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 2017-18 ONWARDS UNDER AUTONOMOUS - CBCS PATTERN]

SPONSORED BY

ANGAMMAL EDUCATIONAL TRUST

Elayampalayam – 637 205, Tiruchengode Tk., Namakkal Dt., Tamil Nadu.
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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 TiruchengodeNamakkal 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.

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	SYLLABUS FOR YEAR I (Semester I)	
1	COURSE PATTERN WITH PAPERS	
2	Language I - Tamil I	
3	Malayalam I	
4	Hindi I	
5	French I	
6	English I - Foundation English I	
7	Core I – General Chemistry – I	
8	Core Practical I – Volumetric Estimations & Inorganic Preparations	
9	Allied I – Physics - I	
10	Allied Practical I – Physics	
11	Value Education I – Yoga	

SYLLABUS FOR YEAR I (Semester II)		
1	COURSE PATTERN WITH PAPERS	
2	Language II - Tamil II	
3	Malayalam II	
4	Hindi II	
5	French II	
6	English II - Foundation English II	
7	Core II - General Chemistry – II	
8	Core Practical I – Volumetric Estimations & Inorganic Preparations	
9	Allied II - Physics	
10	Allied Practical II - Physics	
11	Value Education II – Environmental Studies	

S. No.	TOPICS	P. No.
SYLLABUS FOR YEAR II (Semester III)		
1	COURSE PATTERN WITH PAPERS	
2	Language III - Tamil III	
3	Malayalam III	
4	Hindi III	
5	French III	
6	English III - Foundation English III	
7	Core III – General Chemistry - III	
8	Core Practical II – Inorganic Qualitative Analysis	
9	Allied III - Maths	
10	Allied Practical I- Maths	
11	NMEC I – Essentials of Electricity	
SYLLABUS FOR YEAR II (Semester IV)		
1	COURSE PATTERN WITH PAPERS	
2	Language IV- Tamil IV	
3	Malayalam IV	
4	Hindi IV	
5	French IV	
6	English IV - Foundation English IV	
7	Core IV - General Chemistry - IV	
8	Core Practical II – Inorganic Qualitative Analysis	
9	Allied IV – Maths	
10	Allied Practical I- Maths	
11	NMEC II – Physics in Everyday Life	
SYLLABUS FOR YEAR III (Semester V)		
1	COURSE PATTERN WITH PAPERS	
2	Core V- Organic Chemistry - I	
3	Core VI - Inorganic Chemistry - I	
4	Core VII – Physical Chemistry - I	
5	EC I- Analytical Chemistry	
6	SBEC I- Spectroscopy	
7	Core Practical III – Physical Chemistry	
8	Core Practical IV – Organic Analysis & Preparations , Gravimetric Estimations	
SYLLABUS FOR YEAR III (Semester VI)		
1	COURSE PATTERN WITH PAPERS	
2	Core VIII- Organic Chemistry - II	

3	Core IX - Inorganic Chemistry – II	
4	Core X - Physical Chemistry – II	
5	EC II-Medicinal Chemistry	
6	SBEC II- Polymer Chemistry	
7	Core Practical III – Physical Chemistry	
8	Core Practical IV – Organic Analysis & Preparations , Gravimetric Estimations	

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.

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 & Paper Code	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 & 17U1LT01	4	3	3	25	75	100	Language II & 17U2LT02	4	3	3	25	75	100
English I & 17U1LE01B	4	3	3	25	75	100	English II & 17U2LE02B	4	3	3	25	75	100
Core I & 17U1CHC01	5	5	3	25	75	100	Core II & 17U2CHC02	4	5	3	25	75	100
Core I Practical & 17U2CHCP01	4	0	0	0	0	0	Core I Practical & 17U2CHCP01	4	4	3	40	60	100
Allied I & 17U1PHA01	5	5	3	25	75	100	Allied II & 17U2PHA02	4	5	3	25	75	100
Allied I Practical & 17U2PHAP01	4	0	0	0	0	0	Allied I Practical & 17U2PHAP01	4	4	3	40	60	100
Valued added course & 17U1VE01	2	2	3	25	75	100	Valued added course &17U2ES01	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**	**15**	**125**	**375**	**500**	**Total**	**30**	**28**	**21**	**205**	**495**	**700**
I YEAR TOTAL									**46**	**38**	**410**	**990**	**1200**
YEAR II													
Semester III							**Semester IV**						
Language III & 17U3LT03	4	3	3	25	75	100	Language IV & 17U4LT04	4	3	3	25	75	100
English III & 17U3LE03B	4	3	3	25	75	100	English IV & 17U4LE04B	4	3	3	25	75	100
Core III & 17U3CHC03	5	5	3	25	75	100	Core IV & 17U4CHC04	5	5	3	25	75	100
Core II Practical & 17U4CHCP02	4	0	0	0	0	0	Core II Practical & 17U4CHCP02	4	4	3	40	60	100
Allied III & 17U3MAA01	5	5	3	25	75	100	Allied IV & 17U3MAA02	5	5	3	25	75	100

Allied II Practical & 17U4MAAP01	4	0	0	0	0	0	Allied II Practical & 17U4MAAP01	4	4	3	40	60	100
NMEC I & 17U3PHN01	2	2	3	25	75	100	NMEC II & 17U4PHN02	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**	**15**	**125**	**375**	**500**	**Total**	**30**	**26**	**21**	**205**	**495**	**700**
II YEAR TOTAL									**90**	**72**	**660**	**1740**	**2400**
YEAR III													
Semester V							**Semester VI**						
Core V & 17U5CHC05	5	5	3	25	75	100	Core VIII & 17U6CHC08	5	5	3	25	75	100
Core VI & 17U5CHC06	5	5	3	25	75	100	Core IX & 17U6CHC09	5	5	3	25	75	100
Core III Practical & 17U6CHCP03	3	0	0	0	0	0	Core III Practical & 17U6CHCP03	3	4	3	40	60	100
Core IV Practical & 17U6CHCP04	5	0	0	0	0	0	Core IV Practical & 17U6CHCP04	5	5	3	40	60	100
Core VII & 17U5CHC07	5	5	3	25	75	100	Core X & 17U6CHC10	5	5	3	25	75	100
SBEC I & 17U5CHS01	3	2	3	25	75	100	Elective I & 17U6CHE01	4	4	3	25	75	100
SBEC II & 17U5CHS02	3	2	3	25	75	100	SBEC III & 17U6CHS03	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**	**19**	**21**	**125**	**375**	**500**	**Total**	**30**	**31**	**21**	**205**	**495**	**700**
TOTAL CREDIT FOR THE COURSE									**140**	**126**	**1230**	**2970**	**3600**

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**	4	15	30	2	2	120	4
III	**Elective**	4	15	60	2	3	120	6
IV	**NMEC**	2	15	30	2	2	60	4
IV	**Extension work**	1	15	15	1	1	15	1
OTAL								**140**

GENERAL CHEMISTRY-I

SUBJECT CODE: 17U1CHC01		
SEMESTER – I	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

To enable the students to learn about the fundamentals of chemistry and principles of various topics.

Learning Outcome

Students will be known atomic structure and electronic configurations of atom, also to understand the variation of physical and chemical properties.

Students can understand covalent bonding – concept of hybridization and electron displacement effect, etc.

Students will be enhanced their knowledge towards postulates of kinetic theory of gases, liquefaction of gases, quantum theory and atomic spectra.

Students will learn the basics of quantum chemistry.

Students will gain knowledge about titrimetry and qualitative analysis of inorganic mixtures.

UNIT–I Electronic structure and periodic properties 12 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, ionisation energy, electron affinity and electro negativity along the periods and the groups- Factors affecting ionisation energy and electro negativity.

UNIT–II Basic concepts in organic chemistry 12 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.

UNIT–III Gaseous State 12 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.

UNIT–IV Basic Quantum Chemistry 12 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.

UNIT–V Error Analysis 12 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.

CONTENT BEYOND THE SYLLABUS

1. List out elements having half filled and completely filled orbital.
2. Find out the hybridization and geometry of benzene and ethane.
3. Write gas equations for real gas other than Van der Waals equation.
4. Write the expression for particle in 1D & 3D box.
5. How to prepare 0.1M HCl and 0.5N NaOH.

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).

ONLINE 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.

GENERAL CHEMISTRY-II

SUBJECT CODE: 17U2CHC02		
SEMESTER – II	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

1. To gain knowledge about shapes of inorganic molecules and metallurgy.
2. Acquire the knowledge about hydrocarbons.

Learning Outcome

Students will learn the basic concepts of ionic and covalent bond.

Students will know about the different metallurgical processes and purification techniques.

Students will gain knowledge regarding preparation and properties of alkanes, cycloalkanes, alkenes and alkynes.

Students will enhance their knowledg

e towards various properties of liquids.

UNIT–I Chemical bonding (12 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.

UNIT II Metallurgy (10 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.

UNIT – III Alkanes and Alkenes (13 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.

UNIT–IV Alkadiene and Alkynes (12 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.

UNIT–V Liquid State (13 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.

CONTENT BEYOND THE SYLLABUS

1. Apply VSEPR theory to SO_4^{2-}, XeF_4, ICl and other compounds too.
2. Find out the methods for the concentration of the ores of Cr, Zr and U.
3. Apply Anti-Markovnikov's rule for the addition of HBr to 2-Butene .
4. Compare the orbital model of allene and alkynes.
5. List out the experimental methods for the determination of surface tension and viscosity.

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).

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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).

ONLINE 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/

CORE PRACTICAL –I

SUBJECT CODE: 17U1CHC01		
SEMESTER – I	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

1. To understand the principles of volumetric analysis.
2. To enable the students to have hands-on training on preparation of simple inorganic complexes.

Learning Outcome
Students will learn how to conduct a process precisely.
Students will plan, conduct, review and report the experiment.
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 be known to synthesize, recrystallize and finding melting point of an inorganic compound. It will help them to carry out their research in future.

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

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

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

(b) Discuss the factors affecting Ionisation Energy.

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

(b) Explain covalent bond properties of organic molecules.

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

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

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

(b) Explain Davisson Germer experiment.

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

(b) Write short note on complexometric titrations.

PART – C (3 x 10 = 30 Marks)

Answer ANY three questions

16. Discuss Quantum numbers and their significance.

17. Explain in detail about inductive effect with examples.

18. Drive Vander waals equation for real gases.
19. Discuss i)photoelectric effect ii)Compton effect .
20. Explain different type of titrations

17U2CHC02

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

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

b) Explain Fajan's rule and its applications.

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

b) Explain the extraction of Cu.

