONTENT BEYOND THE SYLLABUS

1. Discuss the factors affecting electophilic and nucleophilic substitution reaction.
2. List out various acid base indicator.
3. List out some other applicaations of chloramphenical and erythromycin.

TEXT BOOKS

1. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (33rd edition), Vishal publishing co., (2017).
2. Jayashree Ghosh .S, Fundamental concepts of Applied Chemistry, New Delhi, S. Chand & Co., (2008).
3. Sharma B.K., Industrial chemistry including chemical engineering (16th), Meerut, Krishnaprakasam media., (2011).
4. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (22nd edition), New Delhi, S. Chand & Co., (2016).
5. Dr.R.D.Madan, Modern inorganic chemistry,(3rd edition), New Delhi,S. Chand & Co., (2014).
6. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry (23rdedition) New Delhi, S. Chand &Co., (2004).

REFERENCE BOOKS

1. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry , (47th edition), Vishal publishing co., (2017).
2. Jayashree Ghosh, Text Book of Pharmaceutical Chemistry, S. Chand, New Delhi, (1999).

3. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (50th edition), New Delhi, S. Chand &Co., (2011).

ONLINE SOURCES

1. http://www.sparknotes.com/chemistry/bonding/molecularorbital/section1.rhtm
2. http://www.organic-chemistry.org/namedreactions/nucleophilic-substitution-sn1-sn2.shtm
3. http://www.soest.hawaii.edu/oceanography/courses/OCN633/Fall%202013/Titrimetry.pdf
4. https://chem.libretexts.org/

Mapping

PO/PSO AND CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	s		S		s	s	s			s
CO2	s		S		s	s	s			s
CO3	s	s	S		s	s	s			s
CO4	s	s	S	s						
CO5	s			s						

SEMESTER II

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Biochemistry)	
Course Code	**18U2CHA02**	**Title**	**Batch**	2018-2021
		Part III Group-A. Allied Chemistry - II	**Semester**	II/IV
Hrs/Week	5		**Credits**	05

OBJECTIVES

1. To compile students with various chromatography techniques and its applications towards industries and research laboratories.
2. To educate about the chemistry of bio-organic and bio-inorganic compounds and various kinds of drugs and its uses .
3. To revise about the qualitative analysis of organic compounds.

K1	CO1	Students predict the concept of various chromatographic techniques.
K2	CO2	Students identify the details of bio organic compounds and bio inorganic compounds.
K3	CO3	Students utilizate knowledge of antipyretics, analgesic, antiseptics, disinfectants and anesthetics
K4	CO4	Students analyze the structure of different haem proteins.
K5	CO5	Students evaluate the different pharmaceutically important compounds and their uses in real life.

UNIT-I: Chromatography (15 Hours)

1.1 Chromatography –definition-types- column, paper, thin layer –method of separation application-Difference between paper chromatography and thin layer chromatography.

1.2 High pressure liquid chromatography (HPLC)-principle-experimental techniques – instrumentation and advantages.

SELF-STUDY: Chromatography techniques
PRACTICAL WORK: layers working

UNIT-II: Amino acids and Carbohydrates (15 Hours)

2.1 Aminoacids- Preparation- Gabriel method, Strecker synthesis- Isoelectric point, Reactions of glycine. Polypeptide- Proteins- Classification- primary structure and its functions.

2.2 Carbohydrates-definition, Classification, Preparation and Reactions of glucose and fructose- Inter conversion of glucose to fructose and vice versa- sucrose and starch (structure only).

SELF-STUDY: peptides and glucose
PRACTICAL WORK: analysis of carbohydrates

UNIT-III: Bio-inorganic Chemistry (15 Hours)

Structure of chlorophyll, phorphyrin unit and photosynthesis. Nitrogen fixation, carbon cycle. structure of haem proteins: haemoglobin, myoglobin. Oxygen transport and respiration. Metallo enzymes, vitamins containing metals.

SELF-STUDY: iron compounds
PRACTICAL WORK: enzymes studies

UNIT-IV: Pharmaceutical Chemistry-II (15 Hours)

Structure and mode of action: Analgesics and Antipyretics-salicylic acid derivatives-aspirin, p-aminophenol derivatives- para acetamol and ibuprofen. Antiseptic and disinfectants-definition and distinction, crystal violet, acridine. Anaesthetics-definition, classification-local and general, preparation ,properties and uses of cocaine and benzo cocaine.

SELF-STUDY: antiseptics formation
PRACTICAL WORK: pharmacy details

UNIT-V: Organic Analysis (15 Hours)

Qualitative analysis of organic substances: test for saturation and unsaturation; aliphatic & aromatic; acidic and basic nature of organic compound; elements test for N, S and halogens: functional groups like acid, phenol, aldehyde, ketone, carbohydrate, amine, ester, amide and diamide.

SELF-STUDY: qualitative analysis
PRACTICAL WORK: estimations

CONTENT BEYOND THE SYLLABUS

1. List out stationary and mobile phases used in HPLC and TLC.
2. Make the discussion of secondary, tertiary and quaternary structure of protein
3. Write conformation tests for nitro compound and phenol.

TEXT BOOKS

1. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (50th edition), New Delhi, S. Chand & Co., (2011).
2. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry (23rdedition). New Delhi, S. Chand &Co., (2004).
3. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (19th edition), New Delhi, S. Chand & Co., (2010).
4. V. Venkateswaran, R. Veeraswamy and A.R.Kulandaivelu, Basic Principles of Practical Chemistry, New Delhi, S.Chand & Co, (1995).
5. Pandey.O.P, Bajpai.D.N., Giri.S., Practical Chemistry, New Delhi, S.Chand & Co, (2012).

REFERENCE BOOKS

1. Jayashree Ghosh .S, Fundamental concepts of Applied Chemistry, New Delhi, S. Chand & Co., (2008).
2. Sharma.B.K., Industrial chemistry including chemical engineering (16th) Meerut, Krishnaprakasam media. (2011).

ONLINE SOURCES

1. https://www.khanacademy.org/test-prep/mcat/chemical-processes/separations-purifications/a/principles-of-chromatography.
2. https://en.wikipedia.org/wiki/Carbohydrate.
3. https://chem.libretexts.org/

Mapping

PO/PSO AND CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1			s		s	s	s		s	
CO2	s	s					s		s	
CO3		s		s	s	s	s	s		
CO4	s		s		s	s			s	s
CO5		s		s					s	

SEMESTER – II

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Biochemistry)	
Course Code	**18U2CHAP01**	**Title**	**Batch**	2018-2021
		Part III Group-A. Allied Chemistry Practicals –I	**Semester**	II
Hrs/Week	3		**Credits**	05

Course Objective

1. To understand the principles of volumetric analysis.
2. To enable the students to have hands-on training on qualitative analysis of organic compounds. **Course Outcomes (CO)**

K1	CO1	Students will learn how to conduct a volumetric estimation process precisely. .
K2	CO2	Students will understand reactions taking place during the experiment.
K3	CO3	Students will plan, conduct, review and report the experiment.
K4	CO4	The students will learn the nature, significance, and influence of errors and how they may best be avoided or minimized during quantitative examination of a chemical compound. Students will gain knowledge about analysis of organic compounds.
K5	CO5	Students will evaluate the reactivity of various functional groups.

I. VOLUMETRIC ESTIMATIONS

I. Acidimetry

1. Estimation of sodium hydroxide-standard sodium carbonate.
2. Estimation of Oxalic acid –standard-oxalic acid.
3. Estimation of Hydrochloric acid – standard oxalic acid

II. Permanganometry

4.Estimation of oxalic acid-std-Mohr's salt or ferrous sulphate.

5.Estimation of sodium nitrite-standard oxalic acid.

6.Estimation of ferrous ion.

II. QUALITATIVE ORGANIC ANALYSIS

Systematic analysis of organic compounds:

Characterization of Organic compounds by their functional groups and confirmation by preparation of derivative.

Functional groups that may be studied:

Aldehydes, Ketones, carboxylic acids, aromatic primary amines, phenol, amide, diamide, nitro compounds and monosaccharides.

CONTENT BEYOND THE SYLLABUS

1. Estimate the hardness of water using EDTA.
2. Estimation of sulphuric acid- standard oxalic acid

TEXT BOOKS

1. V. Venkateswaran, R. Veeraswamy and A.R.Kulandaivelu, Basic Principles of Practical Chemistry, New Delhi, S. Chand & Co, (1995).

REFERENCE BOOKS

1. Pandey O. P, Bajpai D. N., Giri S., Practical Chemistry, New Delhi, S.Chand & Co, (2012).

ONLINE SOURCES

1. http://wwwchem.uwimona.edu.jm/lab_manuals/c10expt25.html
2. http://vlab.amrita.edu/?sub=2&brch=191&sim=345&cnt=1
3. http://amrita.olabs.edu.in/?sub=73&brch=8&sim=116&cnt=1

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc. DEGREE EXAMINATION - II SEMESTER

MODEL QUESTION- GENERAL CHEMISTRY – I

Time: 3 Hours Max. Marks: 75

PART – A (20 x1 = 20 Marks)
Answer all the questions

1. Which of the following has half fiiled stability

a) Fe b) Cr c) Mn d) Zn

2. Which of the following has the electronic configuration of $1s^2\ 2s^2\ 2p^6\ 3d^5\ 4s$

a)Mn b) Fe c) Co d) Cr

3. Which has the highest Ionisation potential

a) Na b) Mg c) Si d) P

4. For n=1, Write the values of l,m and s.

a) 1,0,±1/2 b) 0,0, ±1/2 c) 0,1, ±1/2 d) 1,1,±1/2

5. Which is having SP^3 Hybridisation.

a) C_4H_4 b) CH_2 c) C_2H_2 d) CH_4

6. Select the strong acid of the followings.

a) CH_3COOH b) $Cl_2CHCOOH$ c) Cl_3CCOOH d) $ClCH_2COOH$

7. which is the polar covalent bond.

a)H-H b)Cl-Cl c)H-F d)O=O

8. Choose the most stable carbocation.

a) CH_3^+ b) $CH_3CH_2^+$ c) $CH(CH_3)_2$ d)$C^+(CH_3)_3$

9. At STP 10 gm of a gas occupy 2 lit at what temp will volume become double.

a) 273K b) -273^0C c) 546K d) 546^0C

10. For a gas having n molecules per unit volume moving with a average speed of c m/sec and diameter σm the mean free path is

a) $\sqrt{2}\pi\sigma^2N$ b) $\sqrt{2}\pi\sigma^2CN$ c) $1/\sqrt{2}\ *\pi\sigma^2CN$ d)$1/\sqrt{2}\pi\sigma^2N$

11. If the mean free path of a gas at 760 torr is λ. What will be its value at 5 atm pressure.

a) λ/5 b) 5 λ c) 5 λ /760 d) λ^2.

12. The diameter of molecule B is half that of molecule A. The ratio of mean free path

(λ_A/λ_B) will be

a)1/2 b)1/4 c) 4 d) 2

13. The wave character of an electron was experimentally verified by

a) Einstein b) de droglie c) Germer d) Planck

14. Heisenberg's uncertainity principle precludes the exact simultaneous measurement of

a) charge density and probability b) position and momentum

c) position and direction d) velocity and energy

15. The de broglie relationship can be expressed as

a) $h = \lambda/mv$ b) $\lambda = h/mp$ c) $\lambda m = v/h$ d) $\lambda = h/mv$

16. The dumb- bell was the shape of

a) p- orbital b) s- orbital c) d-orbital d) f-orbital

17. Write the significant figure of 0.000274

a) 2.74×10^{-5} b) 2.74×10^{-4} c) 2.74×10^{-2} d) 2.74×10^{-3}

18. Normal solutions can be prepared with

a) molecular weight in grams b) molecular weight in litre

c) equivalent weight in grams d) atomic weight in grams

19. Give an example for acid-base titration

a) HCl vs NaCl b) NH_4OH vs NaOH C) HCl vs NaOH d) NH_3 vs HCl

20. What is the colour of phenolphthalein in basic medium.

a) orange b) yellow c)pink d)colourless

PART – B (5 x 5 = 25 Marks)

Answer all the questions

21. (a) Explain the extra stability of half filled and completely filled orbitals. (OR)

(b) Discuss the factors affecting Ionisation Energy.

22. (a) Explain sp^3 & sp hybridisation with examples (OR)

(b) Explain covalent bond properties of organic molecules.

23. (a) Drive ideal gas equation (OR)

(b) Explain the terms collision diameter, collision frequency, collision number

24. (a) What are the differecnces between orbit & orbitals? (OR)

(b) Explain Davisson Germer experiment.

25. (a) Explain the types of errors. (OR)

(b) Write short note on complexometric titrations.

PART – C (3 x 10 = 30 Marks)

Answer ANY three of the following questions

26. Discuss Quantum numbers and their significance.
27. Explain in detail about inductive effect with examples.
28. Drive Vander waals equation for real gases.
29. Discuss i)photoelectric effect ii)Compton effect .
30. Explain different type of titrations

18U2CHC02

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc., DEGREE EXAMINATION - II SEMESTER

MODEL QUESTION- GENERAL CHEMISTRY – II

Time: 3 Hours Max. Marks: 75

PART – A (20 x1 = 20 Marks)

Answer all the questions

1. What are the factors affecting the formation of ionic bond.

a) low ionization energy b) high electron affinity

c)high lattice energy of ionic bond d) all the above.

2. Which one of the following is covalent molecule.

a) HF b) H_2 c) NaCl d) NaOH.

3. Name the molecule which has partial ionic character.

a) F2 b) H2 c) HF d) none of the above.

4. Identify the combination which greatly distort regular geometry.

a) lp-lp repulsion b) lp-bp repulsion

c) bp-bp repulsion d) none of the these.

5. Sulphide ores are concentrated by

a) magnetic separation b) froath floatation

c) gravity separation d) hydraulic washing.

6. Heat of ore in presence of air is called

a) calcination b) roasting c) smelting d) none of these.

7. Name the element purified by electrolysis method.

a) Al b) Cu c) Fe d) U.

8. What is the ore of aluminium.

a) ferrite b) cuprite c) bauxite d) aluminate.

9. Write the general molecular formula of alkanes

a) C_nH_{2n+2} b) C_nH_{2n-2} c) C_nH_{2n} d) C_nH_{2n-1}

10. Catalytic hydrogenation of ---------- producing alkanes.

a) alkanes b)alkadienes c)alkenes d) polyenes.

11. What is the first step of free radical substitution reaction.

a) propagation b)initiation c)coupling d)termination.

12. Order of reactivity for the addition of hydrogen halides in alkenes.

a) HCl > HBr > HI b) HI > HBr > HCl c) HBr > HI > HCl d) HI > HCl > HBr

13. Which one the following is allenes.

a) CH_2=CH-CH=CH_2 b) CH_2=C=CH_2 c) CH_2=CH-CH_2-CH_3 d) none of these.

14. Which one of the following product is thermodynamically stable for the 1,2 and1,4 addition of butadiene.

a) 1,4 adduct b) 1,2 adduct c) both d) none.

15. Which is more acidic of the following

a) CH_2=CH_2 b)CH_3-CH_3 c) CHΞCH d) all the above.

16. R-CΞC-H + Br_2 $\rightarrow$?

a)R-CBr = CBr-H b) R- $C(Br)_2$ – CH_3 c) R-CH_2- $C(Br)_2$–H d) none of these.

17. Effect Of Temperature On Vapour Pressure

a) increase b) decrease

c) no changes d) increase and then decrease

18. Which Of the following has high viscosity

a) water b) acetic acid c) benzene d) chloroform

19. Water has spherical shape due to----------

a) surface tension b) surface pressure c) interfacial tension d) none

20. The substance which rotate the plane polarized light in right hand side is called------

a) dextro b) laevo c) racemic d) none

PART – B (5 x 5 = 25 Marks)

Answer all the questions

21. a) Draw MO diagram for F_2 molecule (OR)

b) Explain Fajan's rule and its applications.

22. a) Write a note on froth floatation process. (OR)

b) Explain the extraction of Cu.

23. a) Write note on conformational study of ethane. (OR)

b) Explain Markownikoff's rule and peroxide effect with example .

24. a) Explain the structure of allene and butadiene . (OR)

b) Explain the mercuration and oxymercuration reaction of acetylene.

25. a) Define surface energy .Explain the surface active reagents . (OR)

b) Explain the determination of vapour pressure by dynamic method.

PART – C (3 x 10 = 30 Marks)

Answer ANY three questions

26. Explain VSEPR theory and shapes of simple covalent molecules.

27. Explain the extraction of Iron and its properties, uses.

28. a) Explain Hofmann and saytzeff's rule.

b) Write the chemical reactions of alkenes

29. a) Explain the mechanism of Electrophilic addition in alkynes.

b) Write a note on 1,2 and 1, 4 addition of butadiene with example.

30. a) Explain classification of liquid crystals.

b) Explain the effect of temperature on viscosity.

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc., DEGREE EXAMINATION

MODEL QUESTION- ALLIED CHEMISTRY – I

(BIO-CHEMISTRY)

Time: 3 hrs **Max Marks: 75**

PART – A (20 x1 = 20 Marks)

Answer all the questions

1. Which of the following is example for ionic bond.?

a) NaCl b)Cl_2 c)F_2 d)KCl

2. NaCl crystal has a ..... structure.

a) Tetrahedral (b) Trigonal (c) Octahedral (d) hexagonal

3. Covalent bond involves _____of electrons

a) Sharing b)Transfering c) both d)none

4. What is the bond order for O2 molecule?

a) 1 b) 2 c) 0 d) 3

5. Which one of the following is aromatic compound?

a) Benzene b) alkene c)Acetylene d)chlorine

6. pH of an alkaline water will be .....

a) zero (b) low (c) high (d) none of the above

7. **----------**refers to the capability of water to neutralize a base.

a) Acidity b) Alkalinity c)RO d)Zeolite

8. Hardness of water is due to the presence of _____

a) Calcium b) Ammonium c) Magnesnium d)Ammonium

9. Give an example for primary standard solution

a) Oxalic acid b) NaOH c) KMnO4 d) $Na_2S_2O_3$

10. Oxalic acid Vs NaOH is an example for _____titration

a) Acid base b) Redox c) Conductometric d) Complexometric

11. Number of Gram Equivalence per litre of solution is termed as------

a) Mole fraction b) Molality c) Normality d) Molarity

12. The solution whose strength is known as----------solution.

a) Primary b) Secondary c) both d) none

13. The structural unit which is responsible for activity of drug is termed as ------

a) Pharmacopore b) Pharmacokinetics c) Pharmacology d) Pharma

14. _____is used to kill micro organism

a) Antibiotics b) Antipyrectic c)Analgesics d)none

15. Sulpha drugs contains----------group

a) sulphonyl b) amine c) acid d)aldehyde

16. The first isolated antibiotic is called----------.

a) Penicillin b) chlorophenicol c) Tetraxylene d) sulphathiazole

17. Give an example for nitrogenous fertilizer..

a) Urea b) KCN c) K_2SO_4 d) all

18. ---------- is a substance that is toxic to plants used to destroy unwanted vegetation.

a) Herbicides b) Fungicides c) rodenticide d) all

19. --------soil contain adquate amoount of potash, lime and phosphoric acid.

a) Alluvial soil b) Black soil c)Red soil d)all

20. DDT stands for ----------

a) Dichlorodiphenyltrichloroethane b) Dichlorodiphenyltrichloromethane

c) Dichlorodiphenylethane c) Dichloromethyltrichloroethane

PART – B (5 x 5 = 25 Marks)
Answer all the questions

21. (a) Explain the characteristics of ionic bond (OR)

(b) Draw the structure of NaCl and explain its nature of bonding.

22. (a) Explain Arrhenius concept of acid and bases. (OR)

(b) Write short note on conjugate acid and bases.

23. (a) Define the following terms i)Molarity ii) Normality (OR)

(b) Write short notes on standard solution and explain its types.

24. (a) Write the preparation for sulphaguanine and sulphathiazole. (OR)

(b) Give an brief account on antibiotics.

25. (a) Describe the different types of soils. (OR)

(b) (i) Explain the classification of nitrogeneous fertiliser with examples.

PART – C (3 x 10 = 30 Marks)

Answer ANY thereof the following questions

26. Explain the formation of covalent bond with two examples.

27. Explain the classification of acid and bases with examples.

28. Give an account on Acid –base and redox titration.

29. Explain the mechanism and mode of action of sulpha drugs.?

30. Explain the classification of pesticides.

18U2CHA02

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc. DEGREE EXAMINATION

MODEL QUESTION- ALLIED CHEMISTRY – II

(BIO-CHEMISTRY)

Time: 3 hrs **Max Marks: 75**

PART – A (20 x1 = 20 Marks)

Answer all the questions

1. Which technique is used to separate the the compounds on the basis of difference in affinities of phase

a)Chromatography b) Polarography

c)Thermography d)Chromography

2. In which type of chromatographic separation occurs due to difference in partition co-efficients?

a)Paper b)Column c)Thin layer d)Gas

3. Rf value is the distance travelled by the compound to the distance travelled by the -------

a)solvent b)solute b)elution d)all

4. Which type of chromatography is applied to coloured and colourless substance

a)Paper b)Column c)Thin layer d)HPLC

5. Amino acids contain ----- functional groups

a)1 b)2 c)3 d)4

6. --------- is the pH at which the amino acid does not migrate in an electric field.

a)Isoelectric point b)electric point c)Electronic point d)none

7. The amino acids in a polypeptide chain are linked by ---------- bonds.

a)peptide b)amino bond c)covalent d)ionic

8. Aldehyde group present in carbohydrate is known as------

a) Aldose b)ketose c)hexose d) sucrose

9. Vitamins are classified into ----- types.

a) 2 b)3 c)3 d)5

10. Which element present in the chiorophyll ?

a)Mg b)Ca c)P d)CO

11. Basic unit of Phorphyrin

a)Indole b) Imdazole c)Quinole d)Pyrole

12. Which element is present in the haemoglobin?

a) Cu b)Ag c) Fe d)Au

13. Which metal found in vitamin $B_{12?}$

a) Co b) Cu c)Mg d)Sn

14. Which one is example for Narcotic analgesics?

a)Morphine b)Papaverine c)salicyladehyde d)Benzoic acid

15. Salicyladehyde group of Aspirin

a)$COOCH_3$ b) CHO c)Cl d)No_2

16. p-aminophenol used for

a) Pain reliver b)Anti-inflammatory

c)Anti-septics agen d)anti-bacterial drugs

17. Which among the following compound found only in liquid nature ?

a)amine b)acid c)monoamide d) all

18. Which compound shows aliphatic nature.?

a) Carbohydrate b) amine c) monoamide d)acid

19. Which among the following compounds contain nitrogen ?

a)Aldehyde b)amine c)acid d)alcohol.

20. Which test gives positive result for amides.?

a)Biuret test b) Silver mirror test

c)Lieberrmanns test d)Phthalein fusion test.

PART – B (5 x 5 = 25 Marks)

Answer all the questions

21. (a) Difference between paper and column chromatography. (OR)

(b) Write short notes on methods of separation of column chromatography.

22. (a) Explain the preparation of amino acids by Gabriel method. (OR)

(b) Write the preparation of glucose.

23. (a) Explain the structure of protein. (OR)

    (b) Write short notes on nitrogen fixation.

24. (a) Explain the mode of Action of paracetamol & ibuprofen. (OR)

    (b) Explain the analgesics with examples.

25. (a) Explain the classification of dye based on its structure. (OR)

    (b) Explain the basic operations in dyeing process.

PART – C (3 x 10 = 30 Marks)

Answer ANY three of the following questions

26. Explain the instrumentation and application of HPLC.
27. Explain primary structure of proteins &its function
28. Explain oxygen transport and respiration.
29. Explain the classification of Anesthetics with example.
30. How will you identify the given organic compound as phenol and aldehyde?

SEMESTER III

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Chemistry)	
Course Code	18U3CHC03	**Title**	**Batch**	2018-2021
		Part III	**Semester**	III
Hrs/Week	6	Core III – General Chemistry - III	**Credits**	05

Course Objective

1. To acquire knowledge about the fundamentals and principles of chemistry.

2. To educate the students about the functional groups of organic compounds.

3. To understand the concept of thermodynamic terms.

Course Outcomes (CO)

K1	CO1	Students gain the knowledge of preparation, properties and uses of some important d-block metal compounds
K2	CO2	Students know different types of hydrides, preparation, properties and its uses.
K3	CO3	Students study about preparation, properties and uses of alcohols, phenols and aromatic hydrocarbons.
K4	CO4	Students learn about preparation, properties of aldehydes, ketones and some naming reactions.
K5	CO5	Students able to study about the thermodynamic terms and laws.

UNIT – I: Transition elements (12 HOURS)

The d - block elements - Position in the periodic table - Electronic configuration - General characteristics of d - block elements. Occurrence - extraction, properties and uses of Mo and Pt. Important compounds of transition metals: preparation, properties and uses of Ziegler – Natta catalyst, Prussian blue, Sodium nitro prusside, Turnbull's blue, Nickel DMG complex, Wilkinson's Catalyst, $KMnO_4$, ammonium molybdate and $K_2Cr_2O_7$.

SELF STUDY: Practice electronic configuration of all elements and discuss periodic properties .

PRACTICAL WORK: Short out the applications of $KMnO_4$.

UNIT– II: Hydrides (12 HOURS)

Hydrides - Classification of hydrides - Ionic Hydrides: LiH, NaH - preparation, properties, uses. Covalent Hydrides: Silanes - Chemistry of Mono and Disilanes - Boron hydrides - preparation, properties and structure of Diborane. Complex Hydrides: $NaBH_4$, $LiAlH_4$ - structure, preparation, properties and uses.

SELF STUDY: Compare different types of Hydrides.

PRACTICAL WORK: Ionic hydrides are more stronger than other hydrides –Why?

Unit-III: Alcohols, Phenols and aromatic hydrocarbons (12 HOURS)

Aliphatic alcohols: Introduction - Nomenclature - preparation, properties and distinction between 1^o, 2^o and 3^o alcohols - Aromatic alcohols: Introduction - preparation and properties of benzyl alcohol.

Phenol and its types: Introduction - acidity - preparation, properties and uses of phenol. Dihydric phenols: Introduction - preparation of catechol, resorcinol and quinol. Trihydric phenols: Introduction - preparation of pyrogallol, hydroxyquinol, phloroglucinol.

Aromatic hydrocarbons: Aromaticity - Huckel's rule - Electrophilic substitution reactions in aromatic compounds (general mechanism only).

SELF STUDY : Name some aliphatic and aromatic alcohol using nomenclature rules.

PRACTICAL WORK: Phenol is more acidic then aliphatic alcohol- Why?

UNIT– IV: Carbonyl compounds (12 HOURS)

Introduction - structure of carbonyl compounds – Nomenclature - Preparation and properties of aldehydes and ketones. Chemical properties: Addition reactions, Reactions involving alkyl groups, reduction and oxidation reactions and some important name reactions - Haloform, Reformatsky reaction, Aldol condensation, pinacol-pinacolone rearrangement, Wittig Reaction – Chemistry of acetone and acetaldehyde.

SELF STUDY : Practice naming of Aliphatic and Aromatic aldehydes and Ketones.

PRACTICAL WORK : Reagents using to oxidization and reduction of aldehyde and ketones.

UNIT– V: Thermodynamics – I (12 HOURS)

Thermodynamic terms - system, surrounding and boundary - homogenous and heterogeneous system - types of thermodynamic system - state of system - equilibrium and non equilibrium state - nature of work and heat - law of conservation of energy - First law of thermodynamics - Enthalpy of a system - Heat capacity of a system - work done in reversible isothermal compression - work done in reversible adiabatic expansion - Joule Thomson effect, Joule Thomson coefficient, inversion temperature - zeroth law of thermodynamics - absolute temperature scale .

SELF STUDY :Examples of Homogeneous and Heterogenous system

PRACTICAL WORK: How work done in reversible isothermal compression and adiabatic expansion.

TEXT BOOKS

1. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (33rd edition), Vishal publishing co., (2017).
2. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry, (47th edition) Vishal publishing co., (2017).
3. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (22nd edition), New Delhi, S. Chand & Co., (2016).

REFERENCE BOOKS

1. Morrison R.T. and Boyd R.N., Organic Chemistry (6th edition), New York, Allyn & Bacon Ltd., (1992).
2. Madan.R.D., Inorganic Chemistry (3rd edition), New Delhi, S. Chand and Co., (2012).
3. Mukherji.S.M, Singh.S.P, Kapoor.R.P, Organic Chemistry volume – I (4th edition) New Age International (p) limited (1998).

CONTENT BEYOND THE SYLLABUS

1. Half filled and completely filled d-orbitals.
2. Reducing properties of LAH & BAH.
3. Aromaticity of non benzenoid compounds.
4. Addition reactions of carbonyl compounds using $NaHSO_3$, semicarbazide and phenyl hydrazine.
5. Work out the problems related to First law of thermodynamics.

ONLINE SOURCES

1.https://www.askiitians.com/iit-jee-chemistry/inorganic-chemistry/hydrogen/hydrides .html

2.nsdl.niscair.res.in/jspui/bitstream/123456789/778/1/Revised%20thermodynamics.pdf

3.https://www.askiitians.com/iit-jee-chemistry/organic-chemistry/carbonyl-compounds/aldehydes-and-ketones/chemical-properties-of-aldehydes-and-ketones.html

Mapping

PO/PSO AND CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S					S				
CO2	S	S					S			S
CO3			S	S				S		S
CO4				S					S	
CO5					S					S

SEMESTER – IV

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Chemistry)	
Course Code	18U4CHC04	**Title**	**Batch**	2018-2021
		Part III	**Semester**	IV
Hrs/Week	6	Core IV – General Chemistry - IV	**Credits**	05

Course Objective

1. To study about the fundamentals and applications of nuclear chemistry.
2. To acquire the knowledge about carboxylic acids, its derivatives, Aliphatic and Aromatic amines.
3. To understand the principle and significance of thermodynamics and thermochemistry.

Course Outcomes (CO)

K2	CO1	Students identify the fundamentals and applications of nuclear chemistry.
K3	CO2	Students demonstrate the preparations and properties of mono and dicarboxylic acids.
K5	CO3	Students understand about the Nomenclature, preparations and properties of some aliphatic and aromatic amines.
K1	CO4	Students learn about the concepts and significance of various thermodynamic functions.
K4	CO5	Students analyze about the bond energy, free energy, exothermic and endothermic reactions.

UNIT – I: Nuclear Chemistry (12 HOURS)

Constitution of the nuclei - stable and unstable nuclei and their relationship to (n/p) ratio. Nuclear forces - Natural radioactivity - modes of decay – Radioactive decay series - Nuttal rule and average life - Radioactive equilibrium - Mass defect and binding energy – Numerical problems - Artificial transmutation and artificial radioactivity. Nuclear fission - atom Bomb and nuclear reactors - Nuclear fusion - fusion reaction in the sun, Hydrogen bomb. Application of radioactive isotopes - C^{14} dating, rock dating - Isotopes as tracers - Medicinal Applications.

SELF STUDY :Discuss Mass and energy particle

PRACTICAL WORK: list out the Isotopes using in medicine.

UNIT– II: Carboxylic acids and derivatives (12 HOURS)

General preparation and reactions of Monocarboxylic acids - Preparation, properties and uses of Dicarboxylic acids: Succinic, Maleic and Fumaric acid. Hydroxy acids: Lactic acid, Malic acid, Tartaric and Citric acid. Aromatic dicarboxylic acid: Phthalic acid.

Acid derivatives: preparations of Acid chlorides, Anhydrides, Esters and amides. Reactions involving acid derivatives - Hofmann, Curtius, Lossen and Schmidt rearrangements.

SELF STUDY : Compare the characteristics of mono and dicarboxylic acids

PRACTICAL WORK: Preparation of Ester from acid –How?

UNIT– III: Organic Nitrogen Compounds (12 HOURS)

Aliphatic Amines: Nomenclature - Separation of amines by Hinsberg's and Hoffmann methods - General methods of preparation and properties of primary amines. Distinction between 1^0, 2^0 and 3^0 amines .

Aromatic Amines: Basicity of Aromatic amines - Derivatives of aniline - Acetanilide - preparation and properties. Diazonium compounds - Diazotization mechanism, preparation and properties of diazoacetic ester.

SELF STUDY :Gaberial phthalamide synthesis of amines

PRACTICAL WORK :Aromatic amines are more basic than aliphatic amine-why?

UNIT– IV: Thermodynamics – II (12 HOURS)

Limitations of first law - Need for second law - Spontaneous process - cyclic process - Carnot cycle - efficiency - Carnot theorem - thermodynamic scale of temperature. Concept of Entropy - Units of Entropy - entropy a state function - entropy change in isothermal expansion of an ideal gas - Calculation of entropy changes of an ideal gas with changes in P, V & T. Entropy of mixture of ideal gases - physical significance of entropy. Work & free energy functions - partial molar free energy - Gibbs Duhem equation - Gibbs-Helmholtz equation - Clapeyron – Clausius equation. Third law of thermodynamics.

SELF STUDY : Different types of process.

PRACTICAL WORK: How Entropy and free energy are related with spontaneity of reaction.

UNIT– V: Thermochemistry (12 HOURS)

Introduction – Enthalpy change in a chemical reaction - Exothermic and endothermic reactions - Relation between heats of reaction at constant volume and pressure - Standard Enthalpy - Determination of enthalpies - Kirchoff's equation - Hess's Law and its

applications - measurement of enthalpy - Bond energy and its applications - Nernst Heat theorem –Flame temperature and Explosion temperature.

*SELF STUDY: R*elation between Enthalpy, Entropy and Free energy.

PRACTICAL WORK: Enthalpy changes in chemical reaction.

TEXT BOOKS

1. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (33rd edition), Vishal publishing co., (2017).
2. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry , (47th edition) Vishal publishing co., (2017).
3. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (22nd edition), New Delhi, S. Chand & Co., (2016).

REFERENCE BOOKS

1. Morrison R.T. and Boyd R.N., Organic Chemistry (6th edition), New York, Allyn & Bacon Ltd., (1992).
2. Madan.R.D., Inorganic Chemistry (3rd edition), New Delhi, S. Chand and Co., (2012).
3. Mukherji.S.M, Singh.S.P, Kapoor.R.P, Organic Chemistry volume – I (4th edition) New Age International (p) limited (1998).

CONTENT BEYOND THE SYLLABUS

1. Types of nuclear reactions with examples.
2. Methods to differentiate maleic and fumaric acids.
3. Distinction between aliphatic and aromatic amines.
4. Work out the problems related to Second law of thermodynamics.
5. Work out the problems related to Enthalpy.

ONLINE SOURCES

1. http://www.ltcconline.net/stevenson/2008CHM101Fall/CHM101Lecture Notes 20081201a. htm
2. https ://www.askiitians.com/iit-jee-amines-and-nitrogen-containing-compounds / amines - and-its-preparation-methods/
3. nptel.ac.in/courses/101104063/25

Mapping

PO/PSO AND CO	**PO 1**	**PO2**	**PO 3**	**PO 4**	**PO5**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO5**
CO1	S								S	
CO2		S								S
CO3			S				S			
CO4	S					S				
CO5		S						S		

SEMESTER – IV

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Chemistry)	
Course Code	18U4CHCP02	**Title**	**Batch**	2018-2021
		Part III Core Practical II	**Semester**	IV
Hrs/Week	6		**Credits**	04

COURSE OBJECTIVES

1. To understand the principles of qualitative analysis.

2. To expose the students to separate anions and cations.

2. To enable the students to understand the techniques to remove interfering from non interfering radicals.

COURSE OUTCOMES

Course Outcomes (CO)

K1	CO1	Students learn how to separate the cations and anions systematically.
K2	CO2	Students gain the knowledge about group separation of various cations.
K3	CO3	Students enable to acquire knowledge about interfering and non interfering ions.
K4	CO4	Students learn how to analyze the cations and anions using preliminary tests.
K5	CO5	Students find some cations using flame test.

ANALYSIS OF INORGANIC MIXTURE HAVING ONE INTERFERENCE AND ONE NON-INTERFERENCE ACID RADICALS, TWO BASIC RADICALS.

ANIONS TO BE ANALYSED: Carbonate, Sulphate, Nitrate, Chloride, Fluoride, Borate, Oxalate, Phosphate radicals.

CATIONS TO BE ANALYSED: Lead, Bismuth, Copper, Cadmium, Aluminium, Cobalt, Nickel, Zinc, Barium, Strontium, Calcium, Magnesium, Ammonium radicals.

CONTENT BEYOND THE SYLLABUS

3. Write all the other possible interfering ions with chemical tests.
4. List out the rare earth cations.

TEXT BOOK

2. V. Venkateswaran, R. Veeraswamy and A.R.Kulandaivelu, Basic Principles of Practical Chemistry, New Delhi, S.Chand & Co, (1995).

REFERENCE BOOK

2. Pandey O. P, Bajpai D. N., Giri S., Practical Chemistry, New Delhi, S.Chand & Co, (2012)

ONLINE SOURCES

1. http://amrita.olabs.edu.in/?sub=73&brch=7&sim=180&cnt=1
2. http://www.federica.unina.it/agraria/analytical-chemistry/inorganic-qualitative- analysis/

Mapping

PO/PSO AND CO	**PO 1**	**PO2**	**PO 3**	**PO 4**	**PO5**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO5**
CO1	**S**					S				
CO2			S							S
CO3		S					S			
CO4	S					S				
CO5	S						S			

SEMESTER –III

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Botany/Zoology)	
Course Code	**18U3CHA01**	**Title**	**Batch**	2018-2021
		Part III Allied Chemistry - I	**Semester**	III
Hrs/Week	5		**Credits**	05

OBJECTIVES

1. To impart knowledge in formation of molecule from atoms and various organic reaction mechanism.
2. To prepare students for a carrier in chemical industries.
3. To acquire basic knowledge in fundamental aspects of practical chemistry.

COURSE OUTCOMES

K1	CO1	Students learn about bonding, anti bonding, non bonding and Interhalogen compounds.
K2	CO2	Students acquire knowledge about the fundamental concepts of acid and base and to determine the hardness of water.
K3	CO3	Students able to apply the knowledge to prepare various concentration of solution.
K4	CO4	Students understand about the various antibiotics and drugs.
K5	CO5	Students evaluate the characteristics of soil, fertilizers and pesticides.

UNIT-I : Chemical bonding and Aromaticity (12 Hours)

Chemical Bonding –Definition- types -Ionic bond and covalent bond, hydrogen bond - formation and characteristics properties -bond order- magnetic properties. Structure of NaCl, CaF_2. MO theory--bonding in H_2, O_2, N_2 using MO theory -bonding -bond order- magnetiic properties. Aromaticity –Huckels rule-types –Examples.

SELF-STUDY: discuss chemical bonding types and aromatic characters

PRACTICAL WORK: bond order changes – why

UNIT-II: Acid and Base theory (12 Hours)

Arrhenius concept - Lowry-bronsted theory -Lewis acid and base theory – Conjugated Acid and base-Strength of an Acid and base. Principle and Classification of Hard acid and Base –Soft Acid and base (HSAB). Acidity of water – Alkalinity-PH –hardness of water-types of hardness -methods RO and Zeolite process.

SELF-STUDY: concepts of acid and base

PRACTICAL WORK: water analysis

UNIT-III: Volumetric analysis (12 Hours)

Law of Volumetric analysis- Definitions of molarity, molality, normality and mole fraction. Titration - Back titration - Equivalence point – Indicator – Standard solution - Primary and secondary standards- Types of titrations - Acid-base and redox.

SELF-STUDY: fundamentals of titrations

PRACTICAL WORK: standard solution preparation

UNIT-IV: Pharmaceutical Chemistry-I (12 Hours)

Definition of the terms – Drug, Pharmacy, Pharmacophore, Pharmacodynamics and Pharmacopoeia. Antibiotics - Definition, classification – broad and narrow spectrum antibiotics. penicillin, chloramphenical and erythromycin - structure and uses (structure elucidation not needed). Sulpha drugs- preparation of sulphaguanine and sulphathiazole. Mechanism and mode of action of sulpha drugs.

SELF-STUDY: antibiotics structures

PRACTICAL WORK: medical treatment

UNIT-V: **AgriculturalChemistry (12 Hours)**

Soil types-red soil, black soil, alluvial soil, desert soil, red soil; role of humus: Manures and their importance. Chemical fertilizers: Natural and synthetic fertilizers: Classification of NPK fertilizer- Preparation of Urea, Ammonium sulphate, Triple super phosphate potassium nitrate; role of macronutrients and micronutrients. Pesticides: classification-insecticides, herbicides and fungicides; Structure of important pesticides: DDT, BHC.

SELF-STUDY: soil and fertilizers details

PRACTICAL WORK: analysis of natural

CONTENT BEYOND THE SYLLABUS

1. Discuss the factors affecting electrophilic and nucleophilic substitution reaction.
2. List out various acid base indicator.

3. List out some other applications of chloramphenical and erythromycin.

TEXT BOOKS

7. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (33rd edition), Vishal publishing co., (2017).
8. Jayashree Ghosh .S, Fundamental concepts of Applied Chemistry, New Delhi, S. Chand & Co., (2008).
9. Sharma B.K., Industrial chemistry including chemical engineering (16th), Meerut, Krishnaprakasam media., (2011).
10. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (22nd edition), New Delhi, S. Chand & Co., (2016).
11. Dr.R.D.Madan, Modern inorganic chemistry,(3rd edition), New Delhi,S. Chand & Co., (2014).
12. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry (23rdedition) New Delhi, S. Chand &Co., (2004).

REFERENCE BOOKS

4. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry , (47th edition), Vishal publishing co., (2017).
5. Jayashree Ghosh, Text Book of Pharmaceutical Chemistry, S. Chand, New Delhi, (1999).
6. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (50th edition), New Delhi, S. Chand &Co., (2011).

ONLINE SOURCES

5. http://www.sparknotes.com/chemistry/bonding/molecularorbital/section1.rhtm
6. http://www.organic-chemistry.org/namedreactions/nucleophilic-substitution-sn1-sn2.shtm
7. http://www.soest.hawaii.edu/oceanography/courses/OCN633/Fall%202013/Titrimetry.pdf
8. https://chem.libretexts.org/

Mapping

PO/PSO AND CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	s		s		S	s	s			s
CO2	s		s		S	s	s			s
CO3	s	s	s		S	s	s			s
CO4	s	s	s	s						
CO5	s			s						

SEMESTER IV

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Botany/Zoology)	
Course Code	**18U4CHA02**	**Title**	**Batch**	2018-2021
		Part III	**Semester**	IV
Hrs/Week	5	Allied Chemistry - II	**Credits**	05

OBJECTIVES

1. To compile students with various chromatography techniques and its applications towards industries and research laboratories.
2. To educate about the chemistry of bio-organic and bio-inorganic compounds and various kinds of drugs and its uses .
3. To revise about the qualitative analysis of organic compounds.

COURSE OUTCOMES

K1	CO1	Students predict the concept of various chromatographic techniques.
K2	CO2	Students identify the details of bio organic compounds and bio inorganic compounds.
K3	CO3	Students utilizate knowledge of antipyretics, analgesic, antiseptics, disinfectants and anesthetics
K4	CO4	Students analyze the structure of different haem proteins.
K5	CO5	Students evaluate the different pharmaceutically important compounds and their uses in real life.

UNIT-I: Chromatography (12 Hours)

Chromatography –definition-types- column, paper, thin layer –method of separation application-Difference between paper chromatography and thin layer chromatography. High pressure liquid chromatography (HPLC)-principle-experimental techniques – instrumentation and advantages.

SELF-STUDY: Chromatography techniques

PRACTICAL WORK: layers working

UNIT-II: Amino acids and Carbohydrates (12 Hours)

Aminoacids- Preparation- Gabriel method, Strecker synthesis- Isoelectric point, Reactions of glycine. Polypeptide- Proteins- Classification- primary structure and its functions. Carbohydrates-definition, Classification, Preparation and Reactions of glucose and fructose- Inter conversion of glucose to fructose and vice versa- sucrose and starch (structure only).

SELF-STUDY: peptides and glucose

PRACTICAL WORK: analysis of carbohydrates

UNIT-III: Bio-inorganic Chemistry (12 Hours)

Structure of chlorophyll, phorphyrin unit and photosynthesis. Nitrogen fixation, carbon cycle. structure of haem proteins: haemoglobin, myoglobin. Oxygen transport and respiration. Metallo enzymes, vitamins containing metals.

SELF-STUDY: iron compounds

PRACTICAL WORK: enzymes studies

UNIT-IV: Pharmaceutical Chemistry-II (12 Hours)

Structure and mode of action: Analgesics and Antipyretics-salicylic acid derivatives-aspirin, p-aminophenol derivatives- para acetamol and ibuprofen. Antiseptic and disinfectants-definition and distinction, crystal violet, acridine. Anaesthetics-definition, classification-local and general, preparation ,properties and uses of cocaine and benzo cocaine.

SELF-STUDY: antiseptics formation

PRACTICAL WORK: pharmacy details

UNIT-V: Organic Analysis (12 Hours)

Qualitative analysis of organic substances: test for saturation and unsaturation; aliphatic & aromatic; acidic and basic nature of organic compound; elements test for N, S and halogens: functional groups like acid, phenol, aldehyde, ketone, carbohydrate, amine, ester, amide and diamide.

SELF-STUDY: qualitative analysis

PRACTICAL WORK: estimations

CONTENT BEYOND THE SYLLABUS

4. List out stationary and mobile phases used in HPLC and TLC.
5. Make the discussion of secondary, tertiary and quaternary structure of protein
6. Write conformation tests for nitro compound and phenol.

TEXT BOOKS

6. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (50th edition), New Delhi, S. Chand & Co., (2011).
7. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry (23rdedition). New Delhi, S. Chand &Co., (2004).
8. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (19th edition), New Delhi, S. Chand & Co., (2010).
9. V. Venkateswaran, R. Veeraswamy and A.R.Kulandaivelu, Basic Principles of Practical Chemistry, New Delhi, S.Chand & Co, (1995).
10. Pandey.O.P, Bajpai.D.N., Giri.S., Practical Chemistry, New Delhi, S.Chand & Co, (2012).

REFERENCE BOOKS

3. Jayashree Ghosh .S, Fundamental concepts of Applied Chemistry, New Delhi, S. Chand & Co., (2008).
4. Sharma.B.K., Industrial chemistry including chemical engineering (16th) Meerut, Krishnaprakasam media. (2011).

ONLINE SOURCES

4. https://www.khanacademy.org/test-prep/mcat/chemical-processes/separations-purifications/a/principles-of-chromatography.
5. https://en.wikipedia.org/wiki/Carbohydrate.
6. https://chem.libretexts.org/

Mapping

PO/PSO AND CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1			s		s	s	s		s	
CO2	s	s					s		s	
CO3		s		s	s	s	s	s		
CO4	s		s		s	s			s	s
CO5		s		s					s	

SEMESTER – IV

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Botany/Zoology)	
Course Code	**18U4CHAP01**	**Title**	**Batch**	2018-2021
		Part IV	**Semester**	IV
Hrs/Week	3	Allied Chemistry Practicals	**Credits**	04

Course Objective

Enable the students to learn about the various industries and their applications.

Course Outcomes (CO)

K1	CO1	Students will learn how to conduct a process precisely.
K2	CO2	Students will plan, conduct, review and report the experiment.
K3	CO3	The students will learn the nature, significance, and influence of errors and how they may best be avoided or minimized during quantitative examination of a chemical compound.
K4	CO4	Students will gain knowledge about analysis of organic compounds.

I. VOLUMETRIC ESTIMATIONS

I. Acidimetry

1. Estimation of sodium hydroxide-standard sodium carbonate.
2. Estimation of Oxalic acid –standard-oxalic acid.
3. Estimation of Hydrochloric acid – standard oxalic acid

II. Permanganometry

4.Estimation of oxalic acid-std-Mohr's salt or ferrous sulphate.