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

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

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

b) Explain the mercuration and oxymercuration reaction of acetylene.

15. 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

16. Explain VSEPR theory and shapes of simple covalent molecules.
17. Explain the extraction of Iron and its properties, uses.
18. a) Explain Hofmann and saytzeff's rule.
    b) Write the chemical reactions of alkenes
19. a) Explain the mechanism of Electrophilic addition in alkynes.
    b) Write a note on 1,2 and 1, 4 addition of butadiene with example.
20. a) Explain classification of liquid crystals.
    b) Explain the effect of temperature on viscosity.

GENERAL CHEMISTRY - III

SUBJECT CODE: 17U3CHC03		
SEMESTER – III	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

To enable the students to learn about the characteristics of transition elements, and the concept of thermodynamics.

Learning Outcome

Students will learn the general characteristics of transition elements and the extraction of various elements.

Students can understand the chemistry of hydrides and their uses.

Students will be enhanced their knowledge towards alcohols, phenols and aromatic hydrocarbons.

Students will learn the nature and reactions of carbonyl compounds.

Students will gain knowledge about basic terms involved in thermodynamics.

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 $K_2Cr_2O_7$.

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.

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).

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.

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 - Limitations of first law - 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 .

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

GENERAL CHEMISTRY-IV

SUBJECT CODE: 17U4CHC04		
SEMESTER – IV	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

To gain knowledge about nuclear chemistry, carboxylic acids, amines and second law of thermodynamics.

Learning Outcome

Students will learn the basic concepts of nuclear chemistry.

Students will know about the carboxylic acids and its derivatives .

Students will gain knowledge regarding preparation and properties of aliphatic and aromatic amines.

Students will enhance their knowledge towards entropy and free energy.

Students will acquire knowledge about enthalpy and their related concepts.

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.

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.

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.

UNIT– IV: Thermodynamics – II (12 HOURS)

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.

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 - Standard free energy change - Vant Hoff reaction isotherm- Temperature dependence of the equilibrium constant - Integrated form of Vant Hoff Equation.

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/ 2008CHM101Fal l/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

CORE PRACTICAL –II

SUBJECT CODE:17U4CHCP02		
SEMESTER – III & IV	**CREDIT : 4**	**HOURS :75**

OBJECTIVES

3. To understand the principles of qualitative analysis.
4. To enable the students to understand the techniques to remove interfering from non interfering radicals.

Learning Outcome

Students will learn how to separate the cations and anions systematically.

Students will gain the knowledge about group separation of various cations.

The students will enable to acquire knowledge about interfering and non interfering ions.

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/

17U3CHC03

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.

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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.

ALLIED CHEMISTRY-I

(Botany/Zoology/biochemistry)

SUBJECT CODE: 17U3CHA01/17U1CHA01		
SEMESTER – I	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

1. To gain a knowledge of molecule formation from their atomic orbital and various organic reaction mechanism.
2. To know how chemistry is applied in the field of pharmaceutical and agriculture.

Learning Outcome

Students will know the details of bonding, anti bonding and non bonding and Interhalogen compounds.

Students gain the knowledge of various organic reaction mechanism.

Students accquire the knowledge of errors, concentration solution and different type of titrations.

Students will gain the information regarding terms used in pharmacology, antibiotics and sulpha drugs.

Students will study natural and artificial fertilizers.

UNIT-I : Chemical bonding and Aromaticity (12 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.

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

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.

UNIT-III: Volumetric analysis (12 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.

UNIT-IV: Pharmaceutical Chemistry-I (12 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.

UNIT-V:AgriculturalChemistry (12 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.

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.or

ALLIED CHEMISTRY-II

(Botany/Zoology/ biochemistry)

SUBJECT CODE: 17U4CHA02/17U2CHA02		
SEMESTER – II	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

1. To familiarize students with various chromatography techniques and its applications towards industries and research laboratories.

2. Students will know the chemistry of bio-organic and bio-inorganic compounds.

3. To edify the students about the various kinds of drugs and its uses.

3. To educate the students about the qualitative analysis of organic compounds.

Learning Outcome

Students will be able to understand the concept of various chromatographic techniques.

Students will know the details of bio organic compounds and bio inorganic compounds.

Students will gain knowledge of antipyretics, analgesic, antiseptics, disinfectants and anesthetics

Students will gain knowledge about analysis of organic compounds.

UNIT-I: Chromatography (12 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.

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

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.

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.

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.

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/

ALLIED CHEMISTRY PRACTICALS

(Botany/Zoology /biochemistry)

SUBJECT CODE: 17U4CHAP01/17U2CHAP01		
SEMESTER – II	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

1. To understand the principles of volumetric analysis.
2. To enable the students to have hands-on training on qualitative analysis of organic compounds.

Learning Outcome

Students will learn how to conduct a process precisely.

Students will plan, conduct, review and report the experiment.

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.

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

17U3CHA01/17U1CHA01

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc., DEGREE EXAMINATION

MODEL QUESTION- ALLIED CHEMISTRY – I

(BOTANY /ZOOLOGY/ biochemistry)

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.

17U4CHA02 / 17U2CHA02

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc. DEGREE EXAMINATION

MODEL QUESTION- ALLIED CHEMISTRY – II

(BOTANY /ZOOLOGY/ biochemistry)

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?

ALLIED CHEMISTRY-I
(B.Sc., PHYSICS)

SUBJECT CODE: 17U3CHA03		
SEMESTER – III	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

To enable the students to learn about the fundamentals of chemistry and principles of various topics.

Learning Outcome

Students will be known molecular orbital theory and types of interhalogens.

Students can understand organic reactions and types of hybridisation

Students will be enhanced their knowledge towards electrolysis, conductance and buffer solutions.

Students will learn the basics of pharmaceutical chemistry.

Students will gain knowledge about corrosion and its preventive methods.

UNIT-I: Covalent bonding (12 HOURS)

1.1 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.

1.2 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.

UNIT-II: Organic Reactions (12 HOURS)

2.1 Classification of reactions - substitution, addition, elimination reactions – explanation. Isomerization, polymerization and condensation (definition with examples).

2.2 Hybridization in methane, ethylene, acetylene.

2.3 Aromaticity - Huckel's rule. Electrophilic substitution reactions in benzene - Mechanism of nitration, sulphonation, halogenation and alkylation.

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.

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.

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.

CONTENT BEYOND THE SYLLABUS

6. Apply MO theory to HF molecule.
7. Hybridization and geometry of benzene and ethane.
8. Study the preparative methods of various types of buffers.
9. Gram negative and gram positive bacteria.
10. 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

ALLIED CHEMISTRY-II

(B.Sc., PHYSICS)

SUBJECT CODE: 17U4CHA04		
SEMESTER – IV	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

3. To gain knowledge about coordination compounds and natural products such as amino acids and carbohydrates.
4. Acquire the knowledge about medicinal drugs and dyes.

Learning Outcome

Students will learn the basic concepts of coordination compounds and its applications.

Students will know about the aminoacids, proteins and carbohydrates.

Students will gain knowledge regarding electrode potential and batteries.

Students will enhance their knowledge towards pharamaceutical and industrial chemistry.

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.

UNIT-II: Amino acids and Carbohydrates (12 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)

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.

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

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.

CONTENT BEYOND THE SYLLABUS

6. Apply VB theory to predict the shapes of various complexes.
7. Structures of maltose and cellulose.
8. Types of reference electrode other than calomel and hydrogen electrode.
9. General and local anaesthetics.
10. 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.

ALLIED PRACTICAL

SUBJECT CODE: 17U4CHAP01		
SEMESTER – III/IV	CREDIT : 4	HOURS : 60

OBJECTIVES

1. To understand the principles of volumetric analysis.
2. To enable the students to understand the techniques to analyse the organic compound.

Learning Outcome

Students will learn how to conduct a process precisely.

Students will plan, conduct, review and report the experiment.

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 be known to analyse the organic compound systematically

VOLUMETRIC ESTIMATIONS AND QUALITATIVE ORGANIC ANALYSIS

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.

Functional groups that may be studied:

Aldehydes, ketones, mono and dicarboxylic acids, aromatic primary amines, phenol, amide, diamide and monosaccharides**.**

CONTENT BEYOND THE SYLLABUS

1. Hardness of water using EDTA.
2. Preparation of derivatives for organic compounds.

REFERENCES

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

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

ONLINE SOURCES

3. https://byjus.com/chemistry/volumetric-analysis/
4. http://wwwchem.uwimona.edu.jm/lab_manuals/c10expt25.html

NON MAJOR ELECTIVE COURSE
INDUSTRIAL CHEMISTRY - I
(B.Sc., PHYSICS)

SUBJECT CODE: 17U3CHN01		
SEMESTER – III	CREDIT : 2	HOURS : 30

OBJECTIVES

To enable the students to learn about the various industries and their applications.

Learning Outcome

Students will be known the various methods involved in water quality analysis.

Students can understand the manufacture of soap and detergents.

Students will be enhanced their knowledge towards manufacture of glass.

Students will learn the basic concepts involved in lubricants.

Students will gain knowledge about petroleum products.

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.

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.

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.

UNIT–IV: Lubricants **(6HOURS)**

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

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.

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.

NON MAJOR ELECTIVE COURSE
INDUSTRIAL CHEMISTRY - II
(B.Sc., PHYSICS)

SUBJECT CODE: 17U4CHN02		
SEMESTER – IV	**CREDIT : 2**	**HOURS : 30**

OBJECTIVES

To enable the students to learn about the various industries and their applications.

Learning Outcome

Students will be known various non conventional energies such as solar energy , wind energy etc.,

Students can understand synthetic rubber and polymers

Students will be enhanced their knowledge towards conversion of hard water into soft water.

Students will learn the basics of dairy chemistry.

Students will gain knowledge about various types and manufacture of cement.

Unit-I: Non-Conventional Energy Sources & Storage Devices (6HOURS)

Introduction of solar energy – solar cell - advantage and disadvantages - solar energy programme in India - Lead Acid Storage cell - uses of lead acid storage cell – battery - types - characteristics of a battery - wind energy - generation of electricity through wind mills - advantage and disadvantages wind mills.

Unit-II: Polymer and rubber (6HOURS)

PVC - preparation, properties and uses – Teflon - preparation, properties and uses. Rubber - natural rubber - vulcanization of rubber - advantages of vulcanization - synthetic rubber - Elastomers. Buna-s - preparation, properties and uses - applications of rubber.

Unit-III: Water chemistry - II (6HOURS)

Introduction – hard and soft water - units of hardness, softening of hardwater - zeolite/permutit process, ion-exchange, electrodialysis - boiler compounds - desalination of brackish water - reverse osmosis - Recycling of Effluent water.