5.Estimation of sodium nitrite-standard oxalic acid.

6.Estimation of ferrous ion.

II. QUALITATIVE ORGANIC ANALYSIS

Systematic analysis of organic compounds:

Characterization of Organic compounds by their functional groups and confirmation by preparation of derivative.

Functional groups that may be studied:

Aldehydes, Ketones, carboxylic acids, aromatic primary amines, phenol, amide, diamide, nitro compounds and monosaccharides.

CONTENT BEYOND THE SYLLABUS

3. Estimate the hardness of water using EDTA.
4. Estimation of sulphuric acid- standard oxalic acid

TEXT BOOKS

2. V. Venkateswaran, R. Veeraswamy and A.R.Kulandaivelu, Basic Principles of Practical Chemistry, New Delhi, S. Chand & Co, (1995).

REFERENCE BOOKS

2. Pandey O. P, Bajpai D. N., Giri S., Practical Chemistry, New Delhi, S.Chand & Co, (2012).

ONLINE SOURCES

4. http://wwwchem.uwimona.edu.jm/lab_manuals/c10expt25.html
5. http://vlab.amrita.edu/?sub=2&brch=191&sim=345&cnt=1
6. http://amrita.olabs.edu.in/?sub=73&brch=8&sim=116&cnt=1

Mapping

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	✓	✓	✓	✓	✓
CO2	✓	✓	✓	✓	✓
CO3	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓	✓

SEMESTER III

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Physics)	
Course Code	**18U3CHA03**	**Title**	**Batch**	2018-2021
		Part III	**Semester**	III
Hrs/Week	5	Allied Chemistry – I	**Credits**	05

OBJECTIVES

1. To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.
2. To expose the students to a breadth of experimental techniques using instrumentation.
3. To provide students with the skills required to succeed in graduate, the chemical industry or professional.

K1	CO1	Students will be known molecular orbital theory and types of interhalogens.
K2	CO2	Students can understand organic reactions and types of hybridisation
K3	CO3	Students will be enhanced their knowledge towards electrolysis, conductance and buffer solutions.
K4	CO4	Students will learn the basics of pharmaceutical chemistry.
K5	CO5	Students will gain knowledge about corrosion and its preventive methods.

UNIT-I: Covalent bonding (12 HOURS)

Covalent bond – Hybridization – Definition - Salient features – VSEPR theory – Shapes of inorganic molecules such as BF_3, H_2O, NH_3, ClF_3 and XeF_2. Molecular orbital theory – postulates - bonding, anti bonding and non-bonding molecular orbital - Bond order - MO diagram for H_2, He_2, N_2, O_2, F_2, NO and CO.

SELF-STUDY: discuss chemical bonding types and aromatic characters

PRACTICAL WORK: bond order changes – why

UNIT-II: Organic Reactions (12 HOURS)

Classification of reactions - substitution, addition, elimination reactions – explanation. Isomerization, polymerization and condensation (definition with examples). Hybridization in methane, ethylene, acetylene. Aromaticity - Huckel's rule. Electrophilic substitution reactions in benzene - Mechanism of nitration, sulphonation, halogenation and alkylation.

SELF-STUDY: Inductive effect, Mesomeric effect, Resonance

PRACTICAL WORK: Bromination, nitration of aromatic compounds

UNIT-III: Electrochemistry-I (12HOURS)

Electrolytic conduction - Faraday's law of electrolysis - Conductance of electrolytes - Specific conductance, equivalent conductance, molar conductance - variation of molar conductance with dilution - Kohlrausch law and its application - Conductometric titrations – Ostwald dilution law - pH definition - Common ion Effect - Buffer solutions – Definition - Henderson equation – Derivation – Indicators - Acid-base indicators.

SELF-STUDY: Basic of electrochemistry, ions, electricity, conductance

PRACTICAL WORK: Preparation of buffer solution of suitable pH.

UNIT-IV: Pharmaceutical Chemistry-I (12 HOURS)

Antibiotics - Definition, classification – broad and narrow spectrum antibiotics. penicillin, chloramphenical and erythromycin - structure and mode of action (structure elucidation not needed). Sulpha drugs - preparation of sulphaguanidine, sulphapyridine and sulphathiazole. Mechanism and mode of action of sulpha drugs.

SELF-STUDY: Drugs, classification and its effects.

PRACTICAL WORK: Preparation of chart containing different types of drugs and its effects.

UNIT-V: Applied Chemistry-I (12 HOURS)

Corrosion - Types of corrosion – Dry and Wet corrosion (definition only) - Prevention of corrosion by electroplating. Paints – Requirements of good paint - constituents of paints and their functions - manufacture of paints - special paints: luminescent, fire retardant and heat resistant paints. Varnishes – Constituents, characteristics of good varnish, types and uses.

SELF-STUDY: Nature of metals and reason for corrosion

PRACTICAL WORK: Preparation of chart containing different types of special paint and its ingredients.

CONTENT BEYOND THE SYLLABUS

1. Apply MO theory to HF molecule.
2. Hybridization and geometry of benzene and ethane.
3. Study the preparative methods of various types of buffers.
4. Gram negative and gram positive bacteria.
5. Types of enamels and lacquers.

TEXT BOOKS

1. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (33rd edition), Vishal publishing co., (2017).

2. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry , (47th edition), Vishal publishing co., (2017).
3. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (22nd edition), New Delhi, S. Chand & Co., (2016).

REFERENCES

1. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (50th edition), New Delhi, S. Chand &Co., (2011).
2. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry (23rd edition), New Delhi, S. Chand &Co., (2004).
3. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (19th edition), New Delhi, S. Chand & Co., (2010).
4. Jayashree Ghosh .S, Fundamental concepts of Applied Chemistry, New Delhi, S. Chand & Co., (2008)
5. Sharma.B.K., Industrial chemistry including chemical engineering (16th) Meerut, Krishnaprakasam media. (2011).

ONLINE SOURCES

1. https://chem.libretexts.org/Core/Physical_and_Theoretical_Chemistry/Chemical_Bonding/Molecular_Orbital_Theory/MO_bonding_in_F2_and_O2.
2. https://www.cliffsnotes.com/study-guides/chemistry/organic-chemistry-ii/reactions-of-aromatic-compounds/electrophilic-aromatic-substitution-reactions.
3. https://www.askiitians.com/iit-jee-chemistry/physical-chemistry/electrolytic-conductance-molar-conductance-and-specific-conductance.aspx

Mapping

PO/PSO AND CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S									
CO2		S								
CO3			S							
CO4						S				
CO5										S

SEMESTER IV

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Physics)	
Course Code	**18U4CHA04**	**Title**	**Batch**	2018-2021
		Part III	**Semester**	IV
Hrs/Week	5	Allied Chemistry - II	**Credits**	05

OBJECTIVES

To gain knowledge about coordination compounds and natural products such as amino acids and carbohydrates.

Acquire the knowledge about medicinal drugs and dyes.

K1	CO1	Students will learn the basic concepts of coordination compounds and its applications.
K2	CO2	Students will know about the aminoacids, proteins and carbohydrates.
K3	CO3	Students will gain knowledge regarding electrode potential and batteries.
K4	CO4	Students will enhance their knowledge towards pharamaceutical and industrial chemistry.
K5	CO5	Students will dyes and its importance.

UNIT-I: Coordination compounds (12 HOURS)

Addition compounds - double salts and complexes. Complexes (Mononuclear complexes only) General aspects- central metal atom, Ligand - types of ligands. Coordination number and oxidation state of central metal atom- Nomenclature - Theories of Complexes- Werner's theory, Sidgwick theory, EAN rule, VBT - its applications to $[Cu(NH_3)_4]^{2+}$, $[Ni(CO)_4]$, $[Co(NH_3)_6]^{3+}$ and $[CoCl_6]^{3-}$- Chelation - Meaning, examples - EDTA applications.

SELF-STUDY: Chelate formation in biological systems.

PRACTICAL WORK: Preparation of Tetraaminecopper complexes.

UNIT-II: Amino acids and Carbohydrates (12 HOURS)

Aminoacids – Preparation - Gabriel method, Strecker synthesis - Isoelectric point, Reactions of glycine. Polypeptide – Proteins – Classification - primary structure and its

functions. Carbohydrates - definition, Classification, Preparation and Reactions of glucose and fructose - Inter conversion of glucose to fructose and vice versa - sucrose and starch (structure only)

SELF-STUDY: Different biomolecules and its importance

PRACTICAL WORK: Identification and determination of glucose

UNIT-III: Electrochemistry-II (12 HOURS)

Cells - Galvanic cell with examples. Electrode potential - single electrode potential - Standard electrode potential – Nernt equation – derivation - electrochemical series and its applications – EMF – Applications of EMF measurements: Determination of pH by using hydrogen electrode - Reference electrodes: hydrogen electrode and calomel electrode – Reversible and irreversible cell - Batteries - definition – lead acid battery.

SELF-STUDY: Galvanic series and electrochemical series

PRACTICAL WORK: Construction of a cell with different electrode and measure its potential.

UNIT-IV: Pharmaceutical Chemistry-II (12 HOURS)

Structure and mode of action: Analgesics and Antipyretics-salicylic acid derivatives-aspirin, p-aminophenol derivatives- paracetamol and ibuprofen. Antiseptic and disinfectants - definition and distinction, crystal violet, acridine. Anaesthetics - definition, classification- local and general, preparation, properties and uses of cocaine and benzo cocaine.

SELF-STUDY: Drugs and its importance.

PRACTICAL WORK: Construct a chart on different drugs showing its effects on humans.

UNIT-V: Applied Chemistry-II (12 HOURS)

Dyes – definition - requisites of a true dye, classification of dyes - based on structure and mode of application, colours and chemical constitution - Witt's theory, Bayer theory. Dyeing forces - ionic interactions, hydrogen bonds, vander-waals interaction, covalent bonds with examples, cross dyeing - principle only. Basic operations in dyeing process - preparation of fiber and dye bath, applications of dye and finishing.

SELF-STUDY: Classification of dyes and its uses in textiles.

PRACTICAL WORK: Prepare a chart showing the dyeing process used for different fabrics.

CONTENT BEYOND THE SYLLABUS

1. Apply VB theory to predict the shapes of various complexes.

2. Structures of maltose and cellulose.
3. Types of reference electrode other than calomel and hydrogen electrode.
4. General and local anaesthetics.
5. Methods involved in treating dye effluents.

TEXT BOOKS

1. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (33rd edition), Vishal publishing co., (2017).
2. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry , (47th edition) Vishal publishing co., (2017).
3. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (22nd edition), New Delhi, S. Chand & Co., (2016).

REFERENCES

1. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (50th edition), New Delhi, S. Chand &Co., (2011).
2. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry (23rd edition), New Delhi, S. Chand &Co., (2004).
3. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (19th edition), New Delhi, S. Chand & Co., (2010).
4. Jayashree Ghosh .S, Fundamental concepts of Applied Chemistry, New Delhi, S. Chand & Co., (2008)
5. Sharma.B.K., Industrial chemistry including chemical engineering (16th) Meerut, Krishnaprakasam media. (2011).

ONLINE SOURCES

1. https://www.scribd.com/doc/109192379/Chapter-5-Coordination-Compounds.
2. https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/carbhyd.htm.
3. http://dyes-pigments.standardcon.com/what-is-dye.html.

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓	✓	✓	✓	✓
CO2	✓	✓	✓	✓	✓
CO3	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓	✓
CO5	✓	✓	✓	✓	✓

SEMESTER – III

Programme code	B.Sc.,	**Programme Title**	Bachelor of Arts, Bachelor of Science & Bachelor of Commerce	
Course Code	**18U3CHN01**	**Title**	**Batch**	2018-2021
		Part IV	**Semester**	III
Hrs/Week	3	Non-Major Elective Course-I Industrial Chemistry	**Credits**	02

Course Objective

1. To learn the importance of water chemistry.
2. To understand the manufacturing of soaps, detergents and glass of different types.
3. To enable the students to learn about the preparation and importance of various industrial products.

Course Outcomes (CO)

K1	CO1	Students will be known the various methods involved in water quality analysis.
K2	CO2	Students can understand the manufacture of soap and detergents.
K3	CO3	Students will be enhanced their knowledge towards manufacture of glass.
K4	CO4	Students will learn the basic concepts involved in lubricants. Students will gain knowledge about petroleum products.
K5	CO5	Students will learn how to conduct a volumetric estimation process precisely.

UNIT –I: Water chemistry – I (6HOURS)

Examination of water quality by chemical and physical examination of water: colour – turbidity – odour – taste – temperature – pH – electrical conductivity – suspended solids – dissolved solids – acidity – total acidity – alkalinity – free CO_2 – dissolved O_2 – free chlorine – chlorine demand – BOD – COD.

SELF-STUDY: Water quality parameters.

PRACTICAL WORK: Determination of COD, pH, electrical conductivity of drinking water.

UNIT-II: Soaps and detergents (6HOURS)

Soaps: manufacture – toilet and transparent soaps - metal soaps, cleansing action of soap. Detergents: Manufacture of synthetic detergents - anionic detergents - cationic detergents and amphoteric detergents.

SELF-STUDY: Determining quality of good soap and to study the ingredient used in different soaps.

PRACTICAL WORK: Preparation of Soap using different oils.

UNIT–III: Glass industry (6HOURS)

Glass – physical and chemical properties of glass – characteristics – manufacture: formation of batch material – melting – shaping – annealing – finishing – special glass: optical, borosilicate and coloured glass.

SELF-STUDY: Application of various glasses

PRACTICAL WORK: Preparation of chart for various application of special glass.

UNIT–IV: Lubricants (6HOURS)

Definition – functions – properties – viscosity index – pour point – cloud point – classification – additives for lubricants – grease – solid lubrications – emulsions.

SELF-STUDY: Basic requirements of lubricants.

PRACTICAL WORK: Prepare a chart containing hydrocarbon composition in lubricants.

UNIT–V: Petroleum and Petrochemicals (6HOURS)

Cracking – mechanism, changes occurring during cracking – types – applications - synthetic petrol - Hydrogenation of coal (Bergius process) - Fischer tropsch process - knocking and anti knocking agents - octane number.

SELF-STUDY: Theories of formation of petroleum.

PRACTICAL WORK: Construct a model showing complete process of various cracking techniques.

CONTENT BEYOND THE SYLLABUS

1. Analysis of toxic metals in water.
2. Superiority of detergents over soaps. Explain.
3. Special glasses.
4. Types of lubricants.
5. Cetane number.

TEXT BOOKS

1. Industrial chemistry by B.N.Chakrabarty, Oxford and IBH publishing Co, NewDelhi, 1981.
2. Industrial chemistry by B.K.Sharma, Goel Publishing House, Meerut.

REFERENCE BOOKS

1. College Industrial chemistry by P.P.Singhn, T.M.Joseph, R.G.Dhanvale, Himalaya Publishing house, Bombay 4th edition, 1983.
2. Applied chemistry by Jayashree Ghosh, S.Chand Publication Reprint 2013

ONLINE SOURCES

1. https://www.scribd.com/document/274281762/Water-Technology-Ppt
2. nptel.ac.in/courses/103107082/module6/lecture5/lecture5.pd.

Mapping

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	✓	✓	✓	✓	✓
CO2	✓	✓	✓	✓	✓
CO3	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓	✓
CO5	✓	✓	✓	✓	✓

SEMESTER – III

Programme code	B.Sc.,	Programme Title	Bachelor of Arts, Bachelor of Science & Bachelor of Commerce	
Course Code	18U3CHN02	Title	Batch	2018-2021
		Part IV	Semester	III
Hrs/Week	3	Non-Major Elective Course-II Medicinal Chemistry	Credits	02

Course Objective

1. To study the system of Indian medicines
2. To learn the importance and evaluation of drugs.
3. To prepare and analyse the drugs.

Course Outcomes (CO)

K1	CO1	Students known the systems of Indian medicines
K2	CO2	Students able to understand the drugs.
K3	CO3	Students enhanced their knowledge towards preparation of drugs.
K4	CO4	Students learn the importance of medicinal plants.
K5	CO5	Students know to analyse the drug and its quality.

UNIT - I INTRODUCTION TO PHARMACOGNOSY (6HOURS)

History, Definition and scope of pharmacognosy; Systems of Indian Medicines – Siddha, Unani, Ayurveda, Homeopathy; Terminologies.

SELF-STUDY: Plant, zoo pharmacognosy and its importance.

PRACTICAL WORK: Extraction of drug from a medicinal plants.

UNIT - II CLASSIFICATION OF DRUGS (6HOURS)

Classification of Crude drugs – Taxonomical, Morphological, Pharmacological and chemical classifications; Chemistry of drugs and its evaluation.

SELF-STUDY: Drugs and its importance.

PRACTICAL WORK: Classify the drugs known to you on different basics.

UNIT - III PREPARATION AND APPLICATION OF DRUGS (6HOURS)

Preparation of crude and commercial drugs. Making infusion, decoction, lotion, washers, insect repellents, suppositories, tincture, making herbal syrups, compresses, poultice, plasters, oinments, herbal oils and herbal salves. Surgical fibres, sutures and dressing.

SELF-STUDY: Medicinally important plants and animals.

PRACTICAL WORK: Preparation of herbal syrups.

UNIT – IV PLANTS AS DRUGS (6HOURS)

Organoleptic study of the following medicinal plants: Fruit – Amla, Bulb – Garlic, Rhizome – Ginger, seed – castor, Bark – Cinchona, Leaves – Neem, Flower – Clove.

SELF-STUDY: Different chemical compound in various medicinal plants and its uses.

PRACTICAL WORK: Extraction of vitamin-C from amla.

UNIT – V ANALYTICAL STUDIES (6HOURS)

Analytical Pharmacognosy – drug adultration and detection. Biological testing of herbal drug. Phytochemical investigations with reference to secondary metabolites of locally available medicinal plants.

SELF-STUDY: Function groups present in various drugs and its quantitative estimation.

PRACTICAL WORK: Qualitative and quantitative analysis of various drugs.

TEXT BOOKS

1. S.Lakshmi, Pharmaceutical Chemistry, S.Chand & Sons ,New Delhi,2004.
2. V.K.Ahluwalia and Madhu Chopra, Medicinal Chemistry ,Ane Books,New Delhi,Reprint 2009.

REFERENCES:

1. Pharmacognosy, S.B.Gokhale, Dr.C.K. Kokate, A.P. Purohit, Publisher: Nirali Prakasham, Pune, 2002
2. Herbs that Heal, Acharya Vipul Rao – Diamond Pocket Books, New Delhi, 2005
3. Practical Pharmacognosy. Dr.C.K. Kokate et al. 2003
4. An Introduction to Medicinal Botany and Pharmacognosy – N.C. Kumar, Emkay Publications, New Delhi, 2004.

CONTENT BEYOND THE SYLLABUS

1. Different types of Indian medicine system.
2. Advantage of different medicine system.
3. Uses of different minerals in Indian medicine system.

TEXT BOOKS

1. Industrial chemistry by B.N.Chakrabarty, Oxford and IBH publishing Co, NewDelhi, 1981.

2. Industrial chemistry by B.K.Sharma, Goel Publishing House, Meerut.

REFERENCE BOOKS

1. College Industrial chemistry by P.P.Singhn, T.M.Joseph, R.G.Dhanvale, Himalaya Publishing house, Bombay 4th edition, 1983.
2. Applied chemistry by Jayashree Ghosh, S.Chand Publication Reprint 2013

ONLINE SOURCES

1. https://www.docsity.com/en/classification-of-crude-drugs/2147112/
2. https://link.springer.com/content/pdf/10.1007%2F978-3-319-63862-1.pdf

Mapping

PO/PSO AND CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO 1**	**PSO2**	**PSO 3**	**PSO 4**	**PSO5**
CO1	s		s	s		s	s		s	s
CO2			s			s			s	
CO3	s	s		s	s		s	s		s
CO4	s	s		s	s		s	s		s
CO5		s	s		s	s		s	s	

SEMESTER – III

Programme code	B.Sc.,	**Programme Title**	Bachelor of Arts, Bachelor of Science & Bachelor of Commerce	
Course Code	**18U3CHN03**	**Title**	**Batch**	2018-2021
		Part IV	**Semester**	III
Hrs/Week	3	Non-Major Elective Course-III Water Quality Analysis	**Credits**	02

Course Objective

1. To study the characteristics of water
2. To learn the importance of water purification
3. To analyse the quality measurement about water

Course Outcomes (CO)

K1	CO1	Students knew the various sources of water.
K2	CO2	Students able to understand the importance of various water quality parameters.
K3	CO3	Students able to determine the hardness of water.
K4	CO4	Students knowledge on sources, analysis and control methods of industrial waste water .
K5	CO5	Students learn how to treat polluted water.

UNIT-I INTRODUCTION TO HYDROLOGY (6HOURS)

World water resource; water resources of India- Different ecosysytem of hydrology-Riverine, Estuarine and marine-Status of water quality in India.

SELF-STUDY: Domestic, industrial and agricultural importance of water.

PRACTICAL WORK: Prepare a chart with different sources of water and their water quality.

Unit-II CHARACTERISTICS OF WATER (6HOURS)

Water quality parameters and their interaction-physical and chemical characteristics-colour, odour, taste, turbidity, temperature-chemical constituents- electrical conductivity – suspended solids – dissolved solids – acidity – total acidity – alkalinity - pH – free CO_2 – dissolved O_2 – free chlorine – chlorine demand.

SELF-STUDY: Domestic water quality standards by WHO.

PRACTICAL WORK: Determination of pH, conductivity, acidity and alkalinity of water from different sources.

Unit-III WATER TREATMENT (6HOURS)

Water composition analysis - Hardness of water- Type of Hardness-Determination of hardness by EDTA method, Removal of hardness-Zeolite process, demineralization and Reverse osmosis - Salinity – ionic composition – Minerals-pollutants- BOD, COD- Water quality standard – ISI, EPA, WHO.

SELF-STUDY: Different minerals present in water; relation between BOD, COD and water pollution

PRACTICAL WORK: Determination of hardness of water.

UNIT-IV: INDUSTRIAL WATER POLLUTION, ITS CONTROL & ANALYSIS (6HOURS)

Sources of water pollution – domestic – industrial – agricultural – soil and radioactive wastes as sources of pollution. Water pollutants and their effects. Heavy metal pollution-public health significance of Cadmium – Chromium – Copper – Lead – Zinc – Manganese. Prevention and control its measures.

SELF-STUDY: Case studies on water pollution.

PRACTICAL WORK: Quantitative analysis of Cd, Cr, Cu etc., in polluted water.

UNIT-V: INDUSTRIAL WASTE WATER TREATMENT (6HOURS)

Aerobic treatment; Suspended growth aerobic treatment processes; Activated sludge process and its modifications; Attached growth aerobic processes; Tricking filters and Rotating biological contactors; Anaerobic treatment; suspended growth, attached growth, fluidized bed and sludge blanket systems; nitrification, denitrification; Phosphorus removal.

SELF-STUDY: Basics of aerobic and anaerobic process.

PRACTICAL WORK: Biopurification of water.

TEXT BOOKS:

1. B. K. Sharma, Industrial Chemistry; 8th Ed., Goel Publishing House, New Delhi, 1997.
2. B.K. Sharma and H. Kaur, “Environmental chemistry”, Goel Publishing House, Meerut, 2008

REFERENCES

1. Chemical Process Industries – Norrish Shreve, R. and Joseph A. Brink Jr. McGraw Hill, Industrial Book Company, London.
2. Production and Properties of Industrial Chemicals – Brain A.C.S. Reinhold – NewYork.
3. Outlines of Chemical Technology – For the 21st Century – M. Gopala Rao & Matshall Sittig (3rd Edition)

CONTENT BEYOND THE SYLLABUS

1. Analysis of toxic metals in water.
2. Different techniques used in hardness estimation.
3. Advantages and disadvantages of different water treatment processes.

TEXT BOOKS

1. Industrial chemistry by B.N.Chakrabarty, Oxford and IBH publishing Co, NewDelhi, 1981.
2. Industrial chemistry by B.K.Sharma, Goel Publishing House, Meerut.

REFERENCE BOOKS

1. College Industrial chemistry by P.P.Singhn, T.M.Joseph, R.G.Dhanvale, Himalaya Publishing house, Bombay 4th edition, 1983.
2. Applied chemistry by Jayashree Ghosh, S.Chand Publication Reprint 2013

ONLINE SOURCES

1. https://www.cdc.gov/healthywater/drinking/public/water_treatment.html
2. https://www.hunterwater.com.au

Mapping

PO/PSO AND CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1										
CO2										
CO3										
CO4										
CO5										

SEMESTER – IV

Programme code	B.Sc.,/B.A.,	**Programme Title**	Bachelor of Arts, Bachelor of Science & Bachelor of Commerce	
Course Code	**18U4CHN04**	**Title**	**Batch**	2018-2021
		Part IV	**Semester**	IV
Hrs/Week	3	**Non Major Elective Course**	**Credits**	02
		FOOD AND NUTRITION		

Course Objective

1. To provide energy for doing works.
2. To protect the human beings from infections and deficiency disorders.
3. To increase knowledge on food and nutrition security concepts at the national and sub-national levels.

Course Outcomes (CO)

K1	CO1	Students will gain knowledge in describing general nutritional components emphasizing regulation of dietary carbohydrates, fat, and protein metabolism and their impact on nutritional status and health.
K2	CO2	Students will evaluate others aspects of food quality.
K3	CO3	Students can impact of food preservation, processing, packaging and distribution on food quality.
K4	CO4	Students produce a variety of food products applying principles of food handling and preparation
K5	CO5	Students can give an overview of the main classes of compounds influencing color and flavor of food and have knowledge on important sources of vitamins and minerals in food

Unit-I: FOOD SOURCES (6HOURS)

Introduction-types-sources-nutrients of foods: carbohydrate, protein, fats, oils – functions of food.

SELF-STUDY: Food classification based on nutrients

PRACTICAL WORK: Find the percentage of edible portion of foods

Unit-II: FOOD POISONING AND ADULTERATION (6HOURS)

Food poisoning: Sources, causes and remedy- Food adulteration: Types, common adulteration in food.

SELF-STUDY: Advanced analysis methods for food hazards, adulteration and traceability

PRACTICAL WORK: Execute a sampling plan to monitor chemical and microbiological hazards in food

Unit-III: FOOD PRESERVATION AND PROCESSING (6HOURS)

Importance of food preservation- principles of food preservation -Food spoilage, causes of food spoilage – types of Food spoilage - preservation and processing by heating: sterilisation, pasterusation.

SELF-STUDY: Different methods of food preservation and processing

PRACTICAL WORK: List out the role of chemicals in food preservation.

Unit –IV: VITAMINS (6HOURS)

Definition-types-functions, Sources, deficiency diseases of A, C, K, E and B1,B12,B6.

SELF-STUDY: Fat soluble and water soluble vitamins

PRACTICAL WORK: Absorption, Transport, Storage and toxicity of vitamins

Unit-V: MINERALS (6HOURS)

Mineral elements in food - source and daily requirements of ca, Na, K, Mg, Fe and P.

SELF-STUDY: Effect of mineral imbalances in food.

PRACTICAL WORK: Estimation of Ca, Na, K, Mg, Fe and P in food.

CONTENT BEYOND THE SYLLABUS

1. Functions of food.
2. Types of adulteration.
3. Process of preservation.
4. Deficiency of Vitamins.
5. Requirements of Minerals.

TEXT BOOKS

1. Sumati R.Mudambi, M.V.Rajagopal, Fundamentals of Foods and nutrition, Fourth edition 2003, New Age International Publishers, New Delhi .
2. M.Swaminathan, Handbook of Food and Nutrition, The Bangalore printing and publishing Co.,Ltd, Bangalore.

REFERENCE BOOKS

1. N.Shaguntala Manay, M.shadaksharaswamy, Foods Facts and Principles, second edition,

New Age International Publishers, New Delhi .

2. B.Srilakshmi, Food Science, Second edition, New Age International Publishers, New Delhi.

3. Dr.Kusum Gupta, Dr.L.C.Gupta, Abhishek Gupta, Food and Nutrition, Fourth edition, Jaypee Brothers medical publishers, New Delhi.

ONLINE SOURCES

1. https://Foodandnutrition.net

2. https://www.edx.org

Mapping

PO / CO	PO1	PO2	PO 3	PO4	PO 5	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15
CO1	S	S	S	W	S			S		S	S		S	S	S
CO2	S			S		S	S		S			W		S	
CO3		V			S		V	S		S			S		S
CO4	S		S			V			S			S		S	
CO5		S		S		S		S	S		S		S		S

SEMESTER – IV

Programme code	B.Sc.,	**Programme Title**	Bachelor of Science (Physics)	
Course Code	**18U4CHAP01**	**Title**	**Batch**	2018-2021
		Part IV	**Semester**	IV
Hrs/Week	3	Allied Chemistry Practicals	**Credits**	04

Course Objective

Enable the students to learn about the various industries and their applications.

Course Outcomes (CO)

K1	CO1	Students will learn how to conduct a process precisely.
K2	CO2	Students will plan, conduct, review and report the experiment.
K3	CO3	The students will learn the nature, significance, and influence of errors and how they may best be avoided or minimized during quantitative examination of a chemical compound.
K4	CO4	Students will gain knowledge about analysis of organic compounds.

I. VOLUMETRIC ESTIMATIONS

I. Acidimetry

1. Estimation of sodium hydroxide-standard sodium carbonate.
2. Estimation of Oxalic acid –standard-oxalic acid.
3. Estimation of Hydrochloric acid – standard oxalic acid

II. Permanganometry

4.Estimation of oxalic acid-std-Mohr's salt or ferrous sulphate.

5.Estimation of sodium nitrite-standard oxalic acid.

6.Estimation of ferrous ion.

II. QUALITATIVE ORGANIC ANALYSIS

Systematic analysis of organic compounds:

Characterization of Organic compounds by their functional groups and confirmation by preparation of derivative.

Functional groups that may be studied:

Aldehydes, Ketones, carboxylic acids, aromatic primary amines, phenol, amide, diamide, nitro compounds and monosaccharides.

CONTENT BEYOND THE SYLLABUS

5. Estimate the hardness of water using EDTA.
6. Estimation of sulphuric acid- standard oxalic acid

TEXT BOOKS

3. V. Venkateswaran, R. Veeraswamy and A.R.Kulandaivelu, Basic Principles of Practical Chemistry, New Delhi, S. Chand & Co, (1995).

REFERENCE BOOKS

3. Pandey O. P, Bajpai D. N., Giri S., Practical Chemistry, New Delhi, S.Chand & Co, (2012).

ONLINE SOURCES

7. http://wwwchem.uwimona.edu.jm/lab_manuals/c10expt25.html
8. http://vlab.amrita.edu/?sub=2&brch=191&sim=345&cnt=1
9. http://amrita.olabs.edu.in/?sub=73&brch=8&sim=116&cnt=1

Mapping

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	✓	✓	✓	✓	✓
CO2	✓	✓	✓	✓	✓
CO3	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓	✓

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc. DEGREE EXAMINATION - III SEMESTER

MODEL QUESTION- GENERAL CHEMISTRY – III

Time: 3 Hours Max. Marks: 75

PART – A (20 x1 = 20 Marks)
Answer all the questions

1. Which of the following has d^5 configuration?
   a) Fe b) Cr c) Sc d) Ti
2. In d-block elements, the last electron enters into---------- orbital
   a) s b) p c) d d) f
3. Which of the following is a diamagnetic ion?
   a) Co^{2+} b) Cu^{2+} c) Mn^{2+} d) Sc^{3+}
4. Zn does not show variable valency because of
   a) complete d sub shell b) inert pair effect
   c) $4s^2$ sub shell d) none of these
5. Which has the reducing property?
   a) O_3 b) OsO_4 c) $LiAlH_4$ d) HNO_3
6. In hydrides, the oxidation state of hydrogen is
   a) 1 b) 0 c) -1 d) -2
7. Diborane contains
   a) 3c-2e bond b) 2c-2e bond
   c) 3c-3e bond d) none of these
8. Alkenes can be reduced by
   a) O_3 b) $NaBH_4$ c) $LiAlH_4$ d) HNO_3
9. Which of the following is acidic in nature?
   a) CH_3OH b) C_6H_5OH c) CH_4 d) HCHO
10. Which of the following not obeys Huckel's rule?
    a) benzene b) naphthalene
    c) acetic acid d) cyclopentadienyl anion
11. The reaction between phenol and bromine in the formation of white precipitate. It is due to
    a) 2-bromophenol b) 4-bromophenol
    c) 2,4,6-tribromophenol d) None of these
12. Which of the following give alkenes on oxidation?

a) CH_3OH b) CH_3CH_2OH
c) $(CH_3)_2CHOH$ d) $(CH_3)_3COH$

13. The oxidation of primary alcohol gives
a) aldehyde b) ketone c) both a & b d) none
14. The carbonyl carbon is
a) electrophilic b) nucleophilic c) non polar d) none
15. Which of the following does not give positive test for haloform reaction?
a) acetaldehyde b) acetone c) 2-butanone d) 3-hexanone
16. A strong base can abstract an α-hydrogen from
a) amine b) alkane c) alkene d) ketone
17. Which of the following is true for a closed system?
a) mass entering = mass leaving
b) mass does not enter or leave the system
c) mass entering can be more or less than the mass leaving
d) none of the mentioned
18. The processes or systems that do not involve heat are called
a) isothermal processes b) equilibrium processes
c) thermal processes d) adiabatic processes
19. The -------- law of thermodynamics states that energy can neither be created nor destroyed.
a) I b) II c) III d) zero
20. Heat and work are --------- functions
a) state b) path c) point d) none

PART – B (5 x 5 = 25 Marks)

Answer all the questions

21. (a) Why d-block elements possess variable oxidation state? (OR)
(b) Write the preparation, properties and uses of sodium nitroprusside,
22. (a) Explain the prepartion, properties of NaH. (OR)
(b) List out the synthetic uses of $LiAlH_4$.
23. (a) State and explain Huckel's rule. (OR)
(b) Explain any three chemical properties of phenols.
24. (a) How do you convert acetaldehyde into 2-hydroxy butanol? (OR)
(b) Explain the mechanism of Reformatsky reaction.
25. (a) Write a brief note on Joule-Thomson effect. (OR)
(b) State and explain zeroth law of thermodynamics.

PART – C (3 x 10 = 30 Marks)

Answer ANY three questions

26. Explain in detail about the extraction of platinum.
27. Describe the structure of diborane.

28. What are the differences between 1^0, 2^0 & 3^0 alcohols?
29. Discuss in detail about the chemistry of acetone.
30. Derive the expression for work done in isothermal compression and adiabatic expansion.

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN
(AUTONOMOUS)
DEPARTMENT OF CHEMISTRY
B.Sc., DEGREE EXAMINATION - IV SEMESTER
MODEL QUESTION- GENERAL CHEMISTRY – IV

Time: 3 Hours Max. Marks: 75

PART – A (20 x1 = 20 Marks)
Answer all the questions

1. Radioactivity was discovered by
   a) J.J. Thomson b) Madame Curie
   c) Henry Becquerel d) Rutherford
2. Out of the following the one which has no charge is
   a) gamma rays b) beta rays
   c) alpha rays d) cathode rays
3. Hydrogen bomb is based on the phenomenon of
   a) nuclear explosion b) chemical reaction
   c) nuclear fusion d) nuclear fission
4. When a radioactive nucleus emits an alpha particle, the mass number of the atom
   a) remains same and its atomic number decreases
   b) decreases and its atomic number increases
   c) decreases and its atomic number decreases
   d) increases and its atomic number decreases
5. The one which does not undergo cyclisation is
   a) lactic acid b) maleic acid
   c) succinic acid d) phthalic acid
6. Acetyl chloride cannot be obtained by treating acetic acid with
   a) PCl_5 b) $SOCl_2$ c) $CHCl_3$ d) PCl_3
7. Lactic acid on oxidation with alk.$KmnO_4$ gives
   a) tartaric acid b) pyruvic acid c) cinnamic acid d) propionic acid
8. Tartaric acid is a
   a) monohydroxybutanedioic acid b) dihydroxybutanedioic acid
   c) monohydroxypropanedioic acid d) dihydroxyproapanedioic acid
9. Which pairing of general formula and compound class is incorrect?
   a) $R_3C\text{-}NH_2$ & tertiary amine b) $RCONH_2$ & amide
   c) RNH_2 & primary amine d) $(RCO)_2NH$ & imide
10. Carbylamine reaction is possible for
    a) 1^0 amine b) 2^0 amine c) 3^0 amine d) none
11. Which among the following is a primary amine?
    a) N-methylaniline b) aniline
    c) N,N-dimethylaniline d) none

12. The basicity order of amines

a) $R_3N>R_2NH>RNH_2>ArNH_2$ b) $R_2NH>R_3N>RNH_2>ArNH_2$

c) $R_0N>RNH_2>R_2NH>ArNH_2$ d) $RNH_2>R_2NH>R_3N>ArNH_2$

13. The efficiency of the Carnot cycle is the function of

a) temperatures (T1, T2) between which the Carnot cycle operates

b) net work done (W_{net})

c) heat supplied (Q1) and heat rejected (Q2)

d) all the above

14. Entropy is a measure of

a) orderliness b) disorderliness c) both a & b d) none.

15. What happens to entropy when ice melts into water?

a) it increases b) it becomes zero

c) it remains unchanged d) it decreases

16. According to third law of thermodynamics, which of the following quantity for a perfectly crystalline solid is zero at absolute zero

a) entropy b) free energy c) internal energy d) enthalpy

17. In exothermic reaction,

a) ΔE is zero b) ΔH is negative c) ΔS is zero d) ΔG is zero

18. Variation of heat of reaction with temperature is known as

a) Van't Hoff isotherm b) Van't Hoff isochore

c) Kirchhoff's equation d) none

19. Evaporation of water is

a) exothermic change b) endothermic change

c) does not involve any heat change d) unpredictable

20. The relationship between enthalpy change and internal energy change is

a) $\Delta H=\Delta E+P\Delta V$ b) $\Delta H=\Delta E-P\Delta V$

c) $\Delta H=-(\Delta E+P\Delta V)$ d) $\Delta H=P\Delta V-\Delta E$

PART – B (5 x 5 = 25 Marks)

Answer all the questions

21. a) Derive the relation between mass defect and binding energy. (OR)

b) Explain any five applications of radioactive isotopes.

22. a) How do you differentiate maleic and fumaric acid? (OR)

b) Explain the mecahnism of Schmidt rearrangement.

23. a) Write any three differences between 1^0, 2^0 & 3^0 amines. (OR)

b) Explain the mechanism of diazotization of amines.

24. a) What are the physical significance of entropy? (OR)

b) Derive Gibb's - Duhem equation.

25. a) Write a note on Nernst heat theorem. (OR)

b) State Hess's law and explain its applications.

PART – C (3 x 10 = 30 Marks)

Answer ANY three questions

26. Explain the applications of nuclear fission.
27. Explain any five chemical properties of monocarboxylic acid.
28. How will you separate the mixture of amines by Hinsberg method?
29. Explain in detail about carnot cycle.
30. Derive Kirchhoff's equation.

18U3CHA01

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc., DEGREE EXAMINATION

MODEL QUESTION- ALLIED CHEMISTRY – I

(BOTANY)

Time: 3 hrs **Max Marks: 75**

PART – A (20 x1 = 20 Marks)

Answer all the questions

1. Which of the following is example for ionic bond.?
   a)NaCl b)Cl_2 c)F_2 d)KCl
2. NaCl crystal has a ..... structure.
   a) Tetrahedral (b) Trigonal (c) Octahedral (d) hexagonal
3. Covalent bond involves _____of electrons
   a) Sharing b)Transfering c) both d)none
4. What is the bond order for O2 molecule?
   a) 1 b) 2 c) 0 d) 3
5. Which one of the following is aromatic compound?
   a) Benzene b) alkene c)Acetylene d)chlorine
6. pH of an alkaline water will be .....
   a) zero (b) low (c) high (d) none of the above
7. **----------**refers to the capability of water to neutralize a base.
   a)Acidity b) Alkalinity c)RO d)Zeolite
8. Hardness of water is due to the presence of ____
   a)Calcium b) Ammonium c)Magnesnium d)Ammonium
9. Give an example for primary standard solution
   a)oxalic acid b) NaOH c)KMnO4 d)$Na_2S_2O_3$
10. Oxalic acid Vs NaOH is an example for _____titration
    a) Acid base b) Redox c)Conductometric d)complexometric
11. Number of Gram Equivalence per litre of solution is termed as------
    a) Mole fraction b)Molality c)Normality d)Molarity
12. The solution whose strength is known as----------solution.
    a) primary b)Secondary c)both d)none

13. The structural unit which is responsible for activity of drug is termed as ------
    a)Pharmacopore b) Pharmacokinetics c)Pharmacology d)Pharma
14. _____is used to kill micro organism
    a) Antibiotics b) antipyrectic c)analgesics d)none
15. Sulpha drugs contains----------group
    a) sulphonyl b)amine c)acid d)aldehyde
16. The first isolated antibiotic is called----------.
    a) Penicillin b)chlorophenicol c)Tetraxylene d)sulphathiazole
17. Give an example for nitrogenous fertilizer..
    a)Urea b)KCN c)K_2SO_4 d)all
18. ---------- is a substance that is toxic to plants used to destroy unwanted vegetation.
    a) Herbicides b)Fungicides c)rodenticide d) all
19. --------soil contain adquate amoount of potash, lime and phosphoric acid.
    a) Alluvial soil b) Black soil c)Red soil d)all
20. DDT stands for ----------
    a) Dichlorodiphenyltrichloroethane b) Dichlorodiphenyltrichloromethane
    c) Dichlorodiphenylethane c) Dichloromethyltrichloroethane

PART – B (5 x 5 = 25 Marks)

Answer all the questions

11. (a) Explain the characteristics of ionic bond (OR)
    (b) Draw the structure of NaCl and explain its nature of bonding.
12. (a) Explain Arrhenius concept of acid and bases. (OR)
    (b) Write short note on conjugate acid and bases.
13. (a) Define the following terms i)Molarity ii) Normality (OR)
    (b) Write short notes on standard solution and explain its types.
14. (a) Write the preparation for sulphaguanine and sulphathiazole. (OR)
    (b) Give an brief account on antibiotics.
15. (a) Describe the different types of soils. (OR)
    (b) (i) Explain the classification of nitrogeneous fertiliser with examples.

PART – C (3 x 10 = 30 Marks)

Answer ANY three questions

16. Explain the formation of covalent bond with two examples.
17. Explain the classification of acid and bases with examples.
18. Give an account on Acid –base and redox titration.
19. Explain the mechanism and mode of action of sulpha drugs.?
20. Explain the classification of pesticides.

(AUTONOMOUS)
DEPARTMENT OF CHEMISTRY
B.Sc. DEGREE EXAMINATION
MODEL QUESTION- ALLIED CHEMISTRY – II
(BOTANY)

Time: 3 hrs **Max Marks: 75**

PART – A (20 x1 = 20 Marks)
Answer all the questions

1. Which technique is used to separate the the compounds on the basis of difference in affinities of phase
   a)Chromatography b) Polarography
   c)Thermography d)Chromography
2. In which type of chromatographic separation occurs due to difference in partition co-efficients?
   a)Paper b)Column c)Thin layer d)Gas
3. Rf value is the distance travelled by the compound to the distance travelled by the -------
   a)solvent b)solute b)elution d)all
4. Which type of chromatography is applied to coloured and colourless substance
   a)Paper b)Column c)Thin layer d)HPLC
5. Amino acids contain ----- functional groups
   a)1 b)2 c)3 d)4
6. --------- is the pH at which the amino acid does not migrate in an electric field.
   a)Isoelectric point b)electric point c)Electronic point d)none
7. The amino acids in a polypeptide chain are linked by ---------- bonds.
   a)peptide b)amino bond c)covalent d)ionic
8. Aldehyde group present in carbohydrate is known as------
   a) Aldose b)ketose c)hexose d) sucrose
9. Vitamins are classified into ----- types.
   a) 2 b)3 c)3 d)5
10. Which element present in the chiorophyll ?
    a)Mg b)Ca c)P d)CO
11. Basic unit of Phorphyrin
    a)Indole b) Imdazole c)Quinole d)Pyrole
12. Which element is present in the haemoglobin?
    a) Cu b)Ag c) Fe d)Au
13. Which metal found in vitamin $B_{12?}$
    a) Co b) Cu c)Mg d)Sn
14. Which one is example for Narcotic analgesics?
    a)Morphine b)Papaverine c)salicyladehyde d)Benzoic acid
15. Salicyladehyde group of Aspirin

a)$COOCH_3$ b) CHO c)Cl d)No_2

16. p-aminophenol used for
    a) Pain reliver b)Anti-inflammatory
    c)Anti-septics agen d)anti-bacterial drugs
17. Which among the following compound found only in liquid nature ?
    a)amine b)acid c)monoamide d) all
18. Which compound shows aliphatic nature.?
    a) Carbohydrate b) amine c) monoamide d)acid
19. Which among the following compounds contain nitrogen ?
    a)Aldehyde b)amine c)acid d)alcohol.
20. Which test gives positive result for amides.?
    a)Biuret test b) Silver mirror test
    c)Lieberrmanns test d)Phthalein fusion test.

PART – B (5 x 5 = 25 Marks)

Answer all the questions

11. (a) Difference between paper and column chromatography. (OR)
    (b) Write short notes on methods of separation of column chromatography.
12. (a) Explain the preparation of amino acids by Gabriel method. (OR)
    (b) Write the preparation of glucose.
13. (a) Explain the structure of protein. (OR)
    (b) Write short notes on nitrogen fixation.
14. (a) Explain the mode of Action of paracetamol & ibuprofen. (OR)
    (b) Explain the analgesics with examples.
15. (a) Explain the classification of dye based on its structure. (OR)
    (b) Explain the basic operations in dyeing process.

PART – C (3 x 10 = 30 Marks)

Answer ANY three questions

16. Explain the instrumentation and application of HPLC.
17. Explain primary structure of proteins &its function
18. Explain oxygen transport and respiration.
19. Explain the classification of Anesthetics with example.
20. How will you identify the given organic compound as phenol and aldehyde?