Unit –IV: Dairy Chemistry (6HOURS)

Composition of milk - physical properties of milk – Pasteurisation - effect of heat -types and uses of dry milk - milk product – Ice cream and butter.

Unit-V: Cement Industry (6HOURS)

Lime: Types – Manufacture - Properties, Cement: Types – Manufacture of Portland cement. Setting and hardening of Portland cement - Gypsum – Plaster of Paris - Grading of cement, Adhesives – Definition – Types – advantages and disadvantages.

CONTENT BEYOND THE SYLLABUS

1. Energy from urban waste.
2. Silicone rubber
3. Recycling of industrial effluent.
4. Types of milk products.
5. Special cements.

TEXT BOOKS

1. B.N.Chakrabarty, Industrial Chemistry, Oxford & IBH Publishing Co, New Delhi, 1981.
2. B.K.Sharma, Industrial Chemistry, Goel Publishing House, Meerut.
3. P.P.Singh, T.M.Joseph, R.G.Dhanvale, College Industrial Chemistry, Himalaya Publishing House, Bombay, 4th Ed., 1983.
4. Dr.P.Kamaraj, M.Arthanareeswari, Second Edition 2003, Sudhanandhira Publications.

REFERENCE BOOKS

1. A.Ravikrishnan, Engineering Chemistry -1, Sri Krishna Publications., 2008.
2. Jayashree ghosh, Applied chemistry.

ONLINE SOURCES

1. https://www.toppr.com/guides/physics/sources-of-energy/non-conventional-sources-of-energy.
2. https://www.water-technology.net

17U3CHA01

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc. DEGREE EXAMINATION - III SEMESTER

MODEL QUESTION- ALLIED CHEMISTRY – I

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.

17U4CHA02

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc., DEGREE EXAMINATION - IV SEMESTER

MODEL QUESTION- ALLIED CHEMISTRY – II

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.

17U3CHN01

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN

(AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

B.Sc., 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. The single most important consideration about any drinking water supply is its freedom from

a) Iron staining b) Disease-producing organisms

c) Total dissolved solids d) Chlorides

2. Which of the following causes alkalinity as well as hardness in natural water?

a) $CaCO_3$ b) $Ca(HCO_3)_2$ c) $MgCO_3$ d) All of the above

3. The teeth of the children appear mottled and discoloured due to the presence of

a) fluorides b) chlorides c) hardness d) All of the above

4. Which of the following methods can reduce the total dissolved solids in water?

a) distillation b) reverse osmosis c) ion exchange d) all of the above

5. The water repelling end of the soap has a

a) positive charge b) negative charge c) both d) neutral

6. Soaps are----------based soapy detergents

a) water b) kerosene c) oil d) acid

7. Which of the following is the residual product in the formation of soap?

a) Glyceraldehyde b) Glycerol c) Glycerine d) Acrylonitrile

8. Detergents are synthetic soaps like cleansing agents and are also known as

a) Artifacts b) Detritus c) Syndets d) Collagen

9. Which of following is not a process involved in glass production?

a) Extrusion b) Forming and shaping c) Heat treatment d) Finishing

10. The temperature at which a non-crystalline material transforms from a super cooled liquid to rigid glass is _____

a) Melting point b) Glass transition temperature c) Boiling point

d) Crystalline temperature

11. How does the addition of magnesia and alumina affect soda lime glass?

a) Enhances mechanical strength b) Reduces porosity c) Increases softening temperature

d) Improves chemical durability

12. At what temperature are raw materials for the manufacture of glass inserted into the furnace?

a) 1000^{o}C b) 1500^{o}C c) 2000^{o}C d) 3000^{o}C

13. The lowest temperature at which the oil gives enough vapour

a) Pour point b) Cloud point c) Flash point d) Fire point

14. The fire point is the lowest temperature at which the vapour of oil burns continuously for at least _____ when a small flame is brought near to it.

a) 1 Second b) 2 Seconds c) 4 Seconds d) 5 Seconds

15. The maximum pour-point requirements for refrigerator system are about _____ for lightest grade.

a) -10^{o}F b) -20^{o}F c) -30^{o}F d) -40^{o}F

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) Di ethyl telluride d) N-hexa decane

19. What are the best anti knocking reagents of petrol?

a) straight chain alkanes b) straight chain alkenes

c) alkynes d) aromatics

20. Knocking is also called as _____

a) cracking b) pinging c) doping d) crushing

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) What are the suspended solids present in water?

22. (a) Explain the mechanism of cleansing action of soap. (OR)

(b) What are the types of synthetic detergents?

23. (a) What are the physical properties of glass? (OR)

    (b) Write a short note on borosilicate glass

24. (a) Differentiate between cloud point and pour point. (OR)

    (b) Write a short note on emulsion.

25. (a) What are antikonocking agents? Give examples. (OR)

    (b) Write a note on octane number.

PART - C

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

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

17U4CHN02

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.

CORE PAPER – V

ORGANIC CHEMISTRY

SUBJECT CODE: 17U5CHC05		
SEMESTER – V	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

1. To gain knowledge about optical and geometrical isomerism.
2. Acquire the knowledge about heterocycles.
3. To understand the reaction mechanism and reagents in organic synthesis.

Learning Outcome

Student will be able to get an insight into basic concept of optical isomerism .

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.

Students will be skilled in solving the problems related to isomerisms.

Students will have a clear understanding of mechanisms in organic reactions.

Students will be skilled enough to choose a reagent to carry out organic reactions.

UNIT I Optical isomerism (12 Hours)

Isomerism-Introduction, Types. Optical isomerism-Definition, Specific rotation-conditions for optical activity-asymmetric centre-Chirality- achiral molecules-meaning of (+) and (-) and d and l notations- Elements of symmetry. Projection formulae-Fischer, and Newmann projection formulae-Notation of optical isomers- Cahn- Ingold –Prelog rule, R-S notations for optical isomers with one and two asymmetric Carbon atoms-erythro and threo representations. Resolution methods (mechanical, seeding, biochemical and conversion to diastereoisomers).

UNIT II Geometrical isomerism and Conformational analysis (12 Hours)

Geometrical isomerism- Definition, cis-trans, syn-anti and E-Z notations-geometrical isomerism in maleic and fumaric acids and unsymmetrical ketoximes. Methods of distinguishing geometrical isomers using melting point, dipole moment, dehydration, cyclisation and heat of hydrogenation. Conformational Analysis-introduction of terms-conformers, dihedral angle, torsional strain, conformational analysis of ethane, ethylene glycol, ethylene chlorohydrin and n-butane including energy diagrams-conformers of cyclohexane (chair, boat and skew boat forms)-axial and equatorial bonds-ring flipping showing axial equatorial interconversions.

UNIT III Molecular rearrangements and Reactions (12 Hours)

Benzil-Benzilic acid, Cope, Fries rearrangements, Friedel craft, Reformatsky, Perkin reactions. Robinson annulations, Kolbe electrolysis, Aldol, Claisen condensation

UNIT IV Heterocyclic compounds (12 Hours)

General classification - preparation, properties and uses of pyrrole, furan, thiophene and pyridine. Preparation, properties and uses of condensed five and six membered heterocyclics - indole, benzofuran, quinoline and isoquinoline.

UNIT V Reagents in organic synthesis (12 Hours)

Na/ethanol, alcoholic KOH, H_2/Ni, H_2/Pd-$BaSO_4$, Zn/Hg-HCl, H_2N-NH_2/C_2H_5ONa, Ag_2O, HIO_4, Baeyers, Grignard reagent, manganese dioxide, n-butyl lithium.

CONTENTS BEYOND THE SYLLABUS

1. Methods of identification of optical isomers, resolution, methods of resolution
2. Comparative study of basicity of pyrrole, pyridine with amines.
3. Conformation and stereochemistry of alkane
4. Rearrangement like Wagner-Meerwein, Wolf, Beckmann
5. Important reagents in organic synthesis $AlCl_3$, BF_3, $LiAlH_4$, $NaBH_4$, PCl_5

TEXT BOOKS

1. Finar I.L, Organic chemistry Vol I sixth edition, ELBS, Pearson Education Ltd.,2004
2. Finar I.L, 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. Y.R.Sharma, Elementary Organic Absorption Spectroscopy – principles and chemical applications, S.Chand and Co., 2006.
5. Kalsi.P.S, Stereochemistry, Conformation and Mechanism, New Age International (p) Ltd, VIIth, 2008.
6. Nasipuri. D, Stereochemistry of organic compounds, second edition, Wiley Eastern Ltd., 1994.
7. Bhal B.S and Arun Bhal- a text book of organic chemistry, S.Chand & company ltd, 1948.
8. V.K.Ahluwalia, Rakesh kumar, Parashar.R.K, Organic reaction and mechanism, IVth edition, Narosa publishing house pvt Ltd., 2011.

REFERENCES

1. K.S.Tewari, and N.K.Vishoni, Organic Chemistry, Vikas Publishing House.
2. Soni.P.L and Chawla.H.M. 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.

ONLINE SOURCES:

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

6. https://www.thoughtco.com/definition-of-reagent-and-examples-605598

CORE PAPER – VI

INORGANIC CHEMISTRY-I

SUBJECT CODE: 17U5CHC06		
SEMESTER – V	**CREDIT : 5**	**HOURS : 60**

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.

Learning Outcome

Students will master the basics in inorganic chemistry of acids & bases, solvents and coordination complexes.

Students will have basic understanding on the chemistry of inorganic complexes.

Students will be able to interpret the applications of inorganic compounds in day to day life.

UNIT-I: Modern Concepts of Acids and Bases (12 HOURS)

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 (12 HOURS)

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, liq. N_2O_4, anhydrous H_2SO_4, liq.HF, and molten salts.

UNIT-III: Chemistry of f-Block Elements (12 HOURS)

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 – important compounds – preparation, properties and uses of Uranyl nitrate, Uranium hexa fluoride, Thorium dioxide and Thorium nitrate - Comparison of Lanthanides and Actinides.

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

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 (12 HOURS)

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.

CONTENT BEYOND THE SYLLABUS

1. Students will be able to prepare simple coordination complexes in lab.
2. Students can analyze and check the properties of acids and bases in lab.
3. Students will be able to understand the chemistry of many coordination complexes and their use as drugs.

TEXT BOOKS

1. Puri, Sharma, Kalia, Principles of Inorganic Chemistry 32nd Edition (2014), Milestone Publishers and Distributor, New Delhi.
2. Wahid. 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 (1987), S. Chand Publishing, New Delhi.