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc., DEGREE EXAMINATION

MODEL QUESTION- ALLIED CHEMISTRY – I

(ZOOLOGY)

Time: 3 hrs **Max Marks: 75**

PART – A (20 x1 = 20 Marks)

Answer all the questions

1. Which of the following is example for ionic bond.?
   a)NaCl b)Cl_2 c)F_2 d)KCl
2. NaCl crystal has a ..... structure.
   a) Tetrahedral (b) Trigonal (c) Octahedral (d) hexagonal
3. Covalent bond involves _____of electrons
   a) Sharing b)Transfering c) both d)none
4. What is the bond order for O2 molecule?
   a) 1 b) 2 c) 0 d) 3
5. Which one of the following is aromatic compound?
   a) Benzene b) alkene c)Acetylene d)chlorine
6. pH of an alkaline water will be .....
   a) zero (b) low (c) high (d) none of the above
7. **----------**refers to the capability of water to neutralize a base.
   a)Acidity b) Alkalinity c)RO d)Zeolite
8. Hardness of water is due to the presence of ____
   a)Calcium b) Ammonium c)Magnesnium d)Ammonium
9. Give an example for primary standard solution
   a)oxalic acid b) NaOH c)KMnO4 d)$Na_2S_2O_3$
10. Oxalic acid Vs NaOH is an example for _____titration
    a) Acid base b) Redox c)Conductometric d)complexometric
11. Number of Gram Equivalence per litre of solution is termed as------
    a) Mole fraction b)Molality c)Normality d)Molarity
12. The solution whose strength is known as----------solution.
    a) primary b)Secondary c)both d)none
13. The structural unit which is responsible for activity of drug is termed as ------
    a)Pharmacopore b) Pharmacokinetics c)Pharmacology d)Pharma
14. _____is used to kill micro organism
    a) Antibiotics b) antipyrectic c)analgesics d)none
15. Sulpha drugs contains----------group
    a) sulphonyl b)amine c)acid d)aldehyde

16. The first isolated antibiotic is called----------.
    a) Penicillin b)chlorophenicol c)Tetraxylene d)sulphathiazole
17. Give an example for nitrogenous fertilizer..
    a)Urea b)KCN c)K_2SO_4 d)all
18. ---------- is a substance that is toxic to plants used to destroy unwanted vegetation.
    a) Herbicides b)Fungicides c)rodenticide d) all
19. --------soil contain adquate amoount of potash, lime and phosphoric acid.
    a) Alluvial soil b) Black soil c)Red soil d)all
20. DDT stands for ----------
    a) Dichlorodiphenyltrichloroethane b) Dichlorodiphenyltrichloromethane
    c) Dichlorodiphenylethane c) Dichloromethyltrichloroethane

PART – B (5 x 5 = 25 Marks)

Answer all the questions

11. (a) Explain the characteristics of ionic bond (OR)
    (b) Draw the structure of NaCl and explain its nature of bonding.
12. (a) Explain Arrhenius concept of acid and bases. (OR)
    (b) Write short note on conjugate acid and bases.
13. (a) Define the following terms i)Molarity ii) Normality (OR)
    (b) Write short notes on standard solution and explain its types.
14. (a) Write the preparation for sulphaguanine and sulphathiazole. (OR)
    (b) Give an brief account on antibiotics.
15. (a) Describe the different types of soils. (OR)
    (b) (i) Explain the classification of nitrogeneous fertiliser with examples.

PART – C (3 x 10 = 30 Marks)

Answer ANY three questions

16. Explain the formation of covalent bond with two examples.
17. Explain the classification of acid and bases with examples.
18. Give an account on Acid –base and redox titration.
19. Explain the mechanism and mode of action of sulpha drugs.?
20. Explain the classification of pesticides.

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)
DEPARTMENT OF CHEMISTRY
B.Sc. DEGREE EXAMINATION
MODEL QUESTION- ALLIED CHEMISTRY – II
(ZOOLOGY)

Time: 3 hrs **Max Marks: 75**

PART – A (20 x1 = 20 Marks)
Answer all the questions

1. Which technique is used to separate the the compounds on the basis of difference in affinities of phase
   a)Chromatography b) Polarography
   c)Thermography d)Chromography
2. In which type of chromatographic separation occurs due to difference in partition co-efficients?
   a)Paper b)Column c)Thin layer d)Gas
3. Rf value is the distance travelled by the compound to the distance travelled by the -------
   a)solvent b)solute b)elution d)all
4. Which type of chromatography is applied to coloured and colourless substance
   a)Paper b)Column c)Thin layer d)HPLC
5. Amino acids contain ----- functional groups
   a)1 b)2 c)3 d)4
6. --------- is the pH at which the amino acid does not migrate in an electric field.
   a)Isoelectric point b)electric point c)Electronic point d)none
7. The amino acids in a polypeptide chain are linked by ---------- bonds.
   a)peptide b)amino bond c)covalent d)ionic
8. Aldehyde group present in carbohydrate is known as------
   a) Aldose b)ketose c)hexose d) sucrose
9. Vitamins are classified into ----- types.
   a) 2 b)3 c)3 d)5
10. Which element present in the chiorophyll ?
    a)Mg b)Ca c)P d)CO
11. Basic unit of Phorphyrin
    a)Indole b) Imdazole c)Quinole d)Pyrole
12. Which element is present in the haemoglobin?
    a) Cu b)Ag c) Fe d)Au
13. Which metal found in vitamin $B_{12?}$
    a) Co b) Cu c)Mg d)Sn
14. Which one is example for Narcotic analgesics?

a)Morphine b)Papaverine c)salicyladehyde d)Benzoic acid

15. Salicyladehyde group of Aspirin

a)$COOCH_3$ b) CHO c)Cl d)No_2

16. p-aminophenol used for

a) Pain reliver b)Anti-inflammatory

c)Anti-septics agen d)anti-bacterial drugs

17. Which among the following compound found only in liquid nature ?

a)amine b)acid c)monoamide d) all

18. Which compound shows aliphatic nature.?

a) Carbohydrate b) amine c) monoamide d)acid

19. Which among the following compounds contain nitrogen ?

a)Aldehyde b)amine c)acid d)alcohol.

20. Which test gives positive result for amides.?

a)Biuret test b) Silver mirror test

c)Lieberrmanns test d)Phthalein fusion test.

PART – B (5 x 5 = 25 Marks)

Answer all the questions

11. (a) Difference between paper and column chromatography. (OR)
    (b) Write short notes on methods of separation of column chromatography.
12. (a) Explain the preparation of amino acids by Gabriel method. (OR)
    (b) Write the preparation of glucose.
13. (a) Explain the structure of protein. (OR)
    (b) Write short notes on nitrogen fixation.
14. (a) Explain the mode of Action of paracetamol & ibuprofen. (OR)
    (b) Explain the analgesics with examples.
15. (a) Explain the classification of dye based on its structure. (OR)
    (b) Explain the basic operations in dyeing process.

PART – C (3 x 10 = 30 Marks)

Answer ANY three questions

16. Explain the instrumentation and application of HPLC.
17. Explain primary structure of proteins &its function
18. Explain oxygen transport and respiration.
19. Explain the classification of Anesthetics with example.
20. How will you identify the given organic compound as phenol and aldehyde?

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc. DEGREE EXAMINATION - III SEMESTER

MODEL QUESTION- ALLIED CHEMISTRY – I
(PHYSICS)

Time: 3 Hours Max. Marks: 75

PART – A (20 x1 = 20 Marks)
Answer all the questions

1. Bond order of He_2 is
   a) 0 b) 1 c) 2 d) 3
2. Which of the following has linear shape?
   a) H_2O b) NH_3 c) CH_4 d) ICl
3. Which one of the following is paramagnetic?
   a) N_2 b) NO c) CO d) O_3
4. The addition overlap of atomic orbitals produce ----------molecular orbitals.
   a) antibonding b) non bonding c) bonding d) none
5. Which of the following has sp^2 hybridisation?
   a) C_2H_4 b) C_2H_6 c) C_2H_2 d) CH_4
6. An alkyl halide can be converted into alkene by
   a) substitution b)addition c) elimination d) hydrogenation
7. Which of the following does not obey Huckel's rule?.
   a) benzene b) naphthalene c) cyclobutadiene d) anthracene
8. The electrophile involved in nitration reaction is
   a) NO^+ b) NO_2^+ c) NO^- d)NO_2^-
9. Electrolytic conduction is due to migration of
   a) protons b) electrons c) ions d) atoms
10. The unit of equivalent conductance is
    a) $ohm^{-1}cm^2$ b) ohm cm c) ohm cm^2 d) none
11. Example for an acidic buffer
    a) CH_3COOH/CH_3COONa b) NH_4OH/NH_4Cl
    c) NH_3/NH_4NO_3 d) N_2H_4/N_2H_5Br

12. pH+pOH =
    a) 4 b)12 c) 14 d) 6
13. The medicine that inhibits the growth of or destroys microorganisms are called

a) antibiotics b) antipyretics c) anaesthetics d) antihistamines

14. Which of the following is not a braod spectrum antibiotics?
    a) chloramphenicol b) tetramycine c) pencillin d) erythromycin
15. The drug used to treat bacillary dysentery is
    a) sulfapyridine b) sulfaguanidine c) sulfathaizole d) none
16. Sulfa drugs contain
    a) sulphonamide group b) sulfide group
    c) sulphate group d) sulphite group
17. Which of the following is an example of corrosion?
    a) Rusting of iron b) Tarnishing of silver
    c) Liquefaction of ammonia d) Rusting of iron and tarnishing of silver
18. Spray painting is used to:
    a) Apply paint without touching surface b) Apply large amount of paint
    c) Reach high areas d) Get textured paint
19. The pigments in paints is mixed to give desired
    a) smoothness b) colour c) appearance d) all the above
20. The liquid medium uesd in oil paints is
    a) thinner b) alcohol c) linseed oil d)turpentine

PART – B (5 x 5 = 25 Marks)

Answer all the questions

21. (a) Explain preparation, properties & uses of IF_5 (OR)
    (b) What are the differences between bonding & antibonding orbital?
22. (a) Write a note on hybridization of methane. (OR)
    (b) Explain the mechanism of nitration in Benzene.
23. (a) (i) Explain common ion effect with examples.
    (ii) Define Ph. (OR)
    (b) Describe Kohlrausch's law and its application.
24. (a) (i) Write a note on properties & uses of pencillin.
    (ii) Write a note on preparation & properties of sulphathiazole. (OR)

    (b) (i) Describe the types of antibiotics.
    (ii) Write a note on properties, uses of sulphaguanidine.
25. (a) Describe the types of corrosion and prevention of corrosion. (OR)
    (b) (i) What are the requirements of a good paint?
    (ii) How do you prepare Varnishes?

PART – C

Answer ANY three questions. 3 X 10 = 30

26. Draw MO diagram for carbon monoxide & F_2 .

27. What is meant by aromaticity? Explain the mechanism for Halogenation & Friedal-Craft alkylation of benzene.
28. Explain conductometric titration and its types in detail.
29. Explain the structure, properties and uses of Erythromycin.
30. Explain (i) Paints (ii) Thinner (iii) Binder (iv) Pigments.

18U4CHA04

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc., DEGREE EXAMINATION - IV SEMESTER

MODEL QUESTION- ALLIED CHEMISTRY – II

(PHYSICS)

Time: 3 Hours Max. Marks: 75

PART – A (20 x1 = 20 Marks)

Answer all the questions

1. Which of the following is an example for coordination compound?
   a) NaCl b) $FeSO_4(NH_4)_2SO_4.H_2O$
   c) $K_4[Fe(CN)_6]$ d) $MgSO_4$
2. Example for a neutral ligand
   a) F^- b) H_2O c) Cl^- d) Na^+
3. What is the Coordination number of Cu in $[Cu(NH_3)_4]^{2+}$?
   a) 2 b) 0 c) 4 d) 1
4. Calculate EAN for the complex $[Co(NH_3)_6]^{3+}$
   a) 36 b) 38 c) 39 d) 40
5. Aminoacids contains
   a) only amino group b) both amino and acid group
   c) only acid group d) none
6. The molecular formula for glucose is
   a) $C_6H_{12}O_6$ b) $C_6H_{10}O_6$ c) $C_{12}H_{24}O_{11}$ d) none of these
7. Starch is a
   a) monosaccharide b) disaccharide c) polysaccharide d) none of these
8. Fructose on reduction gives
   a) n-butane b) propane c) n-hexane d) n-pentane
9. The reaction takes place at anode is
   a) oxidation b) reduction c) ionisation d) elimination
10. Which of the following is not a reference electrode?
    a) hydrogen b) platinum c) silver d) calomel
11. Calomel electrode contains
    a) HgCl b) Hg_2Cl c) Hg_2Cl_2 d) none
12. The electroplating of zinc on iron is called
    a) valcanisation b) galvanisation c) both d) none
13. The drug used to reduce fever is called
    a) analgesic b) antipyretic c) antibiotic d) none of these

14. Which one of the following is an antipyretic?
    a) dettol b) penicillin c) aspirin d) all of these

15. Which is one of the following is not a pain killer?
    a) aspirin b) ibuprofen c) paracetamol d) coniine
16. The drugs used to block nerve conduction to prevent pain
    a) analgesic b) antipyretic c) antibiotic d) anaesthetic
17. The substance that imparts colour to the material is called
    a) pigment b) dye c) both d) none of these
18. Indigo is a
    a) acid dye b) base dye c) vat dye d) both a and b
19. The one which intensifies the colour of the substrate is called
    a) chromophore b) auxochrome c) hyperchrome d) hypochrome
20. Azo dyes contain--------group
    a) $-NO_2$ b) -N=N- c) –N=N=N- d) $–NH_2$

PART – B (5 x 5 = 25 Marks)
Answer all the questions

21. (a) Define the terms: i) central metal ion i) Ligand ii) coordination number (OR)
    (b) Explain EAN with examples.
22. (a) Explain the preparation of amino acids by Gabriel method. (OR)
    (b) How do you convert glucose into fructose?
23. (a) Write the principle of Electroplating & its uses. (OR)
    (b) Explain the terms batteries.
24. (a) Write a note on the mode of action of paracetamol & ibuprofen. (OR)
    (b) Explain the analgesics.
25. (a) Explain the classification of dye based on structure. (OR)
    (b) Explain the basic operations in dyeing process.

PART - C

Answer ANY three questions. 3 X 10 = 30

26. Explain the postulates of Werner's theory.
27. Explain any five reactions of glucose.
28. Write an elaborate note on electrochemical series and its applications.
29. Explain in detail about the classification of anaesthetics.
30. Write the preparation of Malachite Green & Crystal Violet.

18U3CHN01

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.A., B.Sc. & B.Com., DEGREE EXAMINATION - IV SEMESTER

MODEL QUESTION- INDUSTRIAL CHEMISTRY – I

Time: 3 Hours Max. Marks: 75

PART – A (20 x1 = 20 Marks)

Answer all the questions

1. BOD means …….
   (a) Biological oxygen demand (b) Basic oxygen demand
   (b) Bacterial oxygen demand (d) Bio oxygen demand
2. Which of the following causes alkalinity and hardness in natural water?
   (a) $CaCo_3$ (b) $Ca(HCO_3)_2$ (C) $MgCO_3$ (d) All of these
3. The teeth of the children appear discolored due to the presence of …….
   (a) Fluorides (b) Chlorides (c) Hardness (d) All of these
4. What is the pH of pure water?
   (a) 7 (b) < 7 (c) > 7 (d) 0
5. The water repelling end of soap has a …….
   (a) Negative charge (b) Positive charge (c) Both (a) & (b) (d) Neutral
6. Which of following is the residual product in the formation of soap?
   (a) Glyceraldehydes (b) Glycerol (c) Glycerin (d) Acrylonitrile
7. Which of the following are anionic detergents?
   (a) Sulphonic acid salt (b) alcohol sulphate
   (c) alkyl benzene sulphonate (d) all the above
8. What is true about soap?
   (a) Soaps are water soluble (b) Soaps are made from fats and oils
   (c) Soaps are formed from sodium or potassium salt of fatty acid (d) All the above
9. Which of the following is not a process involved in glass production?
   (a) Extrusion (b) Forming and shaping (c) Heat treatment (d) Finishing
10. How does the addition of magnesia and alumina affect the glass?
    (a) Reduces porosity (b) Enhances mechanical strength (c) Increases softening

temperature (d) Improves chemical durability

11. The main constituent of borosilicate glass is ……

(a) Silica and boron trioxide (b) Silica gel (c) Quartz (d) Sand

12. Glasses have good ……..

(a) Tensile strength (b) Mechanical property

(c) Compressive strength (d) All the above

13. Lubricants are used to reduce ……

(a) Smoothness (b) Friction (c) Resistance (d) Efficiency

14. The temperature below which the liquid loses its flow nature is …….

(a) Cloud point (b) Viscosity index (c) Pour point (d) Critical point

15. The maximum pour – point requirements for refrigerator system are about ……..for lightest grade.

(a) -10^0F (b) -20^0F (c) -30^0F (d) -40^0F

16. A good liquid lubricant must possess the property of ……..

(a) Low viscosity (b) High boiling point (c) High freezing point (d) Low oiliness

17. Octane number is a rating of …….

(a) Petrol knocking (b) Diesel knocking (c) Petrol cracking (d) Diesel cracking

18. To improve anti knock of diesel ……. are added

(a) TEL (b) Pre- ignition dopes (c) N- decane (d) Diethyl telluride

19. Petrol containing TEL is called ……..

(a) Leaded petrol (b) crude oil (c) Gasoline (d) Diesel

20. Bergius process is used to produce …….

(a) Crude oil (b) Synthetic petrol (c) Alcohol (d) Solid coal

PART – B (5 x 5 = 25 Marks)

Answer all the questions

21. (a) Write a note on colour, odour and turbidity of water. **(Or)**

(b) Write about the suspended solids present in water.

22. (a) Explain about the mechanism of cleansing action of soap. **(Or)**

(b) Discuss about the manufacture of soap.

23. (a) Write the physical properties of glass. **(Or)**

(b) Write a note on colored glass.

24. (a) Differentiate between pour - point and cloud – point. **(Or)**

(b) What are the functions of a lubricant?

25. (a) What are antiknocking agent ? Give examples. **(Or)**

(b) Write a note on synthetic petrol.

PART - C

Answer ANY three questions. **3 X 10 = 30**

26. How will you determine BOD and COD for a given water sample?
27. Explain in detail about the manufacture of detergent.
28. Describe the process of manufacture of glass.
29. What are additives present in lubricants? Explain in detail.
30. Explain about the Bergius process for the hydrogenation of coal.

18U3CHN02

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.A., B.Sc. & B.Com.DEGREE EXAMINATION - IV SEMESTER

MODEL QUESTION- MEDICINAL CHEMISTRY

Time: 3 Hours Max. Marks: 75

PART – A (20 x1 = 20 Marks)
Answer all the questions

1. 1. Who Is known as father of medicine?
   (a) Aristotle (b) Dioscorides (c) Hippocrates (d) Galen
2. The ayurvedic classification system of physiological components of human beings,vaata,pitha kaba is also followed in
   (a) Naturropathy (b) Yoga (c) Unani (d) Siddha
3. The National Institute of Ayurveda NIA is the apex institute for training and research in Ayurveda in india.where is it located ?
   (a) Bangalore (b) Chennai (c) Jaipur (d) Kolkatta
4. The Unani Systems of medicine is based on the teachings of
   (a) Galileo (b) Theodotus (c) Hippocrates (d) Herophilos
5. Drug is not an example of organized crude drug
   (a) Digitalis (b) cinchona (c) Aloe (d) Clove
6. Drug is not under the class of organized drug
   (a) Leaves (b) Fruits (c) Flowers (d) Gums
7. Which of the following drugs was inspired by nature?
   (a) Morphine (b) Salbutamol (c) Citalopram (d) Erythromycin
8. Select the does not belongs to tannin class
   (a) Colophony (b) Guar gum (c) Acacia (d) Agar
9. Drug is used as antimalerial
   (a) Tulsi (b) Ashwagandha (c) Ginseng (d) Artemesia
10. Drug is used as emetic
    (a) Agar (b) Isapgul (c) Ipecas (d) Banana
11. Drug do not used as anticancer
    (a) Podophyllum (b) curare (c) Camptotheca (d) Taxus
12. Drug is not used a a antirheumatic
    (a) Quassia (b) Aconite (c) Colchicum (d) Guggul
13. Drugs which does not belongs to fruits class
    (a) Artemesia (b) Fennel (c) Coriander (d) Colocynth
14. Drugs is not under the seed class

(a) Nux vomica (b) Digitalis (c) Stropanthus (d) Ispgol

15. Select the drug which is not showing caminative property
(a) Dill (b) Mentha (c) Senna (d) Cardamom

16. ----------is not used as cardiotonics
(a) Digitalis (b) Cinchona (c) Squill (d) Stropanthus

17. The undissolved portion of the drug that remains after extraction
(a) Solute (b) Marc (c) Solvent (d) Active drug

18. Which of the following is not the class of secondary metabolite ? (a) Amino acids (b) Terpenes (c) Alkaloids (d) Phenolics

19. Metabolic intermediates found in living systems which are essential for growth and life is called
(a) Saponins (b) Tannins (c) secondary metabolite (d) primary metabolite

20. A local sorce of glycosides is
(a) Cyanogenum esculenta (b) manihot esculenta
(c) manihot cympogon (d) manihot esculentum

PART – B (5 x 5 = 25 Marks)

Answer all the questions

2121. (a) Write a note on the scope of pharmacognosy. (OR)
(b) Give short note on siddha system of Indian medicine.

22. (a) Distinguish between Organized and unorganized drug. (OR)
(b) Evalute the drugs.

23. (a) Write a note on the preparation of crude drugs (OR)
(b) Write a note on the herbal drugs

24. (a) Give the organoleptic study of bark-cinchona. (OR)
(b) Write the uses of medicinal plants.

25. (a) Write a note on the drug adulteration. (OR)
(b) Describe briefly the secondary metabolite of locality available medicinal plants.

PART - C

Answer ANY three questions. 3 X 10 = 30

26. Define the term pharmacognosy,write the scope and development of it.

27. Define crude drugs,classify them and explain the evaluation with suitable examples

28. Give brief account on preparation of crude drugs

29. Explain the organoleptic study of any three medicinal plants

30. Discuss the Analytical Pharmacognosy

18U3CHN03

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.A., B.Sc. & B.Com. DEGREE EXAMINATION - III SEMESTER

MODEL QUESTION- WATER QUALITY ANALYSIS

Time: 3 Hours Max. Marks: 75

PART – A (20 x1 = 20 Marks)
Answer all the questions

1. Which is the first state in India to make roof top rain water harvesting compulsory to all the houses?

   a) Tamil Nadu b) Kerala c) Assam d) Goa

2. Which of the following is the major source of fresh water which is available in India?

   a) Ocean water b) River water c) Pond water d) Ground water

3. Disease caused by eating fish found in water contaminated with industrial waste having mercury is

   a) Minamata disease b) Brights disease c) Hashimotos disease d) Osteosclerosis.

4. What made organisms to build their ecosystem in quatic?

   a) Curiosity b) Evolution c) Force from other organisms d) Increase in water level

5. The optimum value in natural water is _____

   a) 2-4ppm b) 4-7ppm c) 4-6ppm d) 2-7ppm

6. By aerobic process _____ of biodegradable water is converted into the biomass.

   a) 10% b) 30% c) 50% d) 75%

7. Step of sewage water treatment in which sewage is placed in tanks and aerated with large blowers is called

   a) Primary sewage treatment b) Secondary sewage treatment

   c) Activated sludge treatment d) Chlorination.

8. Bio-chemical oxygen demand (BOD) for the first 20 days in generally referred to

   a) Initial demand b) First stage demand

   c) Carbonaceous demand d) All of these

9. Plastics enter the marine environment primarily by

   a) Being dumped or lost there b) Debris carried in runoff

c) Washing out of landfills d) None of the answers are correct

10. Carbonate hardness is caused by

a) Alkalinity b) Calcium c) bicarbonate d) sulfates

11. Hardness that cannot be removed by boiling is called

a) Temporary Hardness b) Permanent Hardness

c) Both A and B d) None of these

12. A technique used to determine the concentration of odour compounds in a sample is knowns as

a)Stripping b) Flushing c) Settling d) Chlorination

13. In filtration, the amount of dissolved solids passing through the filters is

a) Difference between total solids and suspended solids

b) Sum of total solids and Suspended Solids

c) Independent of Suspended solids d) None of the above

14. --------- is the amount of oxygen required to oxidize only organic matter in sewage.

a) Turbidity b) COD c) DO d) BOD

15. BOD/COD ration will always be

Equal to 1 b) Less than 1 c) More than 1 d) None of them

16. Fluoride pollution mainly affects

a) Kidney b) Brain c) Heart d) Teeth

17. Which of the following is a non-point source of water Pollution.

a) Sewage treatments plants b) Urban and Suburban lands

c) Factories d) All of the above

18. The oxidizing agent used in COD test is

a) KCl b) $KMnO_4$ c) Potassium chromate d) $K_2Cr_2O_7$

19. Free chloride residual refers to

a) chloramine b) hypochlorination c) trichloramine d) total chlorine

20. The higher the BOD

a) the lower the water pollution b) the lesser the bacteria in it

c) the more the water pollution d) the more the air pollution

PART – B (5 x 5 = 25 Marks)

Answer all the questions

21. (a).Explain: types of aquatic ecosystem and status of water quality in India. (OR)

(b). Write the effect of turbidity and acidity of water

22. (a). Discuss the determent effects of inorganic pollutants in water. (OR)
(b). Write short note on pH examination in water

23. (a). Write a short note on color and electrical conductivity of water. (OR)

(b). Write the classification of alkalinity and their measurement in detail.

24. (a) Briefly explain about solid content in water (OR)

(b).Explain the determent effects of organic pollutants in water

25. (a) Write notes on nitrification and denitrification. (OR)

(b). Explain notes on water management.

PART - C

Answer ANY three questions. 3 X 10 = 30

26. Details the sample techniques for waste water?

27. What is Dissolved oxygen? Explain COD and BOD in detail?

28. Explain the Abatement procedures for water pollution.

29. Explain the acidity, alkalinity, free CO_2 and free Cl^-

30. Explain the causes for water pollution

18U4CHN04

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN
(AUTONOMOUS)
DEPARTMENT OF CHEMISTRY
B.Sc., DEGREE EXAMINATION - IV SEMESTER
MODEL QUESTION- INDUSTRIAL CHEMISTRY– II

Time: 3 Hours Max. Marks: 75

PART – A (20 x1 = 20 Marks)
Answer all the questions

1. Non conventional energy sources are those energy sources that are _____
   a) Renewable b) Non-renewable c) Produced from electricity
   d) Produced from heat
2. The main application of solar cells is to generate the electricity from _____
   a) Water b) Sunlight c) Wind d) Biomass
3. The storage battery generally used in electric power station is
   a) Nickel-Cadmium battery b) Lead-Acid battery
   c) Zinc-Carbon battery d) all of these
4. The main application of solar cells is to generate the electricity from _____
   a) Water b) Sunlight c) Wind d) Biomass
5. Vulcanisation makes rubber
   a) more-elastic b) soluble in inorganic solvent
   c) crystalline d) more stiff
6. BUNA – S is otherwise called as _____
   a) Sodium rubber b) Synthesized rubber
   c) Butadiene rubber d) Styrene rubber
7. Manufacture of tyres can be done by _____
   a) BUNA – N b) Thiokol rubber
   c) Poly sulphide rubber d) BUNA – S
8. Conveyor belts are made by _____
   a) BUNA – S b) BUNA – N c) Thiokol d) Teflon
9. Temporary hardness of water is caused due to
   a) $MgCO_3$ b) $CaSO_4$ c) $MgSO_4$ d) $MgCl_2$
10. Permanent hardness of water is caused due to
   a) $MgCO_3$ b) $Mg(HCO_3)_2$ c) $MgSO_4$ d) all of the above
11. BOD is
   a) a measure of organic matter present in water b) usually less than COD
   c) biochemical oxygen demand d) all of the above
12. Which of the following is not a method of purifying water?

a) reverse osmosis b) UV radiation
c) distillation d) evaporation from pond

13. Tests for proper pasteurization are based on the activity of which enzyme?
a) Lactase b) Diastase c) Phosphatase d) Catalase

14. Pasteurization aid in which of the following?
a) killing tubercle bacillus b) killing spores
c) increasing fat content d) lowering temperature

15. Milk is a good source of all water-soluble vitamins except for _____
a) Cyanocobalmin b) Riboflavin
c) Ascorbic Acid d) Thiamine

16. Butter is made from the milk and/or cream and must contain a minimum of?
a) 5% fat b) 20% fat c) 50% fat d) 80% fat

17. Which cement is used for the construction of water-retaining structure like tanks, reservoirs, retaining walls, swimming pools, dams, bridges, piers etc?
a) Waterproof Portland Cement b) Colored Cement
c) High Alumina Cement d) Low Heat Cement

18. What is hydration of cement?
a) Chemical reaction of cement with acid
b) Chemical reaction of cement with water
c) Chemical reaction of cement with base
d) Chemical reaction of cement with salt, and acid

19. Silica in excess causes ____
a) The cement to set slowly b) The cement to set quickly
c) The cement to expand d) The cement to disintegrate

20. In the wet process, the kiln is _____
a) Horizontal b) Vertical
c) Slightly inclined with vertical d) Slightly inclined with horizontal

PART – B (5 x 5 = 25 Marks)

Answer all the questions

21. (a) What are the variuos solar energy programmes in india? (OR)
(b) Explain lead acid battery in detail.

22. (a) Write the preparation, properties and uses of PVC. (OR)
(b) Write the preparation, properties and uses of Buna-S

23. (a) How do you desalinate the brackish water? (OR)
(b) Write a note on reverse osmosis.

24. (a) What are the physical properties of milk? (OR)
(b) Write a short note on butter.

25. (a) Write a note on setting of cement. (OR)
(b) Explain the types of adhesives.

PART - C

Answer ANY three questions. **3 X 10 = 30**

26. Explain the generation of electricity from wind mills.
27. Describe in detail about vulcanisation of rubber.
28. How do you softneing the hard water by ion exchange method?
29. Explain in detail about pasteurisation of milk.
30. Explain the manufacture of cement.

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.							
Programme	**B.Sc**	Programme Code	**UCH**			Regulations	**2018-2019**	
Department	**Chemistry**		Semester				**5**	
Course Code	Course Name		Periods per Week			Credit	Maximum Marks	
			L	T	P	C	CA	ESE	Total
18U5CHCO5	**CORE PAPER-V:** **ORGANIC CHEMISTRY-I**		5			05	25	75	100
Course Objectives	1. To gain knowledge about stereoisomerism. 2. Acquire the knowledge about heterocycles. 3. To understand the reaction mechanism and reagents in organic synthesis.							
POs	**PROGRAMME OUTCOME**							
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.							
PO 2	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.							
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence.							
PO 4	Apply one's learning to real life situations.							
PO 5	Analyse and synthesise data from a variety of sources.							
PO 6	Establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.							
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group.							
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data.							
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.							
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information source.							
PO 11	Ability to work independently, identify appropriate resources required for a project.							

PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.
PO 13	Appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO 14	Building a team who can help achieve the vision, motivating and inspiring team members.
PO 15	Ability to acquire knowledge and skills.

Cos	COURSE OUTCOME
CO 1	Student will be able to get an insight into basic concept of stereoisomerism.
CO 2	Students will be skilled in solving the problems related to isomerism.
CO 3	Students will have a firm foundation in the fundamentals of heterocyclic chemistry, methods of synthesis and application of those methods for the preparation of specific groups of heterocyclic systems.
CO 4	Students will have a clear understanding of mechanisms in organic reactions.
CO 5	Students will be skilled enough to choose a reagent to carry out organic reactions.
Pre-requisites	

KNOWLEDGE LEVELS

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

Cos	KLs	POs	KLs
CO 1	1	PO 1	1
		PO 2	3
		PO 3	5
CO 2	3	PO 4	2
		PO 5	4

		PO 6	2
CO 3	2	PO 7	6
		PO 8	4
		PO 9	2
CO 4	4	PO 10	3
		PO 11	1
		PO 12	5
CO 5	3	PO 13	4
		PO 14	2
		PO 15	1

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

Cos	Programme Outcome (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	1	1	2	1	2	1	1	2	1	3	1	1	2	3
CO2	1	3	1	2	2	2	1	2	2	3	1	1	2	2	1
CO3	2	2	1	3	1	3	1	1	3	2	2	1	1	3	2
CO4	1	2	2	1	3	1	1	3	1	2	1	2	3	1	1
CO5	1	3	1	2	2	2	1	2	2	3	1	1	2	2	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect

1. Course End Delivery

Content of the Syllabus			
Unit - I	**Stereochemistry-I**	Periods	12
	Stereoisomerism - definition - classification into optical and geometrical isomerism – optical isomerism - optical activity - conditions for optical activity - asymmetric centre - achiral molecule - elements of symmetry - meaning of + and - , d and l notations - Racemization - methods of racemization - Resolution - methods of resolution -Walden inversion - Notations for optical isomers: Cahn-Ingold-Prelog rules - R-S notation - Erythro and threo representations.		
Unit - II	**Stereochemistry-II**	Periods	12
	Optical activity in compounds containing no asymmetric carbon: biphenyls, allenes and spiranes - Optical activity of lactic and tartaric acid - Geometrical isomerism: cis-trans, syn-anti, E-Z notations - Geometrical isomerism in maleic and fumaric acids - Methods of distinguishing geometrical isomers: dipole moment, dehydration and heat of hydrogenation.		
Unit - III	**Heterocyclic compounds**	Periods	12
	Heterocyclic compounds: five membered and fused heterocyclic rings: pyrrole, furan, thiophene and indole - structure, preparation and properties - aromaticity-relative reactivity of pyrrole, furan and thiophene towards electrophilic substitution reaction-preparation of six membered and fused heterocyclic compounds: pyridine, quinoline, isoquinoline		
Unit - IV	**Molecular rearrangements**	Periods	12
	Benzil-benzilic acid, Wolff, Beckmann, Cope, Hofmann, Curtius, Favorski, Schmidt and Fries rearrangements.		
Unit - V	**Reagents of synthetic importance**	Periods	12
	Sodium borohydride, Lithium aluminium hydride, Manganese dioxide, N-bromosuccinimide, Osmium tetraoxide, Periodic acid, Ziegler-Natta catalyst and Grignard reagent.		
	Total Periods		60

Text Books	
1	I.L. Finar, Organic chemistry Vol I sixth edition, ELBS, Pearson Education Ltd.,2004
2	I.L. Finar, Organic chemistry Vol II fifth edition, ELBS, Pearson Education Ltd.,2012
3	O.P. Agarwal, Reactions and Reagents, Krishna prakashan media (p) Ltd., 1975
4	P.S. Kalsi, Stereochemistry, Conformation and Mechanism, New Age International (p) Ltd, VIIth, 2008.
5	B.S. Bhal and Arun Bhal, A text book of organic chemistry, S.Chand & company ltd, 1948.
References	
1	K.S.Tewari, and N.K.Vishoni, Organic Chemistry, Vikas Publishing House.
2	P.L. Soni and H.M. Chawla Text book of organic chemistry, 26th revised edition, Sultan chand and sons, 1995.
3	R.T.Morrison and Boyd, Organic Chemistry, VIth edition, PHI Learning Pvt Ltd., 2008.
4	M. K. Jain and S. C. Sharma, Modern Organic Chemistry, Vishal Publishing Co. 2018.
5	B. Mehta and M. Mehta, Organic Chemistry, PHI learning Publishers.
E-References	
1	https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Supplemental_Modules_(Organic_Chemistry)/Fundamentals/Isomerism_in_Organic_Compounds/Optical_Isomerism_in_Organic_Molecules
2	https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Supplemental_Modules_(Organic_Chemistry)/Fundamentals/Isomerism_in_Organic_Compounds/Geometric_Isomerism_in_Organic_Molecules
3	http://www.3rd1000.com/chem301/chem302a.htm
4	https://www.scribd.com/doc/97295442/Molecular-Rearrangements
5	https://www.wiley.com/en-us/Molecular+Rearrangements+in+Organic+Synthesis-p-9781118347966

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.							
Programme	**B.Sc**	Programme Code	**UCH**			Regulations		**2018-2019**
Department	**Chemistry**		Semester					**5**
Course Code	Course Name		Periods per Week			Credit	Maximum Marks	
			L	T	P	C	CA	ESE	Total
18U5CHCO6	**CORE PAPER-VI: INORGANIC CHEMISTRY-I**		5			05	25	75	100
Course Objectives	1. To help the student to understand the basic concepts in inorganic chemistry and to develop their critical thinking. 2. To learn the basics and applications of the inorganic compounds. 3.To learn the coordination complexes and limitation.							
POs	**PROGRAMME OUTCOME**							
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.							
PO 2	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.							
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence.							
PO 4	Apply one's learning to real life situations.							
PO 5	Analyse and synthesise data from a variety of sources.							
PO 6	Establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.							
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group.							
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data.							
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.							
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information source.							
PO 11	Ability to work independently, identify appropriate resources required for a project.							
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.							

PO 13	Appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO 14	Building a team who can help achieve the vision, motivating and inspiring team members.
PO 15	Ability to acquire knowledge and skills.

COs	**COURSE OUTCOME**
CO 1	Students known basics in acid and bases
CO 2	Students able to understand the solvents
CO 3	Students enhanced their knowledge of coordination complexes
CO 4	Students learn the importance of f- block elements
CO 5	Students will be able to interpret the applications of inorganic compounds in day to day life.
Pre-requisites	

KNOWLEDGE LEVELS			
1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing			
CO / PO / KL Mapping **(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)**			
Cos	KLs	POs	KLs
CO 1	1	PO 1	2
		PO 2	3
		PO 3	5
CO 2	3	PO 4	1
		PO 5	4
		PO 6	3
CO 3	2	PO 7	6
		PO 8	3
		PO 9	1

CO 4	4	PO 10	2
		PO 11	4
		PO 12	4
CO 5	5	PO 13	2
		PO 14	2
		PO 15	5

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	**Programme Outcome (POs)**														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	1	1	3	1	1	1	1	3	2	1	1	2	2	1
CO2	2	3	1	1	2	3	1	3	1	2	2	2	2	2	1
CO3	3	2	1	2	1	2	1	2	2	3	1	1	3	3	1
CO4	1	2	2	1	3	2	1	2	1	1	3	3	1	1	2
CO5	1	1	3	1	2	1	2	1	1	1	2	2	1	1	3

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	**Modern Concepts of Acids and Bases**	Periods	12

	Acids and Bases - Arrhenius concept - Bronsted - Lowry concept - Luxflood concept - Lewis concepts of acids and bases - Usanovich concept - Conjugate acid - base pairs - Relative strength of acids and bases: Hydracids & Oxyacids - Levelling & Differentiating solvents - Solvent system concept. Hard and Soft Acids and Bases - Classification of acids and bases as hard and soft – examples - Pearson's HSAB Principle and its applications.		
Unit - II	**Non-Aqueous Solvents**	Periods	12
	Classification of solvents - General Characteristics of a solvent, Reaction in non aqueous solvents with reference to liq NH_3, Solutions of alkali metals in ammonia, liq SO_2, anhydrous H_2SO_4, liq.HF, and molten salts.		
Unit - III	**Chemistry of f-Block Elements**	Periods	12
	Position in the periodic table - general characteristics of Lanthanides and Actinides- Lanthanide contraction and its consequences - Isolation of Lanthanides from monazite including the Ion exchange resin methods - Actinides - occurrence and preparation - Chemistry of thorium and uranium.		
Unit - IV	**Coordination Chemistry-I**	Periods	12
	Definition and classification of ligands - Nomenclature of mononuclear and poly nuclear complexes - chelating ligands - chelate effect - coordination number and stereochemistry of complexes - Isomerism in complexes - structural isomerism - stereo isomerism - geometrical isomerism and optical isomerism in 4 and 6 coordinated complexes – Werner's theory & its evidences - Sidgwick theory - EAN rule and its applications.		
Unit - V	**Coordination Chemistry-II**	Periods	12
	Theories of bonding in complexes: VB theory - postulates - Hybridization and Geometry of complexes - Outer orbital and inner orbital octahedral complexes - Square planar - tetrahedral complexes - Magnetic properties of complexes - limitations of VB theory. Crystal Field Theory - postulates - d orbital splitting in octahedral, tetrahedral and square planar complexes - strong and weak field ligands - Spectro chemical series - High spin and Low spin complexes - Colour and Magnetic properties of complexes - CFSE and its uses - Limitations of CFT-Comparison between VBT and CFT.		
Total Periods			60

Text Books	
1	Puri, Sharma, Kalia, Principles of Inorganic Chemistry 32nd Edition (2014), Milestone Publishers and Distributor, New Delhi, Wahid. U. Malik, G. D. Tuli,
2	R. D. Madan, Selected topics in Inorganic Chemistry,S.Chand & company, New Delhi.
References	
1	S. Prakash, G.D. Tuli, S.K. Basu and R.D. Madan, Advanced Inorganic Chemistry - Vol - I (2006), S. Chand Publishing, New Delhi.
2	S. Prakash, G.D. Tuli, S.K. Basu and R.D. Madan, Advanced Inorganic Chemistry - Vol - II (2006), S. Chand Publishing, New Delhi.
E-References	
1	https://en.wikibooks.org/wiki/Introduction_to_Inorganic_Chemistry

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.						
Programme	**B.Sc**	Programme Code	**UCH**		Regulations		**2018-2019**
Department	**Chemistry**		Semester				**5**
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T P	C	CA	ESE Total
18U5CHCO7	**CORE PAPER-VII: PHYSICAL CHEMISTRY-I**		5		5	25	75 100
Course Objectives	1. To facilitate the students to study about the nature of solutions, kinetics of reactions. 2. To learn the concepts of chemical equilibrium. 3. To acquaint the knowledge for derivation of reaction rates, rate constants of various chemical reactions.						
POs	**PROGRAMME OUTCOME**						
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.						
PO 2	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.						
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence.						
PO 4	Apply one's learning to real life situations.						
PO 5	Analyse and synthesise data from a variety of sources.						
PO 6	Establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.						
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group.						
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data.						
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.						
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information source.						
PO 11	Ability to work independently, identify appropriate resources required for a project.						
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.						

PO 13	Appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO 14	Building a team who can help achieve the vision, motivating and inspiring team members.
PO 15	Ability to acquire knowledge and skills.

COs	**COURSE OUTCOME**
CO 1	Students will learn the laws of solutions and deviations of solution w.r.t. pressure, temperature and volume
CO 2	Students can understand fundamental concepts of chemical equilibrium.
CO 3	Students will have enhanced knowledge towards advanced conception of chemical equilibrium.
CO 4	Students will able to understand and explain the theories of chemical kinetics.
CO 5	Students will be skilled in solving the problems of Kinetics.
Pre-requisites	

KNOWLEDGE LEVELS			
1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing			
CO / PO / KL Mapping **(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)**			
Cos	KLs	POs	KLs
CO 1	2	PO 1	2
		PO 2	1
		PO 3	4
CO 2	5	PO 4	2
		PO 5	3
		PO 6	5
CO 3	3	PO 7	3
		PO 8	6
		PO 9	2

CO 4	6	PO 10	3
		PO 11	1
		PO 12	4
CO 5	4	PO 13	2
		PO 14	3
		PO 15	5

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

Cos	Programme Outcome (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	3	2	1	2	1	3	2	2	1	3	2	1
CO2	1	1	2	1	1	3	1	2	1	1	1	2	1	1	3
CO3	2	1	2	2	3	1	1	1	2	3	1	2	2	3	1
CO4	1	1	1	1	1	2	1	3	1	1	1	1	1	1	2
CO5	1	1	3	1	2	2	2	1	1	2	1	3	1	2	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	**Solutions**	Periods	12

	Solutions of gases in liquids – Henry's law - solutions of liquids in liquids – Raoult's law. Ideal solution - Binary liquid mixture - deviation from ideal behavior -Thermodynamics of ideal solutions - V-P-composition curves, V-P-temperature curves - Azeotropic distillation. Theory of fractional distillation, Steam distillation, Determination of Solubility, Solubility Curves. Nernst's distribution law- Colligative properties- Introduction, Thermodynamic derivations, applications and limitations. Thermodynamic derivation of elevation of boiling point and depression of freezing point- Van't Hoff factor- Abnormal molecular mass.		
Unit - II	**Chemical Equilibrium- I**	Periods	12
	Reversible reactions - nature of chemical equilibrium - definition, characteristics of chemical equilibrium - Law of mass action. Equilibrium Law - Derivation - equilibrium constant expression in terms of general and concentration, partial pressure and mole fraction- Heterogeneous equilibrium - Related problems. Thermodynamic derivation of law of chemical equilibrium (K_p, K_c and K_x)- Relations between K_p, K_c and K_x - Problems related to K_p and K_c.		
Unit - III	**Chemical Equilibrium- II**	Periods	12
	Equilibrium law for ideal gases - Effect of inert gas on reaction equilibrium. Le Chatelier's principle - effect of change in concentration, pressure and temperature. Derivation of van't Hoff reaction isotherm. de-Donder's treatment of chemical equilibria -Donnan Equilibrium membrane- concept of chemical affinities. Temperature dependence of equilibrium constant – van't Hoff Isochore - Pressure dependence of equilibrium constant.		
Unit - IV	**Chemical Kinetics-I**	Periods	12
	Chemical kinetics and its scope - rate of a reaction, factors influencing the rate of the reaction. Order and molecularity of a reaction: Definition, types - difference between order and molecularity - Derivation of rate constant and half life period for zero, first order reactions - Derivation of rate constant for second order (same and different initial concentrations) and third order reactions (same initial concentrations only). Methods to determine the order of the reaction - Isolation and half life methods. Kinetics of complex reactions. Parallel and consecutive reactions only.		
Unit - V	**Chemical Kinetics-II**	Periods	12
	Theories of chemical kinetics: Arrhenius equation, effect of temperature on rate of reaction, concept of activation energy. Collision theory of reaction rates- introduction, Derivation of rate constant for bimolecular reaction from collision theory, Failures of CT. Lindemann theory - Introduction, Derivation of rate constant for unimolecular reaction. Theory of absolute reaction rates- Introduction, Thermodynamic derivation		

	of rate constant for bimolecular reaction based on ARRT.	
Total Periods		60

Text Books	
1	A. Bahl, B.S. Bahl and G.D. Tuli, Essentials of Physical Chemistry, Revised multicolor edition, S. Chand publication Ltd, New Delhi, 2010.
2	B.R. Puri, L.R. Sharma, M.S. Pathania, Principles of Physical Chemistry, (47th edition) Vishal Publishing Co., New Delhi, 2017.
3	N. Kundu and S.K. Jain, Physical Chemistry, S. Chand & Company Ltd, New Delhi, 1990.
References	
1	P. Atkins and J.D. Paula, Physical Chemistry, 7th Edn, Oxford University Press, New York, 2002.
2	J.Rajaram and J.C.Kuriacose, Kinetics and mechanisms of chemical transformations, First edition, Macmillan Publishers India Ltd, New Delhi, 2011.
3	R.P.Rastogi and R.R.Misra, An introduction to chemical thermodynamics, 6th revised edition, Vikas Publishing House Pvt. Ltd, New Delhi, 2005.
E-References	
1	https://www.britannica.com/science
2	https://www.chemqueries.com
3	https://socratic.org/Chemistry
4	https://chem.libretexts.org
5	https://www.askiitians.com/Physical Chemistry/Chemical Kinetics

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.						
Programme	**B.Sc**	Programme Code	**UCH**		Regulations	**2018-2019**	
Department	**Chemistry**		Semester			**5**	
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
18U5CHEO1	**ELECTIVE COURSE - I: ANALYTICAL CHEMISTRY**	5			5	25	75	100
Course Objectives	1. To help the student to develop the habit of accurate manipulation and an attitude of critical thinking. 2. To learn the basic analytical methods and appreciate what is involved in an analysis. 3. To develop the student knowledge to handle the chemicals in proper and hygiene manner.							
POs	**PROGRAMME OUTCOME**							
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.							
PO 2	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.							
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence.							
PO 4	Apply one's learning to real life situations.							
PO 5	Analyse and synthesise data from a variety of sources.							
PO 6	Establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.							
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group.							
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data.							
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.							
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information source.							
PO 11	Ability to work independently, identify appropriate resources required for a project.							
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.							

PO 13	Appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO 14	Building a team who can help achieve the vision, motivating and inspiring team members.
PO 15	Ability to acquire knowledge and skills.