REFERENCE BOOKS

1. Satya Prakash, G.D. Tuli, S.K. Basu and R.D. Madan, Advanced Inorganic Chemistry – Vol – I (2006), S. Chand Publishing, New Delhi.
2. Satya Prakash, G.D. Tuli, S.K. Basu and R.D. Madan, Advanced Inorganic Chemistry – Vol – II (2006), S. Chand Publishing, New Delhi.

ONLINE SOURCES

1. https://en.wikibooks.org/wiki/Introduction_to_Inorganic_Chemistry
2. https://en.wikipedia.org/wiki/Inorganic_chemistry
3. https://www.chemguide.co.uk/inorgmenu.html

CORE PAPER-VII

PHYSICAL CHEMISTRY - I

SUBJECT CODE: 17U5CHC07		
SEMESTER – V	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

Facilitate the students to study about the nature of solutions, kinetics of reactions and learn the concepts of chemical equilibrium.

Learning Outcome

Students will learn the laws of solutions and deviations of solution w.r.t. pressure, temperature and volume.

Students can understand fundamental concepts of chemical equilibrium.

Students will have enhanced knowledge towards advanced conception of chemical equilibrium.

Students will able to understand and explain the theories of chemical kinetics.

Students will be skilled in solving the problems of Kinetics.

UNIT – I: Solutions (12 HOURS)

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. 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 (12 HOURS)

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 (12 HOURS)

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 - concept of chemical affinities.

Temperature dependence of equilibrium constant - van't Hoff Isochore - Pressure dependence of equilibrium constant.

UNIT – IV: Chemical Kinetics-I (12 HOURS)

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 (12 HOURS)

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.

CONTENT BEYOND THE SYLLABUS

1. Real solutions and colligative properties.
2. Homogeneous equilibrium and dissociation of PCl_5 and N_2O_4.
3. Biochemical equilibria.
4. Mechanism of complex reactions.
5. Problems related to first, second and third order reactions.

TEXT BOOKS

1. Arun Bahl, B.S. Bahl and G.D. Tuli, Essentials of Physical Chemistry, Revised multicolor edition, S. Chand publication Ltd, New Delhi, 2010.
2. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry, (47th edition) Vishal Publishing Co., New Delhi, 2017.
3. Kundu N. and Jain S.K., Physical Chemistry, S. Chand & Company Ltd, New Delhi, 1990.

REFERENCE BOOKS

1. Peter Atkins and Julio de Paula, Physical Chemistry, 7th Edn, Oxford University Press, New York, 2002.
2. Rajaram J. and Kuriacose J.C., Kinetics and mechanisms of chemical transformations, First edition, Macmillan Publishers India Ltd, New Delhi, 2011.
3. Rastogi R.P. and Misra R.R., An introduction to chemical thermodynamics, 6th revised edition, Vikas Publishing House Pvt. Ltd, New Delhi, 2005.

ONLINE SOURCES

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

ELECTIVE COURSE – I

ANALYTICAL CHEMISTRY

SUBJECT CODE: 17U5CHE01		
SEMESTER – V	CREDIT : 3	HOURS : 60

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.

Learning Outcome

Students will utilize the learned analytical skills in handling various chemical and biochemical instruments.

Students will have basic understanding on purification and separation techniques.

Students will have a thorough understanding of thermal and electro analytical techniques.

Students will be able to interpret the results of quantitative experiments and interpret the data in meaningful way.

UNIT-I: Laboratory Hygiene and safety (9 HOURS)

Storage and handling of corrosive, flammable, explosive, toxic, carcinogenic and poisonous chemicals. Simple first aid procedures for accidents involving acids, alkalies, 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.

UNIT-II: Gravimetric Analysis (12 HOURS)

Principle-theories of precipitation-solubility product and precipitation-factors affecting solubility product- precipitational 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 (12 HOURS)

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 (15 HOURS)

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 (12 HOURS)

Principle - Thermogravimetric analysis and Differential Thermal Analysis - discussion of various components with block diagram- TGA & DTA curves of $CuSO_4.5H_20$ 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 ($E_{1/2}$)- Polarography as an analytical tool in quantitative and qualitative analysis.

CONTENT BEYOND SYLLABUS

1. Calculation of solubility product.
2. Selection of desiccant for the purification of solids, liquids.
3. Comparison between adsorption, partition and column chromatography.

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

REFERENCE BOOKS

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.

ONLINE SOURCES

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

SKILL BASED ELECTIVE COURSE – I

SPECTROSCOPY

SUBJECT CODE: 17U5CHS01		
SEMESTER – V	**CREDIT : 2**	**HOURS : 60**

OBJECTIVES

Students acquire the knowledge about the fundamentals and different types of spectroscopy .

Learning Outcome

Students know principle, instrumentation and applications of Rotational spectroscopy.

Students can able to learn theory, laws, 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.

To understand the concept of NMR spectrum and its applications.

Students have an idea of different types of peak, Nitrogen rule and fragmentation of Mass spectroscopy.

UNIT – I Rotational Spectroscopy (12 HOURS)

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 IR & Raman Spectroscopy (12 HOURS)

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.

UNIT – III NMR spectroscopy (12HOURS)

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 – IV UV-VIS spectroscopy (12 HOURS)

Theory-Instrumentation-Beer-Lamberts Law – bands in UV-VIS spectrum – possible electronic transitions – types of electronic transitions based on selection rules – characteristic absorption (λ_{max} and ε_{max}) 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, Hyperchromic shift..

UNIT – V Mass spectroscopy (12 HOURS)

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.

CONTENT BEYOND SYLLABUS

1. Rotational spectra of diatomic molecules – H_2, HCl.
2. Theory and instrumentation of Raman Spectroscopy.
3. Determination of structure of molecules using different spectroscopic techniques.

TEXT BOOKS

1. Chatwal 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.

REFERENCE BOOKS

1. Collin N.Banwell, Mc Cash and M.Elaine, Fundamentals of Molecular Spectroscopy, Tata Mc.Graw Hill Publishing, New Delhi, 1994.
2. Jag Mohan, Organic Analytical Chemistry, Narosa Publishers, 2003.
3. William Kemp, Organic Spectroscopy, 3 rd Edition, Palgrave publishers, 2007.
4. Robert M. Silverstein, Francis X.Webster, David J. Kiemle, David L. Bryce, Spectrometric Identification of Organic Compounds, 8th Edition, 2015.
5. G. Aruldhas, Molecular Structure and Spectroscopy, PHI Learning Pvt. Ltd., 2004.

ONLINE SOURCES

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

CORE PAPER - VIII

CHEMISTRY OF NATURAL PRODUCTS

SUBJECT CODE: 17U6CHC08		
SEMESTER – VI	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

1. To gain knowledge about optical and geometrical isomerism.
2. Acquire the knowledge about heterocycles.
3. To understand the reaction mechanism and reagents in organic synthesis.

Learning Outcome

To gain an insight into basic concept of optical isomerism .

To providing theoretical understanding of heterocyclic chemistry which includes various methods of synthesis and application of those methods for the preparation of specific groups of heterocyclic systems.

To understand geometric isomerism and conformational isomerism

To acquire basic knowledge of mechanism of organic reactions.

To understand the reagents in organic synthesis

UNIT- I Fats, Oils and Wax (12 Hours)

Occurrence, properties - hydrogenation, drying of oils, hydrogenolysis, Rancidity. Analysis of oils and fats – saponification, iodine number. Synthetic detergents –classification, Occurrence of wax, difference between wax and lipids, phosphoglycerides, phosphate esters, phosphate ester acids, cell membrane.

UNIT II Alkaloids (12 Hours)

Alkaloids-classification-isolation, general methods of determination of structure of alkaloids-synthesis and structural elucidation of piperine, atropine and nicotine. Terpenes-classification, isolation, isoprene rule, synthesis and structural elucidation of citral, geraniol, alpha pinene.

UNIT III Steroids, Hormones and Vitamins (12 Hours)

Steroids – definition – Cholesterol and Ergosterol (structure only). Steroidal Harmones – Androsterones, Testrosterone, Progestrone and Oestrone (structure only). Vitamins – Introduction, Classification, occurrence and deficiency of vitamins – Structures of water and fat soluble vitamins. Synthesis of Retinol, Thiamine and Ascorbic acid.

UNIT IV Amino acids and proteins (12 Hours)

Amino acids-classification-essential and non essential amino acids-preparation of alpha amino acids-glycine, alanine and tryptophan-General properties of amino acids-Zwitter ions,

isoelectric point. Peptides and proteins-synthesis of peptide- Bergmann method. Proteins-classification based on physical and chemical properties and on physiological functions-primary and secondary structure of proteins-helical and sheet structures (elementary treatment only) – Denaturation of proteins.

UNIT V Carbohydrates (12 Hours)

Classification, Reactions of Glucose and Fructose- open chain and ring structures of glucose and fructose- -mutarotation, anomers, epimers and diastereomers. Interconversion of monosaccharides- conversion of pentose to hexose and vice-versa, aldose to ketose and vice-versa. Disaccharides-structural elucidation of sucrose and maltose, Polysaccharides-structure of starch and cellulose - derivatives of cellulose.

CONTENT BEYOND THE SYLLABUS

1. Structure and of some important alkaloids, terpene such as quninine, morphine and Limonene, carvone.
2. Isomerism of amino acids, occurrence and functions in biochemistry.
3. Benefits of fats and oils, Micelle formation and their uses.
4. Carbohydrates classifications, Sources, Nutrition benefits of carbohydrates.
5. General methods of classification of steroids uses of Vitamin

TEXT BOOKS

1. Finar I.L. Organic chemistry vol I & II- ELBS, Pearson Education Ltd., 2008.
2. O.P. Agarwal- Reactions and Reagents- Krishna prakashan media (p) Ltd., 1975
3. Bhal B.S and Arun Bhal- A text book of organic chemistry, S. Chand & company Ltd, 1948.

REFERENCES

1. Kalsi P.S Stereochemistry Conformation and Mechanism-, New Age International (p) Ltd, VIIth ,2008.
2. Nasipuri D. Stereochemistry of organic compounds , second edition,Wiley Eastern Ltd., 1994.
3. K.S. Tewari, and N.K. Vishoni, Organic Chemistry, Vikas Publishing House.
4. Soni.P.L and Chawla.H.M. Text book of organic chemistry,26th revised edition, Sultan chand and sons, 1995.
5. V.K. Ahuluwalia, Rakesh kumar, Parashar R.K, Organic reaction and mechanism,IVth edition, Narosa publishing house Pvt Ltd., 2011.
6. R.T. Morrison and Boyd, Organic Chemistry, VIth edition., PHI Learning Pvt Ltd., 2008.

CORE PAPER - IX

INORGANIC CHEMISTRY – II

SUBJECT CODE: 17U6CHC09		
SEMESTER – VI	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

1. To gain knowledge about the geometry of crystals and its significance.
2. Acquire the knowledge about the different oxidation states of halogens.

Learning Outcome

To gain an insight into characterization of inorganic compounds.

To acquire basic knowledge on electronegativity of different halogens and their resulting interhalogen compounds.

To enable the students to design and synthesis pharmaceutically valuable complexes.

UNIT – I: Solid State Chemistry (12 Hours)

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 (12 Hours)

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 (12 Hours)

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 (12 Hours)

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 (12 Hours)

Organometallic compounds: Definition – Classification based on nature of C-M bond: Ionic, σ bonded and non classically bonded. Organometallic compounds of Lithium and Boron - preparation, properties, structure and uses. Olefin complexes - Zeise's salt - synthesis and structure Cyclopentadienyl complexes - Ferrocene- preparation, properties, bonding and uses.

CONTENT BEYOND THE SYLLABUS

1. Significance of XRD studies.
2. Naturally occurring coordination complexes.
3. Compounds containing non-classical bonds.

TEXT BOOKS

1. Puri, Sharma, Kalia, Principles of Inorganic Chemistry 32nd Edition (2014), Milestone Publishers and Dustributor, New Delhi.
2. Wahid. 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.

REFERENCE BOOKS

1. Satya Prakash, G.D. Tuli, S.K. Basu and R.D. Madan, Advanced Inorganic Chemistry – Vol – I (2006), S. Chand Publishing, New Delhi.
2. Satya Prakash, G.D. Tuli, S.K. Basu and R.D. Madan, Advanced Inorganic Chemistry – Vol – II (2006), S. Chand Publishing, New Delhi.

ONLINE SOURCES

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

CORE PAPER – X

PHYSICAL CHEMISTRY - II

SUBJECT CODE: 17U6CHC10		
SEMESTER – VI	**CREDIT : 5**	**HOURS : 60**

OBJECTIVES

Encourage the students to study about the phases of compound, conductance of electrolytes and learn the theory of photo-physical processes.

Learning Outcome

Students will learn the formation of metal alloy systems.

Students can understand fundamental concepts of electrochemistry and method of determinations.

Students will be improved their knowledge towards dissociation of acids, bases and salts.

Students will learn the various types of cells and electrodes.

Students will gain knowledge about the radiative and non-radiative transitions in photochemistry.

UNIT – I: Phase Rule (12 HOURS)

Statement, Explanation of terms involved in phase rule, Derivation of phase rule. One component system-water and sulphur 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 systems and compound formation with incongruent melting points – K-Na alloy system.

UNIT – II: Electrochemistry – I (12 HOURS)

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 (12 HOURS)

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 (12 HOURS)

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 - Polarization and overvoltage. Potentiometric titration – principle, acid-base and redox titrations.

UNIT – V: Photochemistry (12 HOURS)

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 – law of photochemical equivalence. Photochemical reactions - Kinetics of hydrogen - bromine reaction - decomposition of HI.

CONTENT BEYOND THE SYLLABUS

1. Preparation and properties of metal alloys.
2. Conductance measurements of various electrolytes.
3. Different types of buffer solutions.
4. Functions of electrodes and cell reactions.
5. Calculation of quantum yield for various photochemical reactions.

TEXT BOOKS

1. Arun Bahl, B.S. Bahl and G.D. Tuli, Essentials of Physical Chemistry, Revised multicolor edition, S. Chand publication Ltd, New Delhi, 2010.
2. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry, (47th edition) Vishal Publishing Co., New Delhi, 2017.
3. Crow D.R., Principles and Applications of Electrochemistry, 4th Edition, CRC Taylor and Francis Group, 1994.
4. Rohatgi-Mukherjee K.K., Fundamentals of Photochemistry, Revised edition, New Age International Pvt. Ltd, New Delhi, 2003.

REFERENCE BOOKS

1. Gurdeep Raj, Advanced Physical Chemistry, Krishna Prakashan Media Pvt. Ltd, 35th edition, 2009.
2. Peter Atkins and Julio de Paula, Physical Chemistry, 7th Edn, Oxford University Press, New York, 2002.
3. Yadhav M.S., Electrochemistry, Anmol Publications Pvt Ltd, Revised Edition, 2001.

ONLINE SOURCES

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://www.askiitians.com

ELECTIVE COURSE – II

MEDICINAL CHEMISTRY

SUBJECT CODE: 17U6CHE02		
SEMESTER – VI	**CREDIT :3**	**HOURS : 60**

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 chemotheraphy.

Learning Outcome

Students will learn the basic principles of chemistry involved in life sciences.

Students will have basic understanding on cancer chemotherapy and haemetology.

Students will be able to incorporate the causes of various diseases and proper usage of medicines.

Students will be able to know the different types of drugs being used in drug industry.

UNIT – I Study of Drugs (12 Hours)

Definition of the terms – Drug, Pharmacophore, Pharmacodynamics, Pharmacopoeia, pharmacology, pharmacokinetics, Bacteria, Virus, Fungus, Actinomycetes, Metabolites, Metabolism of drug, Antimetabolites, L_{D50}, E_{D50} . Classification of drugs, Assay of drugs – Specific methods.

UNIT – II Antibiotics (12 Hours)

Antibiotics – definition – classification as broad and narrow spectrum antibiotics. Structure, properties, mode of action and uses of penicillin, chloramphenicol, streptomycin, tetracycline, novobiocin, puromycin .

UNIT – III Sulphonamides (12 Hours)

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 (12 Hours)

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 (12 Hours)

Types of neoplasms – sarcoma, carcinoma, carcinosarcoma, teratoma, leukemia and polycythemia. Causes of cancer – virus and chemicals. Treatment of cancer – surgery, radiation therapy and medical therapy. Cytotoxic anticancer drugs – alkylating agents – Bis-chloroethylamines, Cyclophosphamide, Mechlorethamine, Ethyleneimines, Alkyl Sulfonates, Nitrosoureas – Miscellaneous of alkylating agents – Mode of action of Alkylating agents.

CONTENT BEYOND THE SYLLABUS

1. Students will be able to prepare simple organic compounds in lab.
2. Students can analyze and check the properties of drugs.
3. Students will be able to understand the chemistry of many chemical compounds and their use as 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.

REFERENCE BOOKS

1. Graham Patrick, Medicinal Chemistry ,VIVA Books Private Ltd , New Delhi ,2002 .
2. Rama Rao 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.

ONLINE SOURCES

1. https://pharmafactz.com/introduction-to-medicinal-chemistry/
2. https://en.wikipedia.org/wiki/Medicinal_chemistry
3. http://library.umac.mo/ebooks/b28050332.pdf

SKILL BASED ELECTIVE COURSE – II

POLYMER CHEMISTRY

SUBJECT CODE: 17U6CHS02		
SEMESTER – VI	**CREDIT : 2**	**HOURS : 60**

OBJECTIVES

To impart the students the knowledge of polymer materials, their formation mechanisms, properties and uses.

Learning Outcome

Students will be able to gain knowledge about the properties and classification of polymers.

Students will be able to estimate the number- and weight-average molecular masses of polymers given the degree of polymerisation and mass fraction of chains present.

Students will enhance their knowledge towards the commercially important polymers, their preparation and applications.

UNIT-I POLYMERS CLASSIFICATION AND PROPERTIES (12 Hours)

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 POLYMERIZATION (12 Hours)

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 (12 Hours)

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.

UNIT –IV POLYMER DEGRADATION AND COMPOUNDING MATERIALS OF POLYMERS (12 Hours)

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 (12 Hours)

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.

CONTENT BEYOND THE SYLLABUS

1. Bullet proof plastics.
2. Preparation of Polymer nanocomposites and their applications.
3. Polymer based solar cells and its application in energy storage.

TEXT BOOKS:

1. V,R. Gowarikar., N.V. Viswanathan: Polymer Science-Wiley Eastem limited,New Delhi.1986.
2. Textbook of Polymer Science –FW Billmeyer,Wiley-1984.
3. Dr.M.S.Bhatnagar, A Text Book Polymers, S.Chand & Company Ltd, Ram Nagar,New Delhi. Volume-II-2004.

ONLINE SOURCES

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

CORE PRACTICAL- III

PHYSICAL CHEMISTRY PRACTICAL

SUBJECT CODE: 17U6CHCP03		
SEMESTER – VI	**CREDIT : 4**	**HOURS : 60**

OBJECTIVES

To verify the some important principles in physical chemistry and to determine various physical properties using simple instruments like conductivity meter, potentiometer, etc.

Learning Outcome

To develop skills in doing experiments in kinetics, Potentiometry and phase rule.

To make students capable of understanding and verifying principles of physical chemistry practically.

Students will gain an understanding of how to keep records of instruments, parameters, and experimental observations.

A) Kinetics

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.

B) Conductivity

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.(Potassium chloride)
4. Conductometric titration-Strong acid vs Strong base-
5. Weak acid vs Strong base.

C) Potentiometry

Potentiometric titration- Strong acid vs Strong base- Weak acid vs Strong base.

D) Heterogenous Equilibrium

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 Kf of a solvent by Rast method

TEXT BOOKS AND REFERENCE BOOKS

1. Basic Principle of Practical chemistry – V.Venkateswaran, R.Veeraswamy and A.R. Kulandaivelu, S.Chand and Sons ,NewDelhi,2004.
2. Experimental Physical chemistry V.D.Athawale,Parulmathur,Newage international publishers,2001.

ONLINE SOURCES

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.

CORE PRACTICAL- IV

ORGANIC ANALYSIS, PREPARATIONS AND GRAVIMETRIC ESTIMATIONS

SUBJECT CODE: 17U6CHCP04		
SEMESTER – VI	**CREDIT : 5**	**HOURS : 80**

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.

Learning Outcome

Students will learn to predict the outcome of organic reactions using a basic understanding of the general reactivity of functional groups and mechanism.

Enable the students to work effectively as a member of a team and tocCommunicate productively with lab mates, teaching assistant and instructor.

Students will learn to maintain a detailed scientific notebook.

(I) Organic Qualitative analysis:

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, Aldehydes, Ketones, Monosaccharides, Amides, Diamides, Aromatic primary amines and Nitro compounds.