COs	COURSE OUTCOME
CO 1	Students will utilize the learned analytical skills in handling various chemical and biochemical instruments.
CO 2	Students will be able to learn basic understanding on precipitation and gravimetric techniques.
CO 3	Students will have basic understanding on purification and separation techniques.
CO 4	Students will be able to interpret the results of quantitative experiments and interpret the data in meaningful way.
CO 5	Students will have a thorough understanding of thermal and electro analytical techniques.
Pre-requisites	

KNOWLEDGE LEVELS

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

Cos	KLs	POs	KLs
CO 1	2	PO 1	3
		PO 2	5
		PO 3	3
CO 2	1	PO 4	1
		PO 5	2
		PO 6	4
CO 3	4	PO 7	6
		PO 8	2
		PO 9	3
	3	PO 10	5

CO 4		PO 11	4
		PO 12	4
CO 5	5	PO 13	3
		PO 14	2
		PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	**Programme Outcome (POs)**														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	1	2	2	3	1	1	3	2	1	1	1	2	3	2
CO2	1	1	1	3	2	1	1	2	1	1	1	1	1	2	1
CO3	2	2	2	1	1	3	1	1	2	2	3	3	2	1	2
CO4	3	1	3	1	2	2	1	2	3	1	2	2	3	2	3
CO5	1	3	1	1	1	2	2	1	1	3	2	2	1	1	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
	Laboratory Hygiene and safety	Periods	12

Unit - I	Storage and handling of corrosive, flammable, explosive, toxic, carcinogenic and poisonous chemicals. Simple first aid procedures for accidents involving acids, alkalis, bromine, burns and cut by glass. Threshold vapour concentration - safe limits. Waste disposal. Heating methods, stirring methods, filtration techniques. Calibration of pipette, standard measuring flask and burette. Weighing principle in chemical balance and single pan balance.		
Unit - II	**Gravimetric Analysis**	Periods	12
	Principle-theories of precipitation-solubility product and precipitation-factors affecting Solubility product- precipitation errors- Co-precipitation and post-precipitation, Reduction of errors. Precipitation from homogeneous solution, washing and drying of precipitate. Calculation in gravimetric analysis - use of gravimetric factor. Choice of precipitant-specific and selective precipitant- Anthranilic acid, cupferon, DMG, ethylenediamine, 8- hydroxyquinoline, salicylaldoxime, use of masking and demasking agent. Crucibles-types, care and uses.		
Unit - III	**Purification Techniques**	Periods	12
	Dessicant: Types of dessicant: Relative efficiencies of dessicant, Drying power and temperature, Regeneration of dessicant, choice of dessicants - Technique of drying: Drying of solids. Purification of solid organic compounds - Recrystallisation, Extraction, sublimation, use of miscible solvents, use of drying agents and their properties. Purification of liquids- Distillation: Theory of distillations; Technique; Fractional distillation, Steam distillation, azeotropic and vaccum distillation.		
Unit - IV	**Chromatographic Techniques**	Periods	12
	Introduction - Adsorption Chromatography-Partition Chromatography. Column Chromatography - principle, types of adsorbents, preparation of the column, elution, recovery of substances and applications. TLC –Principle, Choice of adsorbent and solvent, preparation of chromatoplates, R_f - value, factors affecting the R_f values. Significance of R_f value. Paper chromatography - principle, solvents used, paper electrophoresis - separation of amino acids. Gas Chromatography (GC)-principle - instrumentation and applications of Gas Chromatography (GC) and High pressure liquid chromatography (HPLC). High pressure liquid chromatography (HPLC)-principle - instrumentation and advantages.		
Unit - V	**Thermal and electroanalytical techniques**	Periods	12

	Principle - Thermogravimetric analysis and Differential Thermal Analysis - discussion of various components with block diagram- TGA & DTA curves of $CuSO_4.5H_2O$ and $CaC_2O_4.H_2O$ in air and in CO_2- factors affecting TGA & DTA curves. Polarography- principle, concentration polarization, dropping mercury electrode (DME)- advantages and disadvantages- migration, residual, limiting and diffusion currents- Use of supporting electrolytes- Ilkovic equation (derivation not required) and significance- current voltage curve- oxygen wave. Half wave potential (E1/2)- Polarography as an analytical tool in quantitative and qualitative analysis.
Total Periods	60

Text Books	
1	D.A. Skoog, D.M. West and F.J. Holler, Analytical Chemistry: An Introduction, 5th edition, Saunders college publishing, Philadelphia, 1990.
2	U.N. Dash, Analytical Chemistry: Theory and Practice, Sultan Chand and sons Educational Publishers, New Delhi, 1995.
3	R.A. Day Jr. A.L. Underwood, Quantitatives Analysis, 5th edition, Prentice Hall of India Private Ltd., New Delhi, 1988
4	R. Gopalan, Analytical Chemistry, S. Chand and Co., New Delhi
References	
1	Elementary Organic Spectroscopy: Principles and Chemical Applications, S.Chand and company Ltd., Ram Nagar, New Delhi, 1990
2	V.K. Srivastava, K.K. Srivastava, Introduction to Chromatography: Theory and Practice, S. Chand and company, New Delhi, 1987
3	R.M. Roberts, J.C. Gilbert, L.B. Rodewald, A.S. Wingrove, Modern Experimental Organic Chemistry, 4th edition, Holt Saunders international editions
4	A.K. Srivastava, P.C. Jain, Chemical Analysis: An Instrumental Approach for B.Sc. Hons. and M.Sc. Classes, S. Chand and company Ltd., Ram Nagar, New Delhi
E-References	
1	https://www.news-medical.net/life-sciences/Analytical-Chemistry-Techniques.aspx.
2	https://www.toppr.com/guides/chemistry/organic-chemistry/purification-of-organic-compounds
3	https://www.hitachihightech.com/global/products/science/tech/ana/thermal/descriptions/ta.html

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.						
Programme	**B.Sc**	Programme Code	**UCH**		Regulations	**2018-2019**	
Department	**Chemistry**		Semester			**5**	
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
18U5CHSO1	**SKILL BASED ELECTIVE COURSE – I** **SPECTROSCOPY**	2			2	25	75	100
Course Objectives	Students acquire the knowledge about the fundamentals and different types of spectroscopy. Students can able to interpret unknown compounds through UV, FT-IR, Raman, NMR, Mass spectroscopy. Students can able to identify the structure of unknown compounds and application of spectroscopy.						
POs	**PROGRAMME OUTCOME**						
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.						

PO 2	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence.
PO 4	Apply one's learning to real life situations.
PO 5	Analyse and synthesise data from a variety of sources.
PO 6	Establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group.
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data.
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information source.
PO 11	Ability to work independently, identify appropriate resources required for a project.
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.
PO 13	Appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO 14	Building a team who can help achieve the vision, motivating and inspiring team members.
PO 15	Ability to acquire knowledge and skills.

COs	COURSE OUTCOME
CO 1	Student will be able to understand the principle, instrumentation and applications of Rotational Spectroscopy.
CO 2	Students will be skilled in UV spectroscopy and it's applications.
CO 3	Students can able to learn theory, laws, and types of band and applications of IR Spectroscopy. Knowledge of students will be developed in the field of Raman spectroscopy by the learning of Scattering, stokes and anti-stokes line etc.
CO 4	Students can able to understand the concept of NMR spectrum and its applications.
CO 5	Students will be skilled in different types of peak, Nitrogen rule and fragmentation of Mass spectroscopy.
Pre-requisites	

KNOWLEDGE LEVELS
1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing
CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)			
Cos	KLs	POs	KLs
CO 1	2	PO 1	3
		PO 2	2
		PO 3	4
CO 2	1	PO 4	5
		PO 5	1
		PO 6	4
CO 3	3	PO 7	3
		PO 8	5
		PO 9	2
CO 4	4	PO 10	3
		PO 11	5
		PO 12	4
CO 5	3	PO 13	3
		PO 14	2
		PO 15	5

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

Cos	Programme Outcome (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	3	1	1	2	1	2	1	3	2	1	1	2	3	1
CO2	1	2	1	1	3	1	1	1	2	1	1	1	1	2	1
CO3	3	2	2	1	1	2	1	1	2	3	1	2	3	2	1
CO4	2	1	3	2	1	3	2	2	1	2	2	3	2	1	2

CO5	3	2	2	1	1	2	1	1	2	3	1	2	3	2	1

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit - I	**Rotational Spectroscopy**	Periods	6
	Fundamental concepts electromagnetic spectrum - Region of spectrum, Interaction of radiation with matter. Rotational Spectroscopy - Principle-Instrumentation-Selection rules for rotational spectroscopy - Molecular rotation-diatomic molecule as rigid rotor-diatomic molecule as non-rigid rotor. Applications of rotation spectra: bond length-isotopic substitution.		
Unit - II	**UV-VIS spectroscopy**	Periods	6
	Theory-Instrumentation-Beer-Lamberts Law - bands in UV-VIS spectrum - possible electronic transitions - types of electronic transitions based on selection rules - characteristic absorption (λmax and εmax) of carbonyl, isolated double bond, conjugated double bond systems and aryl groups - factors influencing the absorption. Spectroscopic terms: Chromophore, Auxochrome, Bathochromic shift, Hypsochromic shift, Hypochromic shift and Hyperchromic shift.		
Unit - III	**IR & Raman Spectroscopy**	Periods	6
	Theory-Instrumentation- Hooke's Law - bands in IR spectrum - Units- Number and types of fundamental vibrations-Modes of vibrations and their energies- Factor affecting the frequency of absorption-Conjugation, inductive effect and hydrogen bonding. Applications of IR -Identification of Functional groups. Rayleigh scattering and Raman scattering - Stokes and anti-stokes lines in Raman spectra - Raman frequency - condition for a molecule to be Raman active - Comparison of Raman and IR spectra. Applications of Raman spectroscopy.		

Unit - IV	**NMR spectroscopy**	Periods	6
	Nuclear spin and conditions for a molecule to give rise to NMR spectrum- Theory of NMR spectra-Instrumentation- chemical shift, Number of NMR signals - shielding, de-shielding, Factors influencing chemical shift. TMS & its applications, peak area and number of protons -splitting of signals-spin-spin coupling.		
Unit - V	**Mass spectroscopy**	Periods	6
	Basic Principles - Instrumentation - Molecular ion peak, metastable peak, base peak and isotopic peak - their uses- Nitrogen rule-Ring rule-Fragmentation of alkanes, alkenes, cycloalkane and alcohol - McLafferty rearrangement- Applications of Mass spectroscopy.		
Total Periods			30

Text Books	
1	C. Anand, Instrumental methods of chemical analysis, Himalaya Publishing, 1980.
2	Y.R.Sharma, Elementary Organic Absorption Spectroscopy-principles and chemical applications, S.Chand and Co., 2006.
3	K.V. Raman, R. Gopalan and P.S. Ragavan, Molecular spectroscopy, K.V. Raman, R. Gopalan and P.S. Ragavan Thomson Publications, 2004.
References	
1	C.N. Banwell, Mc Cash and M. Elaine, Fundamentals of Molecular Spectroscopy, Tata Mc.Graw Hill Publishing, New Delhi, 1994.
2	J. Mohan, Organic Analytical Chemistry, Narosa Publishers, 2003.
3	W. Kemp, Organic Spectroscopy, 3rd Edition, Palgrave publishers, 2007.
4	R.M.Silverstein, F.X.Webster, D.J. Kiemle, D.L. Bryce, Spectrometric Identification of Organic compounds, 8th Edition, 2015.
5	G. Aruldhas, Molecular Structure and Spectroscopy, PHI Learning Pvt. Ltd., 2004.
E-References	
1	https://nptel.ac.in/courses/122101001/downloads/lec-13.pdf
2	https://en.wikipedia.org/wiki/Rotational_spectroscopy
3	https://nptel.ac.in/courses/102103044/pdf/mod2.pdf
4	www.mssl.ucl.ac.uk/~gbr/workshop3/papers/Paerels_school_Mar17.pdf

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.						
Programme	**B.Sc**	Programme Code	**UCH**		Regulations	**2018-2019**	
Department	**Chemistry**		Semester			**6**	
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
18U6CHCO8	**CORE PAPER-VIII: ORGANIC CHEMISTRY-II**	5			5	25	75	100
Course Objectives	1. To gain knowledge about fats, oils and waxes. 2. To understand the properties and structure of alkaloids and terpenoids. 3. Acquire the knowledge about steroids, amino acids, proteins and carbohydrates.							
POs	**PROGRAMME OUTCOME**							
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.							
PO 2	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.							
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence.							
PO 4	Apply one's learning to real life situations.							
PO 5	Analyse and synthesise data from a variety of sources.							
PO 6	Establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.							
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group.							
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data.							
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.							
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information source.							
PO 11	Ability to work independently, identify appropriate resources required for a project.							
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.							
PO 13	Appreciating environmental and sustainability issues; and adopting objective, unbiased							

	and truthful actions in all aspects of work.
PO 14	Building a team who can help achieve the vision, motivating and inspiring team members.
PO 15	Ability to acquire knowledge and skills.

COs	COURSE OUTCOME
CO 1	To gain an insight into fats, oils, wax and detergents.
CO 2	To gain knowledge about the properties and structure of organic compounds like terpenoids, alkaloids derived from plant materials.
CO 3	To understand the structure of some steroidal hormones and vitamins.
CO 4	To gain an insight into amino acids and its preparation, proteins structure and nucleic acids.
CO 5	To acquire basic knowledge of monosaccharides and disaccharides.
Pre-requisites	

KNOWLEDGE LEVELS			
1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing			
CO / PO / KL Mapping **(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)**			
Cos	KLs	POs	KLs
CO 1	2	PO 1	3
		PO 2	4
		PO 3	6
CO 2	3	PO 4	1
		PO 5	3
		PO 6	2
CO 3	1	PO 7	4
		PO 8	5
		PO 9	3

CO 4	4	PO 10	1
		PO 11	4
		PO 12	2
CO 5	5	PO 13	6
		PO 14	2
		PO 15	4

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	**Programme Outcome (POs)**														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	1	1	2	2	3	1	1	2	2	1	3	1	3	1
CO2	3	2	1	1	3	2	2	1	3	1	2	2	1	2	2
CO3	1	1	1	3	1	2	1	1	1	3	1	2	1	2	1
CO4	2	3	1	1	2	1	1	2	2	1	3	1	1	1	3
CO5	1	2	2	1	1	1	2	3	1	1	2	1	2	1	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	**Fats, Oils and Wax**	Periods	12
	Occurrence, properties - hydrogenation - drying of oils - hydrogenolysis - rancidity - analysis of oils and fats: saponification value and iodine number - synthetic detergents: cationic, anionic and non-ionic detergents - occurrence of wax - difference between wax and lipids - compound lipids: phospholipids, Sphingolipids and glycolipids.		
Unit - II	**Terpenoids and Alkaloids**	Periods	12
	Terpenoids and alkaloids- Occurrence - Terpenes: General methods of determination of structure of alkaloids are added. Definition - general properties- classification and isolation - isoprene rule - structural elucidation of citral, geraniol and menthol. Alkaloids: Definition - general properties - classification - isolation - structure determination of conine, piperine, nicotine.		
Unit - III	**Steroids, Hormones and Vitamins**	Periods	12
	Steroids: Definition- Cholesterol and Ergosterol (structure only) - Steroidal harmones: Androsterones, Testrosterone, Progestrone and Oestrone (structure only) - Vitamins: Water and Fat soluble vitamins - Occurrence and biological importance of thiamine, riboflavin, pyridoxine and ascorbic acid – structural elucidation of pyridoxine and ascorbic acid.		
Unit - IV	**Amino acids, proteins and nucleic acids**	Periods	12
	Amino acids: - classification - essential and non essential amino acids - preparation of α-amino acids- zwitter ion, isoelectric point - Peptides- synthesis of peptide: Bergmann method, Sheehan method – Proteins - primary and secondary structure of proteins - End group analysis - Nucleic acids: Types of nucleic acids and constituents.		
Unit - V	**Carbohydrates**	Periods	12
	Classification - Monosaccharide: Constitution of glucose and fructose - Reactions of glucose and fructose – Mutarotation and its mechanism - Cyclic structure - pyranose and furanose forms - Fischer and Haworth projection of glucose and fructose - Disaccharides: Structure and reactions of maltose and sucrose (Structural elucidation not necessary).		
Total Periods			60

Text Books	
1	I.L.Finar Organic chemistry vol I & II- ELBS, Pearson Education Ltd., 2008
2	O.P. Agarwal- Reactions and Reagents- Krishna prakashan media (p) Ltd., 1975
3	B.S.Bhal and Arun Bhal- A text book of organic chemistry, S. Chand & company Ltd, 1948.
References	
1	K.S. Tewari, and N.K. Vishoni, Organic Chemistry, Vikas Publishing House.l I & II- ELBS, Pearson Education Ltd., 2008
2	P.L.Soni and H.M.Chawla. Text book of organic chemistry, 26th revised edition, Sultan chand and sons, 1995
3	R.T. Morrison and Boyd, Organic Chemistry, VIth edition., PHI Learning Pvt Ltd., 2008.
4	Modern Organic Chemistry, M. K. Jain and S. C. Sharma, Vishal Publishing Co. 2018
5	Organic Chemistry, Bhupinder Mehta and Manju Mehta, PHI learning Publishers.
E-References	
1	https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Map%3A_Organic_Chemistry_(McMurry)/27%3A_Biomolecules Lipids/27.03%3A_Waxes%2C_Fats%2C_and_Oils.
2	https://www.britannica.com/science/alkaloid
3	https://chem.libretexts.org/Bookshelves/Biological_Chemistry/Supplemental_Modules_(Biological_Chemistry)/Lipids/Steroids
4	https://www.thoughtco.com/amino-acid-373556
5	https://microbenotes.com/carbohydrates-structure-properties-classification-and-functions

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.						
Programme	**B.Sc**	Programme Code	**UCH**		Regulations	**2018-2019**	
Department	**Chemistry**		Semester			**6**	
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
18U6CHCO9	**CORE PAPER-IX: INORGANIC CHEMISTRY-II**	5			5	25	75	100
Course Objectives	1. To study the structure of some crystals. 2. To gain knowledge of some important electron deficient compounds. 3. Acquire the knowledge about coordination chemistry and organo-metallic compounds.							
POs	**PROGRAMME OUTCOME**							
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.							
PO 2	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.							
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence.							
PO 4	Apply one's learning to real life situations.							
PO 5	Analyse and synthesise data from a variety of sources.							
PO 6	Establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.							
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group.							
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data.							
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.							
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information source.							
PO 11	Ability to work independently, identify appropriate resources required for a project.							
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.							

PO 13	Appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO 14	Building a team who can help achieve the vision, motivating and inspiring team members.
PO 15	Ability to acquire knowledge and skills.

COs	**COURSE OUTCOME**
CO 1	Students gain knowledge about the geometry of crystals and its significance
CO 2	Students capable to recognize the inter halogens and pseudo halogens.
CO 3	Students improved their understanding towards preparation of some electron deficient compounds.
CO 4	Students become skilled at the importance of coordination chemistry.
CO 5	Students can identify and understanding the structures of some organo-metallic compounds
Pre-requisites	

KNOWLEDGE LEVELS			
1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing			
CO / PO / KL Mapping **(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)**			
Cos	KLs	POs	KLs
CO 1	1	PO 1	1
		PO 2	3
		PO 3	2
CO 2	2	PO 4	4
		PO 5	6
		PO 6	2
CO 3	2	PO 7	4
		PO 8	3

		PO 9	4
CO 4	3	PO 10	5
		PO 11	3
		PO 12	2
CO 5	4	PO 13	1
		PO 14	4
		PO 15	5

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	**Programme Outcome (POs)**														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	1	2	1	1	2	1	1	1	1	1	2	3	1	1
CO2	2	2	3	1	1	3	1	2	1	1	2	3	2	1	1
CO3	2	2	3	1	1	3	1	2	1	1	2	3	2	1	1
CO4	1	3	2	2	1	2	2	3	2	1	3	2	1	2	1
CO5	1	2	1	3	1	1	1	2	3	2	2	1	1	3	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit – I	**Solid State Chemistry**	Periods	12
	Crystalline and Amorphous solids - Differences - Symmetry in crystals - Basic crystal systems - Space lattice and unit cell - Bravais lattices-CCP, FCP, BCP, Packing efficiency - Miller indices - Types of crystals - Radius ratio rule and its applications - Structure of Sodium Chloride, Cesium Chloride, Zinc blende and Wurtzite. Defects in ionic crystals: Schottky, Frenkel, Metal excess and metal deficiency defects.		
Unit – II	**Inter Halogens and Pseudohalogens**	Periods	12
	Definition - similarities and dissimilarities between halogen and pseudohalogen - preparation, properties, structure and uses of cyanogen and thiocyanogen - Naming of the interhalogens - types, preparation, properties, structure and uses of ICl, BrF_3, IF_5, and IF_7. Basic properties of iodine.		
Unit – III	**Electron Deficient Compounds**	Periods	12
	Definition - Borides: structure, properties and uses - Boranes: Diborane - preparation, properties and uses - bonding in boranes - B_2H_6, B_4H_{10} - Carboranes – Wade's rule - compounds of boron with nitrogen: preparation, properties and uses - Borazine-preparation, properties and uses.		
Unit – IV	**Coordination Chemistry-III**	Periods	12
	Stability of complexes - Thermodynamic and kinetic stability - stepwise and overall stability constant - Factors affecting the stability of complexes. Ligand substitution reactions in square planar complexes: The trans effect - Trans effect series - uses of trans effect - theories of trans effect - electrostatic polarization theory - π- bonding theory - mechanism of substitution reactions - factors affecting the rates of substitution reactions in square planar complexes.		
Unit – V	**Organometallic Compounds**	Periods	12
	Organometallic compounds: Definition - Classification based on nature of C-M bond: Ionic, σ bonded and non classically bonded. Organometallic compounds of Lithium, Magnesium and Boron - preparation, properties, structure and uses. Olefin complexes – Zeise's salt - synthesis and structure Cyclopentadienyl complexes - Ferrocene-preparation, properties, bonding and uses.		
Total Periods			60

Text Books	
1	Puri, Sharma, Kalia, Principles of Inorganic Chemistry 32nd Edition (2014), Milestone Publishers and Distributor, New Delhi.
2	W.U. Malik, G. D. Tuli, R. D. Madan, Selected topics in Inorganic Chemistry, S.Chand & company, New Delhi.
3	R.D. Madan, Satyaprakash's Modern Inorganic Chemistry, S. Chand Publishing, New Delhi.
References	
1	S. Prakash, G.D. Tuli, S.K. Basu and R.D. Madan, Advanced Inorganic Chemistry - Vol – I (2006), S. Chand Publishing, New Delhi.
2	S. Prakash, G.D. Tuli, S.K. Basu and R.D. Madan, Advanced Inorganic Chemistry-Vol – II (2006), S. Chand Publishing, New Delhi.
E-References	
1	https://chem.libretexts.org/
2	https://www.toppr.com/guides/chemistry/the-p-block-elements/interhalogen- compounds/
3	http://chem.yonsei.ac.kr/chem/upload/CHE3103-01/119484463779670.pdf

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.						
Programme	**B.Sc**	Programme Code	**UCH**		Regulations		**2018-2019**
Department	**Chemistry**		Semester				**6**
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T P	C	CA	ESE Total
18U6CHC10	**CORE PAPER-X:** **PHYSICAL CHEMISTRY-II**		5		5	25	75 100
Course Objectives	1. To encourage the students to study about the different phases of compounds. 2. To acquire the knowledge on the fundamental concepts of electrochemistry. 3. To understand the principle of radiative and non-radiative transitions in photochemistry.						
POs	**PROGRAMME OUTCOME**						
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.						
PO 2	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.						
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence.						
PO 4	Apply one's learning to real life situations.						
PO 5	Analyse and synthesise data from a variety of sources.						
PO 6	Establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.						
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group.						
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data.						
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.						
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information source.						
PO 11	Ability to work independently, identify appropriate resources required for a project.						
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.						

PO 13	Appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO 14	Building a team who can help achieve the vision, motivating and inspiring team members.
PO 15	Ability to acquire knowledge and skills.