(II) Organic Preparations:

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
4. Bromination – Preparation of p - Bromoacetanilide from Acetanilide
5. Bromination – Preparation of sym - Tribromophenol from Phenol
6. Benzoylation – Preparation of Benzanilide from aniline

(III) Gravimetric Estimations

(1) Estimation of Nickel as Nickel DMG Complex

(2) Estimation Barium as Barium Chromate

(3) Estimation of Lead as Lead Chromate

NOTE:

Practical procedures will be supplied by the department.

TEXT BOOKS AND REFERENCE 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.
3. Raj .K. Bansal, Laboratory Manual of Organic chemistry, 3rd Edition, New Age Internal Publication
4. B.S. Furniss, A.J.Hannaford, P.W.D Smith and A.R. Tatchell, Vogel's Practical Organic chemistry, 5th Edition. ELBS (1989)

ONLINE SOURCES

1. https://www.toppr.com/guides/chemistry/organic-chemistry/qualitative-analysis-of-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_Experiments/07%3A_Gravimetric_Analysis_(Experiment)

17U5CHC05

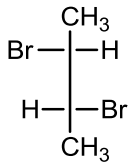
VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN
(AUTONOMOUS)
DEPARTMENT OF CHEMISTRY
B.Sc. DEGREE EXAMINATION - V SEMESTER
MODEL QUESTION- ORGANIC CHEMISTRY – I

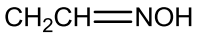
Time: 3 Hours Max. Marks: 75

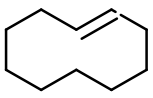
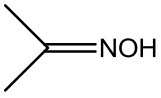
PART – A (20 x1 = 20 Marks)
Answer all the questions

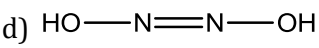
1. Which of the following compound would show optical isomerism?
   a)$CH_3CH(OH)COOH$ b)$H_2N\ CH(CH_3)_2$ c) $(CH_3)_2CHCHO$ d) H_2NCH_2COOH
2. Separating of d and l enantiomorphs from a racemic mixture is called
   a) Resolution b) Dehydration c)Rotation d) Dehydrohalogenation
3. Racemic mixture is formed by mixing two
   a) Isomeric compounds b) Chiral compounds c) Meso compounds d) Optical isomers
4. The absolute configuration of the asymmetric centres in the given molecule is

   a) 2R, 3R
   b) 2R, 3S
   c) 2S, 3R
   d) 2S, 3S

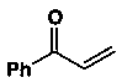


5. Which among the following does not exhibit geometric isomerism
   a) 1-hexene b) 2-hexene c) 3-hexene d) 4-hexene
6. Which will not show geometrical isomerism?
   a) 

   b) 
   c) 

   d) 

7. Which of the following correctly orders the relative steric energies of conformations of cyclohexane?
   a) *E*(chair) < *E*(twist-boat) < *E*(boat b) *E*(twist-boat) < *E*(boat) <*E*(chair)
   b)*E*(boat) < *E*(twist-boat) < *E*(chair) d) *E*(chair) < *E*(boat) < *E*(twist-boat)
8. The most stable conformation of ethylene glycol is
   a) anti b) gauche c) partially eclipsed d) fully eclipsed
9. Which medium is used in benzylic acid rearrangement reaction?
   a) Neutral b) Strong basic c) Mild acidic d) Strong acidic
10. Which product is formed in the Reformatsky reaction?
    a) β-hydroxy ester b) aldehyde c) 2◦ alcohol d) ketone
11. Which of the following mechanisms involve isomerization?
    a) Michael Addition b) Robinson Annulation
    c) Mannich Reaction d) Claisen Condensation
12. Which combination of carbonyl compounds gives phenyl vinyl ketone by an aldol condensation?



    a) Acetophenone and ketone b) Acetophenone and aldehyde
    c) Benzaldehyde and aldehyde d) Benzaldehyde and ketone
13. The order of aromaticity of furan, Thiophene and Pyrrole is
    a) Thiophene > Furan > Pyrrole b) Furan > Pyrrole > Thiophene
    c) Thiophene > Pyrrole > Furan d) Pyrrole > Thiophene >Furan

14. Which of the following is not a five membered ring?
    a) Pyridine b) Pyrrole c) Furan d) Thiophene
15. What is the name of the following reaction?

    a) Gattermann reaction b) Riemer tiemann reaction
    c) Friedal craft reaction d) Blanc's chloromethylation
16. Clemmensen reduction of a ketone is carried out in the presence of which of the following?
    a) H_2 and Pt as catalyst b) Glycol with KOH
    c) Zn-Hg with HCl d) $LiAlH_4$
17. What is the name of the given reaction of preparation of aldehyde?

$$CH_3COCl \xrightarrow[Pd/BaSO_4]{2H} CH_3CHO + HCl$$

    a)Reimer-Tiemann reaction
    b) Cannizzaro reaction
    c) Rosenmund reaction d) Reformatsky reaction
18. Which is not present in Grignard reagent?
    a) Methyl group b) Magnesium c) Halogen d) –COOH group
19. Which one of the following is Baeyer reagent?
    a) Na/ethanol b) alc.KOH c) H_2/Ni d) Alk.$KMnO_4$
20. The reagents was used as a polymerization initiator in the production of elastomers is
    a) Ag_2O b) Na/ethanol c) n-C_4H_9-Li d) HIO_4

PART – B (5 x 5 = 25 Marks)

Answer all the questions

21. a) Write a note on Cahn – Ingold – Prelog rules. (or)
    b) Explain any two of the resolution methods.
22. a) Discuss Geometrical isomerism of maleic and fumaric acids. (or)
    b) Explain conformational analysis of ethylene chlorohydrin.
23. a) Explain Benzil-Benzilic acid rearrangement. (or)
    b) Explain Robinson annulations reaction.
24. a) Write the preparation , properties and uses of thiophene. (or)
    b) Write Fischer Indole Synthesis.
25. a) Explain the preparation and applications of Zn/Hg-HCl. (or)
    b) Discuss the applications of n-butyl lithium.

PART - C

Answer ANY three questions. 3 X 10 = 30

26. Briefly explain Fischer and Newmann projection formulae.
27. Discuss the conformational analysis of 1,2 and 1,3 disubstituted cycloalkanes.
28. Explain i) Fries rearrangement ii) Claisen condensation.
29. Explain the preparation and properties of Pyridine.
30. Discuss the applications of i) alc.KOH ii) H_2/Pd-$BaSO_4$ iii) MnO_2 iv) HIO_4

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VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN
(AUTONOMOUS)
DEPARTMENT OF CHEMISTRY
B.Sc. DEGREE EXAMINATION – V SEMESTER
MODEL QUESTION –CORE PAPER-VI
INORGANIC CHEMISTRY

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

PART - A

Answer all the questions. **20 X 1=20**

1. A substance that donates a pair of electrons to form coordinate covalent bond is called……..

   (a) Lewis acid (b) Lewis base (c) Bronsted-Lowry acid (d) metal ion

2. Brønsted-Lowry acid is a ……. Donor

   (a) electron (b) hydroxyl (c) proton (d) anion

3. The conjugate acid of $[Ti(OH_2)_5(OH)]^{2+}$ is ……..

   (a) $[Ti(OH_2)_6]^{3+}$ (b)$[Ti(OH_2)_4(OH)_2]^{+}$ (c)$[Ti(OH_2)_5O]^{+}$ (d)$[(H_2O2)_4Ti(OH)_6]^{4+}$

4. An example of hard acid is……

   (a) K^{+} (b)Cu^{+} (c)Pd^{2+} (d)Tl^{+}

5. Comparing H_2O and NH_3 as solvents leads to analogies between which pair of species?

   (a) NH_3 & $[OH]^{-}$(b)$[NH_2]^{-}$ & H_2O (c)$[NH_2]^{-}$ & $[OH]^{-}$ (d)$[NH_4]^{+}$ & H_2O

6. Which statement is incorrect about Na in liquid NH_3?

   (a) It is an oxidizing agent (b) It is a reducing agent
   (c) It gradually liberates H_2 (d) It gives a blue solution when dilute

7. BF_3 reacts in liquid HF to give:

   (a) HBF_4 (b)$[BF_2]^{+}$ (c)$[H_2F]^{+}$ (d)$[HF_2]^{-}$

8. Which statement is incorrect about liquid N_2O_4?

   (a) Physical data confirm that N_2O_4 ionizes to give $[NO_2]^{+}$ and $[NO_2]^{-}$

   (b)It reacts with electropositive metals to liberate NO

   (c)It is a good oxidizing agent

   (d)It is useful for preparing complex nitrate salts

9. Which oxidation states correctly represent the usual range exhibited by the stated metal?

   (a) Ce; +3 & +4 (b)Th; +2 & +4 (c)Pu; +3, +4, +5 & +6 (d) U; +2, +3 & +4

10. Which is the most common oxidation state for thorium in its compounds?

    (a) +3 (b) +4 (c) +5 (d) +6

11. In addition to uranium, which other actinoid occurs naturally in significant amounts?

    (a) Actinium (b) Plutonium (c) Protactinium (d) Thorium

12. On moving from Pu to Md, the size of the ions ____.

    (a) constant (b) decreases (c) increases (d) decreases first then increases

13. The oxidation state of iron in $K_4[Fe(CN)_6]$ is

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

14. The _____ sphere is enclosed in brackets in formulas for complex species, and it includes the central metal ion plus the coordinated groups.

    (a) ligand (b) donor (c) coordination (d) chelating

15. In coordination chemistry, the donor atom of a ligand is
    (a) a Lewis acid (b) the counter ion (c) the central metal atom.
    (d) the atom in the ligand that shares an electron pair with the metal.

16. A molecule that cannot be superimposed on its mirror image is said to exhibit which of the following?

    (a) geometrical isomerism (b) optical isomerism

    (c)linkage isomerism (d) coordination isomerism

17. According to VBT, the formation of a stable bond requires

    (a) The electrons should have opposite spins
    (b) The two atoms should be close to each other
    (c) The greater overlapping of the electron cloud
    (d) All of the mentioned

18. According to VB theory SP^3 hybridization leads to …….. Structure.

    (a) linear (b)trigonal (c) tetrahedral (d) bipyramidal

19. The complex ion which has no d-electron in the central metal atom is

    (a) $[MnO_4]^-$ (b)$[Co(NH_3)_6]^{3+}$ (c)$[Fe(CN)_6]^{3-}$ (d) $[Cr(H_2O)_6]^{3+}$

20. Match up the correct formula and magnetic property. Which pair is correct?

    (a) $[Zn(OH_2)_6]^{2+}$; paramagnetic (b) $[Co(NH_3)_6]^{3+}$; diamagnetic

    (c) $[Co(NH_3)_6]^{3+}$; diamagnetic (d) $[V(OH_2)_6]^{2+}$; diamagnetic

PART - B

Answer all the questions. 5 X 5 = 25

11. (a) Write a short note on Leveling effect. **(OR)**
    (b) Which of the following is more acidic? Explain
    $HClO_4$, $HClO_3$, $HClO_2$, HClO
12. (a) What are the characteristics of a solvent? **(OR)**
    (b) Explain the reactions takes place in liq. SO_2.
13. (a) Give a brief account of Lanthanide contraction. **(OR)**
    (b) Explain the preparation properties and uses of Uranyl nitrate, Thorium dioxide.
14. (a) Discuss the optical isomerism in square planar complexes. **(OR)**
    (b) State and explain EAN rule.
15. (a) Explain the type of hybridization, geometry and magnetic properties for the following complex using VBT: $[Cu(NH_3)_4]^{2+}$ and $[Fe(CN)_6]^{3-}$. **(OR)**
    (b) Explain crystal field splitting in octahedral complexes.

PART - C

Answer ANY three questions. 3 X 10 = 30

16. Explain the applications of HSAB concept.
17. Explain the solutions of alkali metal in liq. NH_3.
18. (i) Compare lanthanides and actinides (ii) Explain the isolation of lanthanides from monazite.

19. Explain Werner's theory. How it explain structure of co-ordination compounds?
20. (i) Discuss the postulates of VBT (ii) Explain CFSE & their uses?

17U5CHC07

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(Autonomous)
B.Sc. DEGREE EXAMINATION
MODEL QUESTION – PHYSICAL CHEMISTRY-I

Time : THREE Hour **Maximum : 75 Marks**

SECTION A – (20 x 1 = 20 marks)
Answer ALL Questions.

1. A saturated solution of KCl on heating becomes ……
   a) hydrated b) Unsaturated
   c) supersaturated d) None of these
2. The No.of moles of a solute per kilogram of the solvent is called ……..
   a) Mole fraction b) Molality c) Normality d) Molarity
3. Mathematically Henry's law can be expressed as ……..
   a) C = kP b) C∞ P c) k= C/P d) All of these
4. Sugar dissolves in water due to the formation of …….
   a) covalent bond b) ionic bond c) hydrogen bond d) co-ordinate bond
5. Equilibrium reactions are characterized by ……..
   a) the presence of both reactants and products b) going to completion
   c) being non-spontaneous d) both (a) and (b)
6. Which of the following will change the equilibrium constant for a reaction mixture?
   a) adding an inert gas b) changing temperature
   c) increasing pressure by decreasing volume d) All the above
7. A catalyst will increase the rate of a chemical reaction by ……
   a) shifting the equilibrium to the right b) shifting the equilibrium to the left
   c) lowering the activation energy d) increasing the activation energy
8. In writing equilibrium constant expressions which of the following quantities can be used to represent the amount of reactants and products?
   a) Concentrations b) partial pressures
   c) mole fractions d) (a) and (b) only
9. Which of the following represent equilibrium constants?
   a) weak acid dissociation constant b) K_c for a reaction
   c) Concentration of strong base in water d) (a) and (b)
10. Which statement is true for a liquid /gas mixture in equilibrium?
    a) depend on temperature b) amount of the gas independent of pressure
    c)interchange between liquid and gas phase d) all the above
11. If the equilibrium constant for a reaction is large, what can be said about the reaction?
    a) Very little product is formed
    b) very little reactant remains at equilibrium
    c) the reaction goes to completion
    d) large quantities of reactants will remain at equilibrium
12. What effect does a catalyst have on the equilibrium position of a reaction?
    a)a catalyst favours the formation of products
    b) a catalyst favours the formation of reactants
    c) a catalyst does not change equilibrium position
    d) a catalyst may favour product formation
13. Reaction rates can change with
    a) Temperature b)addition of a catalyst c) reactant concentrations d) all of these
14. The quantity k in rate law expression
    a) is independent of concentration b) is called Arrhenius constant

c) is dimensionless d) is independent of the temperature

15. In series of reactions which is the rate determining step?
    a) the simplet reaction b) reaction of major reactant
    c) the slowest reaction d) the fastest reaction
16. A reaction in which all reactions all reactants in the same phase is called
    a) elementary b) bimolecular c) homogeneous d) heterogeneous
17. What happens in a steady state?
    a)product is being formed faster b) heat is evolved
    c) the concentration of an intermediate is constant d) nothing is happening
18. A + B + C -----→ Product is:
    a) Unimolecular b) Trimolecular c) Bimolecular d) Tetramolecular
19. In a lab each of the following factors will affect the reaction rate EXCEPT
    a) catalyst used b)concentration of reactants c)identity of reactants d)oxygen availability
20. Species that are formed in one step of reaction mechanism and used up in another step are called
    a) catalysis b) intermediates c) inhibitors d) activated complexes

SECTION B – (5 x 5 = 25 marks)
Answer ALL Questions

21. (a). Write down thermodynamic derivation of Nernst's law (OR)
    (b). Derive thermodynamics of ideal solutions.
22. (a). Write a note on Equilibrium law. (OR)
    (b). Explain law of mass action.
23. (a) Account on Van't Hoff isochore. (OR)
    (b) Explain equilibrium constant expression interms of general and interms of pressure..
24. (a)Describe the kinetics of complex reaction with example. (OR)
    (b)Give any one method to identify the order of a reaction.
25. (a)Write notes on Concept of Activation energy. (OR)
    (b) Derive Arrhenius equation.

SECTION C – (3 x 10 = 30 marks)
Answer Any THREE questions.

26. Explain V-P Composition curve and V-P temperature curve.
27. Account on characteristics of chemical equilibrium.
28. Derive Van'tHoff reaction isotherm.
29. Derive rate constant and half life period for second order reaction.
30. Describe the Lindemann theory of unimolecular reactions.

17U5CHE01

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS)

B.Sc. CHEMISTRY DEGREE EXAMINATION

MODEL QUESTION PAPER

ANALYTICAL CHEMISTRY

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

PART- A

Answer all the questions **20 X 1 = 20**

1. …….. is an irritant that is also flammable, toxic, and carcinogenic.
   (a) Benzene (b) Aziridine (c) Carbon disulphide (d) None of the mentioned
2. Which of the following is not a form of eye protection?
   (a) Polycarbonate safety spectacles (b) Face shield (c) Goggles (d) Contact lenses
3. Threshold limit value for nitric acid is …….. µg/cubic metre.
   (a) 70 (b) 80 (c) 25 (d) 30
4. …….. chemicals should be stored in corrosion-resistant chambers.
   (a) Carcinogenic (b) toxic (c) Corrosive (d) All the above
5. In EDTA titrations, ……. ion is employed as a masking agent for estimating magnesium and calcium.
   (a) cyanide (b) fluoride (c) copper (d) Nickel
6. Examples of chelating precipitants are
   (a) Cupferon (b) 8-hydroxy quinolone (c) Anthranilic acid (d) All the above
7. Crucible which is made up of porcelain is
   (a) Gooch crucible (b) sintered glass crucible
   (b) (c) clay crucible (d) none of the mentioned
8. To filter precipitates needed to be ignited we use
   (a) Gooch crucible (b) sintered glass crucible
   (c) clay crucible (d) plastic crucible
9. Drierite (Drying agent) is the commercial name for ……..
   (a) Anhydrous calcium sulphate (b) Anhydrous sodium sulphate
   (c) Anhydrous magnesium perchlorate (d) Anhydrous copper sulphate
10. Molecular sieves are alumina silicates and their pore sizes range from ..... Å.
    (a) 3 to 5 (b) 3 to 4 (c) 3 to 6 (d) 3 to 7
11. Which of the following is not a common method used for purification?
    (a) Sublimation (b) Crystallisation (c) Electrolysis (d) Chromatography

12. The process of distillation is used for the liquids having
    (a) Sufficient difference in their boiling point
    (b) Sufficient difference in their melting point
    (c) Sufficient difference in their solubility
    (d) None of the mentioned
13. In Column chromatography, the stationary phase is made of _____ and the mobile phase is made of _____
    (a) Solid, liquid (b) Liquid, liquid (c) Liquid, gas (d) Solid, gas
14. Pattern on paper in chromatography is called

(a) Chroming (b) chroma (c) chromatograph (d) chromatogram

15. Retention factor is the ratio of
    (a) Distance moved by substance from base line to distance moved by the solvent from base line
    (b) Distance moved by solvent from base line to distance moved by the substance from base line
    (c) Distance moved by substance from top line to distance moved by the solvent from top line
    (d) Distance moved by solvent from top line to distance moved by the substance from top line
16. Select the correct statement from the following.
    (a) Paper chromatography is a type of partition chromatography
    (b) A special quality paper is used in paper chromatography
    (c) Chromatography paper contains water trapped in it, which acts as stationary phase
    (d) All of the mentioned
17. Thermal analysis is defined as _____
    (a) Measurement of concentration of materials as a function of temperature
    (b) Measurement of solubility of materials as a function of temperature
    (c) Measurement of physical properties as a function of temperature
    (d) Measurement of line positions of crystals as a function of temperature
18. Which of the following option is appropriate for the TGA and DTA?
    (a) TGA and DTA measures only weight
    (b) TGA measures only weight while DTA measures other effects
    (c) TGA and DTA measures only temperature
    (d) TGA measures only temperature while DTA measures other effects
19. Which of the following forms of electrochemistry seeks to obtain the condition of full polarization?
    (a) potentiometry (b) voltammetry (c) coulometry (d) electrogravimetry
20. The Potential at the point on the polarographic wave where the current is equal to one half of the diffusion current is termed as
    (a) Half wave current (b) full wave Current
    (c) half wave Potential (d) full wave Potential

PART- B

Answer all the questions **5 X 5 = 25**

21. (a) Discuss the general precautions which help avoid accidents in laboratories. (OR)
    (b) Discuss the methods which are used for heating and stirring chemicals in laboratories.
22. (a) Distinguish between (i) Coprecipitation and Post-precipitation
    (ii) Specific precipitant and selective precipitant (OR)
    (b) What is a masking and demasking agent? Illustrate the application of masking and ` demasking agents in gravimetric analysis.

23. (a) Define : (i) the relative efficiency of a desiccant

(ii) the drying capacity of a desiccant

(iii) Regeneration of desiccants (OR)

(b) Write a note on the theory of distillation.

24.(a) Explain the difference between adsorption chromatography and partition chromatography.

(OR)

(b) Explain the principle of thin layer chromatography? How is TLC performed?

25. (a) Draw and explain the TGA curve expected on heating $CaC_2O_4 . H_2O$ in the range 30- 1000ºC.