COs	**COURSE OUTCOME**
CO 1	Students will identify the formation of metal alloy systems.
CO 2	Students can demonstrate the processes in electrochemistry and method of determinations in conductometric titrations.
CO 3	Students understand the formation and dissociation of acids, bases and salts.
CO 4	Students learn about the various types of cells and electrodes.
CO 5	Students analyze and apply the different laws of photochemical reactions.
Pre-requisites	

KNOWLEDGE LEVELS			
1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing			
CO / PO / KL Mapping **(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)**			
Cos	KLs	POs	KLs
CO 1	2	PO 1	2
		PO 2	4
		PO 3	1
CO 2	1	PO 4	3
		PO 5	5
		PO 6	2
CO 3	4	PO 7	4
		PO 8	5
		PO 9	3
	5	PO 10	1

CO 4		PO 11	2
		PO 12	4
CO 5	3	PO 13	3
		PO 14	5
		PO 15	4

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	**Programme Outcome (POs)**														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	1	2	2	1	3	1	1	2	2	3	1	2	1	1
CO2	2	1	3	1	1	2	1	1	1	3	2	1	1	1	1
CO3	1	3	1	2	2	1	1	2	2	1	1	3	2	2	3
CO4	1	2	1	1	3	1	2	3	1	1	1	2	1	3	2
CO5	2	2	1	3	1	2	2	1	3	1	2	2	3	1	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	**Phase Rule**	Periods	12

	Statement, explanation of terms involved in phase rule, derivation of phase rule. One component system – water, sulphur and CO_2 systems - two component system - solid - liquid equilibria - CST Lower and upper systems - simple eutectic system - Ag- Pb and KI-H_2O systems. Compound formation with congruent melting points - $FeCl_3$-H_2O and Zn-Mg and compound formation with incongruent melting points - K-Na alloy system.		
Unit - II	**Electrochemistry – I**	Periods	12
	Faraday's laws, Ohm's law, Electrolytic conductance - specific conductance - equivalent conductance - molar conductance - variation of molar conductance and equivalent conductance with dilution. Transport number - Determination of transport number by Hittorf's method and moving boundary method. Ionic mobilities - definition and determination – Walden's rule. Kohlrausch's law - applications. Conductometric titrations - Principle, types - strong acid vs strong base, weak acid vs strong base. Advantages of conductometric titrations.		
Unit - III	**Electrochemistry – II**	Periods	12
	Debye - Huckel Theory - Ionic atmosphere - dissociation of weak acids and bases - Ionic product of water - common ion effect and its applications. pH and its determination - Hydrolysis of different types of salts - determination of degree of hydrolysis - electrical conductance method (Bredig's method). Buffer solution - pH of Buffer solution - Henderson - Hasselbalch equation. Solubility product - relation between solubility product and molar solubility - Applications of solubility product.		
Unit - IV	**Electrochemistry – III**	Periods	12
	Standard cell - single electrode potential - Types of electrode - Standard Hydrogen electrode and calomel electrode - Quinhydrone electrode and glass electrode - EMF - measurements (Poggendorff's method) - Standard emf - emf series - applications. Electrochemical cells - Galvanic cell. Cell reaction and half cell reaction - cell representation. Reversible and Irreversible cells. Concentration cell with and without transference. Polarization and overvoltage. Potentiometric titration - principle, acid-base and redox titrations.		
Unit - V	**Photochemistry**	Periods	12
	Electromagnetic radiation - difference between thermal and photochemical processes. Laws of photochemistry - Beer-Lambert's Law, Grothus - Draper law, Stark-Einstein law. The Jablonski diagram depicting various photo physical processes occurring in the excited state - Radiative (Fluorescence and Phosphorescence) and non-radiative (Internal Conversion and Inter system crossing) processes. Quantum yield - Definition, determination - Spectroscopic method and Agnometric method - law of photochemical equivalence. Photochemical reactions - Kinetics of hydrogen - bromine reaction -		

	decomposition of HI.	
	Total Periods	60

Text Books	
1	A. Bahl, B.S. Bahl and G.D. Tuli, Essentials of Physical Chemistry, Revised multicolor edition, S. Chand publication Ltd, New Delhi, 2010.
2	B.R . Puri , L.R.Sharma., M.S.Pathania., Principles of Physical Chemistry, (47th edition) Vishal Publishing Co., New Delhi, 2017.
3	D.R. Crow, Principles and Applications of Electrochemistry, 4th Edition, CRC Taylor and Francis Group, 1994.
4	K.K. Rohatgi-Mukherjee, Fundamentals of Photochemistry, Revised edition, New Age International Pvt. Ltd, New Delhi, 2003.
References	
1	G. Raj, Advanced Physical Chemistry, Krishna Prakashan Media Pvt. Ltd, 35th edition, 2009.
2	P. Atkins and J. D. Paula, Physical Chemistry, 7th Edn, Oxford University Press, New York, 2002.
3	M.S. Yadhav, Electrochemistry, Anmol Publications Pvt Ltd, Revised Edition, 2001.
E-References	
1	soft-matter.seas.harvard.edu/index.php
2	https://latestcontents.com/chemistry
3	https://hemantmore.org.in/science/chemistry
4	https://www.edinst.com
5	https://chem.libretexts.org/Jablonski_diagram

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.						
Programme	**B.Sc**	Programme Code	**UCH**		Regulations	**2018-2019**	
Department	**Chemistry**		Semester			**6**	
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
18U6CHEO2	**ELECTIVE COURSE - II** **MEDICINAL CHEMISTRY**	4			3	25	75	100
Course Objectives	1. To help the student to understand the basic concepts in medicinal chemistry and to develop their critical thinking. 2. To learn the basics and applications of the chemical compounds as drugs in pharmaceutical industry. 3. To understand the importance of the constituents of blood and cancer chemotherapy.						
POs	**PROGRAMME OUTCOME**						
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.						
PO 2	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.						
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence.						
PO 4	Apply one's learning to real life situations.						
PO 5	Analyse and synthesise data from a variety of sources.						
PO 6	Establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.						
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group.						
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data.						
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.						
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information source.						
PO 11	Ability to work independently, identify appropriate resources required for a project.						
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.						

PO 13	Appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO 14	Building a team who can help achieve the vision, motivating and inspiring team members.
PO 15	Ability to acquire knowledge and skills.

COs	COURSE OUTCOME
CO 1	Students will learn the basic principles of chemistry involved in life sciences.
CO 2	Students will have basic understanding on cancer chemotherapy and haemetology.
CO 3	Students will be able to incorporate the causes of various diseases and proper usage of medicines.
CO 4	Students will be able to know the different types of drugs being used in drug industry.
CO 5	Students will be able to know the different types of drugs being used in drug industry.
Pre-requisites	

KNOWLEDGE LEVELS

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

Cos	KLs	POs	KLs
CO 1	2	PO 1	2
		PO 2	1
		PO 3	4
CO 2	1	PO 4	3
		PO 5	5
		PO 6	2
CO 3	4	PO 7	4
		PO 8	6
		PO 9	4
CO 4	5	PO 10	2
		PO 11	3

		PO 12	4
CO 5	3	PO 13	5
		PO 14	1
		PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Outcome (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	2	1	3	1	1	1	3	2	1	1	2	2
CO2	2	3	1	1	1	2	1	1	1	2	1	1	1	3	1
CO3	1	1	3	2	2	1	1	1	3	1	2	3	2	1	2
CO4	1	1	2	1	3	1	2	2	2	1	1	2	3	1	1
CO5	2	1	2	3	1	2	2	1	2	2	3	2	1	1	3

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
	Study of Drugs	Periods	12

Unit - I	Definition of the terms - Drug, Pharmacophore, Pharmacodynamics, Pharmacopoeia, pharmacology, pharmacokinetics, Bacteria, Virus, Fungus, Actinomycetes, Metabolites, Metabolism of drug, Antimetabolites, LD_{50}, ED_{50}. Classification of drugs, Assay of drugs - Specific methods.		
Unit - II	**Antibiotics**	Periods	12
	Antibiotics - definition - classification as broad and narrow spectrum antibiotics. Structure, properties, mode of action and uses of penicillin, chloramphenicol, streptomycin, tetracycline, novobiocin and puromycin.		
Unit - III	**Sulphonamides**	Periods	12
	Sulphonamides - preparation, properties and uses of sulphanilamides - mechanism and action of sulpha drugs - preparation, properties and uses of sulphadiazine, sulphapyridine, prontosil and sulphathiazole.		
Unit - IV	**Blood and Haematological Agents**	Periods	12
	Blood - composition of blood - pH of blood -blood Serum - blood grouping and matching – physiological function of plasma protein - role of blood as oxygen carrier with haemoglobin- cytochrome. Blood pressure, hypertension, clotting of blood and haemotological agents.		
Unit - V	**Cancer Chemotherapy**	Periods	12
	Types of neoplasms - Sarcoma, Carcinoma, Carcinosarcoma, Teratoma, Leukemia and Polycythemia. Causes of cancer through virus and chemicals. Treatment of cancer by surgery, radiation therapy and medical therapy. Cytotoxic anticancer drugs - alkylating agents - Bis-chloroethylamines, Cyclophosphamide, Mechlorethamine, Ethyleneimines, Alkyl Sulfonates, Nitrosoureas - Miscellaneous alkylating agents - Mode of action of Alkylating agents.		
Total Periods			60

Text Books	
1	S. Lakshmi, Pharmaceutical Chemistry, S.Chand & Sons, New Delhi,2004.
2	V.K. Ahluwalia and Madhu Chopra, Medicinal Chemistry , Ane Books,New Delhi, Reprint 2009.
References	
1	G. Patrick, Medicinal Chemistry, VIVA Books Private Ltd, New Delhi, 2002
2	R.R. Nadendla , Principles of Organic Medicinal Chemistry New Age International Private Ltd Publishers, New Delhi Reprint 2007.
3	P. Parimoo, A Text Book of Medicinal Chemistry, CBS Publishers, New Delhi,2006.
E-References	
1	https://pharmafactz.com/introduction-to-medicinal-chemistry/
2	https://en.wikipedia.org/wiki/Medicinal_chemistry
3	http://library.umac.mo/ebooks/b28050332.pdf

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.						
Programme	**B.Sc**	Programme Code	**UCH**		Regulations		**2018-2019**
Department	**Chemistry**		Semester				**6**
Course Code	Course Name		Periods per Week		Credit	Maximum Marks	
			L	T P	C	CA	ESE Total
18U6CHS02	**SKILL BASED ELECTIVE COURSE - II** **POLYMER CHEMISTRY**		2		2	25	75 100
Course Objectives	1. To impart the students the knowledge of polymer materials, their formation mechanisms, properties and uses. 2. To learn basic concepts of polymer chain architecture, structure and morphology, with particular emphasis on the relationship between chemical structure (chain architecture). 3. To impart the students the understanding of biological applications of polymer materials.						
POs	**PROGRAMME OUTCOME**						
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.						
PO 2	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.						
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence.						
PO 4	Apply one's learning to real life situations.						
PO 5	Analyse and synthesise data from a variety of sources.						
PO 6	Establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.						
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group.						
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data.						
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.						
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information source.						
PO 11	Ability to work independently, identify appropriate resources required for a project.						
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.						

PO 13	Appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO 14	Building a team who can help achieve the vision, motivating and inspiring team members.
PO 15	Ability to acquire knowledge and skills.

COs	**COURSE OUTCOME**
CO 1	Students will be able to gain knowledge about the properties and classification of polymers.
CO 2	Students will be able to prepare of polymer through different techniques of polymerization.
CO 3	Students will be able to estimate the number- and weight-average molecular masses of polymers given the degree of polymerization and mass fraction of chains present.
CO 4	Students will develop their knowledge towards degradation of polymerization.
CO 5	Students will enhance their knowledge towards the commercially important polymers, their preparation and applications.
Pre-requisites	

KNOWLEDGE LEVELS

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

Cos	KLs	POs	KLs
CO 1	3	PO 1	4
		PO 2	2
		PO 3	1
CO 2	2	PO 4	3
		PO 5	6
		PO 6	4
CO 3	4	PO 7	2
		PO 8	5
		PO 9	2

CO 4	1	PO 10	4
		PO 11	1
		PO 12	3
CO 5	3	PO 13	4
		PO 14	2
		PO 15	4

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	**Programme Outcome (POs)**														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	2	1	3	1	2	2	1	2	2	1	3	2	2	2
CO2	1	3	2	2	1	1	1	1	3	1	2	2	1	3	1
CO3	3	1	1	2	1	3	1	2	1	3	1	2	3	1	3
CO4	1	2	3	1	1	1	2	1	2	1	3	1	1	2	1
CO5	2	2	1	3	1	2	2	1	2	2	1	3	2	2	2

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	**Polymers Classification and properties**	Periods	6
	Monomers, Oligomers and Polymers - Degree of polymerization and its significance- Funtionality - Tacticity of Polymers (Isotactic, Syndiotactic and Atactic). Nomenclature of polymers- Homopolymers and Co-polymers. Classification of polymers - Natural, Synthetic, Organic and Inorganic Polymers - linear, cross linked and network. Physical properties of polymers - Elasticity, Tensile strength, Glass Transition Temperature.		
Unit - II	**Techniques and Mechanism of Polymerisation**	Periods	6
	General methods of preparation of polymer-Bulk, Solution, Suspension and Emulsion polymerization. Mechanism of polymerization- Cationic, anionic, free radical and Coordination polymerization. Types of Polymerization - Condensation and Addition Polymerization. Plastics-Thermoplastic and Thermosetting Plastics.		
Unit - III	**Molecular weight and its Determination**	Periods	6
	Molecular weight and its determination: concept of Molecular weight-Number average Molecular weight-Weight average molecular weight. Methods of determining molecular weight- Osmometry, Viscometry and sedimentation, Gel permeation Chromatography.		
Unit - IV	**Polymer degradation and Compounding materials of polymers**	Periods	6
	Polymer degradation-Definition- Types of degradation- Thermal degradation - Mechanical degradation, Hydrolytic degradation, Photodegradation and Biodegradation. Compounding Materials of Polymers – Plastics – Fillers – Plasticizers – Colorants –Antioxidants - Stabilizers and Lubricants and Differences.		
Unit - V	**Industrially important polymers**	Periods	6
	Individual Polymers-Polyacrylates, Polystyrene, Polyethylene, Polyvinylchloride, Polyester, Polyamides- (Nylon-6, Nylon 6,6), Kevlar-Preparation and Uses. Types of Rubber - Natural Rubber and synthetic process - Vulcanization. Fibre Reinforced Plastic (FRP) - Foamed Plastics-Conducting Polymers, polymers in biological application.		
Total Periods			30

Text Books	
1	V.R. Gowarikar., N.V. Viswanathan: Polymer Science-Wiley Eastem limited,New Delhi.1986.
2	F.W. Billmeyer,Wiley, Textbook of Polymer Science, 1984.
3	M.S.Bhatnagar, A Text Book Polymers, S.Chand & Company Ltd, Ram Nagar, New Delhi. Volume-II-2004.
References	
E-References	
1	https://byjus.com/jee/polymers/
2	https://www.intechopen.com/books/fiber-reinforced-polymers-the-technology-applied-for-concrete-repair/introduction-of-fibre-reinforced-polymers-polymers-and-composites-concepts-properties-and-processes

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.						
Programme	**B.Sc**	Programme Code	**UCH**		Regulations		**2018-2019**
Department	**Chemistry**		Semester				**6**
Course Code	Course Name	Periods per Week			Credit	Maximum Marks	
		L	T	P	C	CA	ESE	Total
18U6CHCP03	**CORE PRACTICAL - III:** **PHYSICAL CHEMISTRY PRACTICAL**			3	4	40	60	100
Course Objectives	1. To verify the some important principles in physical chemistry. 2. To determine various physical properties using simple instruments like conductivity meter, potentiometer, etc.							
POs	**PROGRAMME OUTCOME**							
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.							
PO 2	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.							
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence.							
PO 4	Apply one's learning to real life situations.							
PO 5	Analyse and synthesise data from a variety of sources.							
PO 6	Establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.							
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group.							
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data.							
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.							
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information source.							
PO 11	Ability to work independently, identify appropriate resources required for a project.							
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.							
PO 13	Appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.							

PO 14	Building a team who can help achieve the vision, motivating and inspiring team members.
PO 15	Ability to acquire knowledge and skills.

COs	COURSE OUTCOME
CO 1	To develop skills in doing experiments in kinetics, Potentiometry and phase rule.
CO 2	Students will gain an understanding of how to keep records of instruments, parameters.
CO 3	Students will gain experimental observations.
CO 4	Students will get various physical properties using simple instruments.
CO 5	Enable the students to work effectively as a member of a team and to Communicate productively with lab mates, teaching assistant and instructor.
Pre-requisites	

KNOWLEDGE LEVELS			
1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing			
CO / PO / KL Mapping **(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)**			
Cos	KLs	POs	KLs
CO 1	2	PO 1	2
		PO 2	3
		PO 3	4
CO 2	4	PO 4	5
		PO 5	1
		PO 6	6
CO 3	1	PO 7	2
		PO 8	3
		PO 9	3
	1	PO 10	2

CO 4		PO 11	4
		PO 12	3
CO 5	3	PO 13	2
		PO 14	4
		PO 15	1

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Outcome (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	1	2	1	1	2	2	3	1	2	3	1	2
CO2	1	2	3	2	1	1	1	2	2	1	3	2	1	3	1
CO3	2	1	1	1	3	1	2	1	1	2	1	1	2	1	3
CO4	2	1	1	1	3	1	2	1	1	2	1	1	2	1	3
CO5	2	3	2	1	1	1	2	3	3	2	2	3	2	2	1

Course Assessment Methods			
Direct			
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations			
Indirect			
1. Course End Delivery			
Content of the Syllabus			
Unit - I	**Kinetics**	Periods	12
	1. Rate constant determination for first order reaction-Hydrolysis of an ester in acidic medium (Ethyl acetate or Methyl acetate). 2. Rate constant determination for second order reaction-Reaction between Potassium persulphate and Potassium iodide.		

Unit - II	**Conductivity Experiments -I**	Periods	12
	1. Determination of cell constant. 2. Determination of dissociation constant for weak acid (Acetic acid). 3. Determination of Equivalent conductance at infinite dilution for strong electrolyte (KCl).		
Unit - III	**Conductivity Experiments-II**	Periods	12
	1.Conductometric titration-Strong acid vs Strong base, 2.Weak acid vs Strong base. 3. Precipitation titration – KCl vs $AgNO_3$		
Unit - IV	**Potentiometry**	Periods	12
	1. Potentiometric titration- Strong acid vs Strong base, 2. Weak acid vs Strong base. 3. Precipitation titration – KCl vs $AgNO_3$		
Unit - V	**Heterogeneous Equilibrium**	Periods	12
	1. Binary system-naphthalene/biphenyl, 2. Phenol/water system-determination of CST and study of effect of impurity (NaCl) on CST. 3. Determination of transition temperature for hydrated salts-sodium thiosulphate, sodium acetate, strontium chloride, manganous chloride. 4. Determination of K_f of a solvent by Rast method.		
Total Periods			60

Text Books	
1	Basic Principle of Practical chemistry - V. Venkateswaran, R. Veeraswamy and A.R. Kulandaivelu, S. Chand and Sons, New Delhi, 2004.
References	
1	Experimental Physical Chemistry, V.D. Athawale, Parulmathur, New age International publishers, 2001.
E-References	
1	https://pubs.acs.org/doi/abs/10.1021/ed013p250.2
2	https://www.elsevier.com/books/experiments-in-physical-chemistry/wilson/ 978-0-08-023798-5

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.							
Programme	**B.Sc**	Programme Code	**UCH**			Regulations	**2018-2019**	
Department	**Chemistry**		Semester				**6**	
Course Code	Course Name		Periods per Week			Credit	Maximum Marks	
			L	T	P	C	CA	ESE	Total
18U6CHCP04	**CORE PRACTICAL- IV** **ORGANIC ANALYSIS, PREPARATIONS AND GRAVIMETRIC ESTIMATIONS**				5	5	25	75	100
Course Objectives	1. The students will get training in the quantitative analysis of metal ions using gravimetric method. 2. The students will get training for systematic qualitative analysis and preparation of simple organic compounds.							
POs	**PROGRAMME OUTCOME**							
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.							
PO 2	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.							
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence.							
PO 4	Apply one's learning to real life situations.							
PO 5	Analyse and synthesise data from a variety of sources.							
PO 6	Establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.							
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group.							
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data.							
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.							
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information source.							

PO 11	Ability to work independently, identify appropriate resources required for a project.
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.
PO 13	Appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO 14	Building a team who can help achieve the vision, motivating and inspiring team members.
PO 15	Ability to acquire knowledge and skills.

COs	**COURSE OUTCOME**
CO 1	Students will learn to predict the outcome of organic reactions.
CO 2	To understanding of the general reactivity of functional groups and mechanism.
CO 3	Enable the students to work effectively as a member of a team.
CO 4	To Communicate productively with lab mates, teaching assistant and instructor.
CO 5	Students will learn to maintain a detailed scientific notebook.
Pre-requisites	

KNOWLEDGE LEVELS			
1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing			
CO / PO / KL Mapping **(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)**			
Cos	KLs	POs	KLs
CO 1	2	PO 1	3
		PO 2	1
		PO 3	4
CO 2	1	PO 4	2
		PO 5	6
		PO 6	2
	3	PO 7	3

CO 3		PO 8	4
		PO 9	2
CO 4	5	PO 10	4
		PO 11	2
		PO 12	4
CO 5	4	PO 13	3
		PO 14	4
		PO 15	2

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

Cos	Programme Outcome (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	2	1	1	3	1	1	1	1	3	2	1	1	2	2	1
CO2	2	3	1	1	2	3	1	3	1	2	2	2	2	2	1
CO3	3	2	1	2	1	2	1	2	2	3	1	1	3	3	1
CO4	1	2	2	1	3	2	1	2	1	1	3	3	1	1	2
CO5	1	1	3	1	2	1	2	1	1	1	2	2	1	1	3

Course Assessment Methods
Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus			
Unit – I	**Organic Qualitative analysis-I**	Periods	15
	Analysis of Organic Compounds Characterization of organic compounds by their functional group and confirmation by preparation of derivatives. The following functional groups may be studies: Carboxylic Acids (mono and di), Phenols, Aromatic Esters, and Aldehydes.		
Unit – II	**Organic Qualitative analysis-II**	Periods	15
	Analysis of Organic Compounds Characterization of organic compounds by their functional group and confirmation by preparation of derivatives. Ketones, Monosaccharides, Amides, Diamides, Aromatic primary amines and Nitro compounds.		
Unit – III	**Organic Preparations - I**	Periods	15
	Preparations involve the following reactions: 1. Oxidation - Preparation of Benzoic acid from Benzaldehyde 2. Hydrolysis - Preparation of Methyl salicylate from Salicylic acid 3. Nitration- Preparation of p - Nitroacetanilide from Acetanilide.		
Unit – IV	**Organic Preparations - II**	Periods	15
	4. Bromination - Preparation of p - Bromoacetanilide from Acetanilide 5. Bromination - Preparation of sym -Tribromophenol from Phenol 6. Benzoylation - Preparation of Benzanilide from aniline.		
Unit – V	**Gravimetric Estimations**	Periods	15
	1. Estimation of Nickel as Nickel DMG Complex 2. Estimation Barium as Barium Chromate 3. Estimation of Lead as Lead Chromate		
Total Periods			75

Text Books	
1	Dr. N.S Gnanapragasam, Organic chemistry Lab manual.
2	V. Venkateswaran, R.Veeraswamy and A.R. Kulandaivelu, Basic Principle of Practical chemistry, S. Chand and Sons, New Delhi, 2004.
References	
1	R.K. Bansal, Laboratory Manual of Organic chemistry, 3rd Edition, New Age Internal Publication.
2	B.S. Furniss, A.J. Hannaford, P.W.D Smith and A.R. Tatchell, Vogel's Practical Organic chemistry, 5th Edition, ELBS (1989).

E-References	
1	https://www.toppr.com/guides/chemistry/organic-chemistry/qualitative-analysisof-organic-compounds/
2	https://www.csub.edu/chemistry/organic/manual/Lab14_QualitativeAnalysis.pdf
3	https://chem.libretexts.org/Ancillary_Materials/Laboratory_Experiments/Wet_Lab _Experiments/General_ Chemistry_Labs/Online_Chemistry_Lab_Manual/Chem_11_ /07%3A_Gravimetric_Analysis_ (Experiment)

Signature of BOS Chairman