(OR)

(b) Describe briefly the principle of polarography.

PART- C

Answer ANY three questions 3 X 10 = 30

26. List the general rules to be borne in mind in storage and handling of chemicals.

27. Write a note on types, maintenance and uses of crucibles.

28. Explain the principle, technique and advantages of sublimation.

29. Explain the principle, instrumentation and applications of Gas chromatography (GC).

30. (i) With a diagram , explain the experimental set-up used in TGA.

(ii) Explain how DTA differs from TGA.

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(Autonomous)
B.Sc. DEGREE EXAMINATION
MODEL QUESTION PAPER – V SEMESTER
SPECTROSCOPY

Time : 3 hrs **Maximum : 75 Marks**

SECTION A – (20 x 1 = 20 marks)
Answer ALL Questions.

1. The molecule which is IR in active but Raman Active is ……
   a) N_2 b) HCL c) SO_2 d) Protein
2. The vibrational rotational spectrum is observes in ……region
   a) Near IR b) Microwave region c) visible region d) Radiofrequency region
3. The increase in rotational energy shows absorption spectrum in……..
   a) IR region b) UV region c) Visible region d) Microwave region
4. Which one of the following diatomic molecule will not give a rotation in spectrum
   a) N2 b) CO c) NO d) HF
5. The different types of energies associated with a molecule are
   a) Electronic energy b) Vibrational energy c) Rotational energy d) All the above
6. Which one of the following is an application of molecular spectroscopy
   a) structural investigation b) basis of understanding of colours
   c) study of energetically excited reaction d) All the above
7. Which of these properties must change be Raman active……
   a) volume b) dipole moment c) polarisibility d) None of the above
8. Which type of scattering results in a longer wavelength than the incident light?
   a) Rayleigh b) stokes c) antistokes d) None of the above
9. The distance between the centres of the peaks of doublet is called as?
   a) coupling constant b) spin constant c) spin spin coupling d) chemical shift
10. H_2, CH_4,C_2H_6 and C_6H_6 exhibit which PMR spectra?
    a) Singlet b) Doublet c) Triplet d) Quintet
11. A proton Hb is coupled to four equivalent proton Ha .the multiplicity and the relative intensity of lines in the signal Hb is ……..
    a) Doublet 1:4 b) triplet 1:4:6 c) quintet1:4:6:4:1 d) None of the above
12. In which region of the electron magnetic spectrum does an absorption at 600 nm come?
    a)Visible b)Near Uv c) IR d) Vaccum uv
13. What is a red shift?
    a) The shifting of an absorption to shorter wave length
    b) The shifting of an absorption towards the blue end of the spectrum
    c) The shifting of an absorption to lower energy
    d) The shifting of an absorption to higher energy
14. What is a chromophore?
    a) A group of atoms in a compound responsible for electromagnetic radiation
    b) A group of atoms in a coloured compound
    c) group of atoms in a compound responsible for absorption electromagnetic radiation
    d) coloured compound
15. In which of the following π electron are not delocalized?
    a) Hepta 1,6-diene b) buta 1,3-diene c) Allyl anion d) An α,β unsaturated ketone
16. What does the notation $\sigma^* \leftarrow n$ mean?
    a) Absorption transition from a quantum level n to σ*MO
    b) Emission transition from a quantum level n to σ*MO

c) Emission transition from a quantum level non bonding molecular bonding n to σ*MO
d) Absorption transition from a quantum level non bonding molecular bonding n to σ*MO

17. Who discovered the Mass spectrometer?
a)Francis aston b) J.J.Thomson c) Ernest o.lawrence d) Walter kaufmann
18. In which state of matter mass spectroscopyis being performed?
a) Solid b) Liquid c) gaseous d) plasma
19. What are the main criteria on which mass spectrometer used for?
a) composition in sample b) Relative massof atoms c) concentration of elements in sample d) properties of sample
20. Seperation of Ions in Mass spectrometer take plac on the pairs of which of the following?
a) Mass b) Charge c) Molecular weight d) Mass to charge ratio

SECTION B – (5 x 5 = 25 marks)
Answer ALL Questions

21. (a). Write a short note application of rotation spectra. (OR)
(b). Explain molecular rotation of diatomic molecule at rigid rotor.
22. a). Give the comparision of IR and Raman spectra. (OR)
(b). Explain the types of fundamental vibrations, modes and their energies.
23. (a) Define chemical shift.Explain the factors affecting chemical shift. (OR)
(b) Write a short note on spin spin coupling.
24. (a)Explain the instrumentation of UV spectroscopy. (OR)
(b)Explain the types of electronic transition.
25. (a) Explain the instrumentation of Mass spectroscopy. (OR)
(b) Explain Mc Lafferty rearrangement.

SECTION C – (3 x 10 = 30 marks)
Answer Any THREE questions.

26. Explain briefly about the principle and instrumentation of Rotational spectroscopy?
27. Write briefly about the conditions for a molecule to be Raman active.
28. Explain briefly about the principle and instrumentation of NMR spectroscopy.
29. Explain briefly about the Applications of UV spectroscopy.
30. Explain briefly about the types of peak in Mass spectroscopy and their uses.

17U6CHC08

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (Autonomous)
B.Sc., DEGREE EXAMINATION
MODEL QUESTION PAPER
CHEMISTRY OF NATURAL PRODUCTS

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

PART – A

Answer all the questions. **20 X 1 =20**

1. The melting point of at is -------- and melting point of oil is----------
(a)higher,higher (b) lower, lower (c) higher, lower (d) lower, higher

2. Which of the following is an example of fats?
   (a)Glyceryl trioleate (b) Vegetable ghee (c) coconut oil (d) Groundnut oil
3. Saponification is hydrolysis
   (a) By alkalis (b) In digestive tracts of human being (c) By acids (d) By salts
4. Iodine number is defined as the number of grams of iodine needed for the iodination of gram/grams of oil or fat
   (a)1 (b) 5 (c) 1000 (d) 100
5. Alkaloids generally occur in
   (a) plants (b) animals (c) Minerals (d) All the above
6. Alkaloids are generally
   (a) Nitrogeneous compounds (b) Basic in nature (c) physiologically active substance
   (d) all the above
7. How many double bonds (C=C) present in geraniol?
   (a) 0 (b) 1 (c) 2 (d) 4
8. α-Terpeniol is a ---------- compound?
   (a) acyclic (b) monocyclic (c) bicyclic (d) None of the above
9. Fat soluble vitamins are
   (a) A,C,E (b) Acids And Bases (c) A,D,E,K (d) A,B,C,D
10. Which of the following does not have an α,β unsaturated carbonyl group?
    (a) Androsterone (b) Oestrone (c) Progesterone (d) all the above
11. Steroidal hormone which plays an important role in carbohydrate metabolism is
    (a)Oestrone (b) Androsterone (c) Cortisoe (d) Progesterone
12. Which vitamin contain cobalt
    a) Vit B_1 b) Vit B_{12} c) Vit B_6 d) None of the above
13. Zwitter ion is
    (a)An ion that positively charged in solution
    (b) An ion that negatively charged in solution
    (c) A compound that can ionise both as a base and an acid
    (d) Carbohydrate with electric charge
14. Glycine reacts with nitrous acid to form
    (a)Glycolic acid (b) Diketopiperazine (c) Methylamine (d) Butyrlactam
15. Five elements which are presents in naturally occurring proteins are
    (a)C,H,O,P,S (b) N,C,H,O,I (c) N,S,C,H,O (d) C,H,O,S,I
16. Digestion of protein involves
    (a)change in the secondary structure only
    (b) change of peptide bond
    (c) change in the primary structure only
    (d) Removal of NH2
17. Glucose and fructose can be obtained from sucrose is heated in presence of
    (a)Dil hydrogen sulphide (b) Dil hydrogen peroxide
    (c) Dil hydrochloric acid (d) Dil nitric acid
18. Which biomolecule simply refers as “stuff of life” in the given macromolecule
    (a)protein (b) Lipids (c) carbohydrate (d) vitamins
19. Which is the simplest carbohydrate?
    (a) Dihydroxy actone (b) Glyceraldehyde (c) Glucose (d) Galactose
20. Glucose can have isomers due to the presence of 4 asymmetric carbon atoms
    (a)4 (b) 2 (c) 12 (d) 16

PART – B

Answer all the questions. **5 X 5= 25**

21. (a) Explain Drying of oil **(OR)**

(b) Discuss the classification of Synthetic detergents.

22. (a) Write a note on classification of terpenoids **(OR)**
    (a) Write down the synthesis and structural elucidation of piperine
23. (a) Draw the structure of i)Cholesterol ii) Ergosterol iii) Androsterones iv) Testrosterone v) Progestrone **(OR)**
    (b) Discuss the Classification of Vitamins
24. (a) Explain the concept Zwitter ions, isoelectric point **(OR)**
    (b)Discuss Denaturation of proteins.
25. (a) Write a note on mutarotation. **(OR)**
    (b) How will you convert pentose to hexose.

PART - C

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

26. List out the difference between wax, lipids and fats.
27. Explain the synthesis and structural elucidation of citral.
28. Explain the Synthesis of Ascorbic acid.
29. Discuss the primary and secondary structure of proteins.
30. Explain the structural elucidation of maltose.

17U6CHC09

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN
(AUTONOMOUS)
DEPARTMENT OF CHEMISTRY
B.Sc. DEGREE EXAMINATION - VI SEMESTER
MODEL QUESTION- INORGANIC CHEMISTRY - II

Time: 3 hrs Max Marks: 75

PART - A

Answer all the questions. **20 X1=20**

1. In face centered cubic lattice, a unit cell is shared equally by how many unit cells?

   a)2 b) 4 c)6 d) 8

2. An ionic compound has a unit cell consisting of A ions at the corners of a cube and B ions on the centres of faces of the cube. The empirical formula of the compound would be?

   a)AB b)A_2B c)AB_3 d) A_3B

3 Which of the following is a molecular crystal?

   a)Dry ice b)Quartz c)Rock salt d)Diamond

4. Sodium chloride usually crystallizes in a face centered cubic lattice.How many ions are in contact with any single Na^+ ion?

   a) 8 b) 6 c)4 d) 1

5. The stability of inetrhalogen compounds follow the order

a)IF_3>BrF_3>ClF_3 b) BrF3> IF3>ClF3 c) ClF3>BrF3> IF3 d) ClF3> IF3 >BrF3

6. In XA_5,the central atom has (both X and A are halogens)
   a)5 bond pairs and no lone pairs b) 5 bond pairs and one lone pairs
   c) 6 bond pairs and no lone pairs d) 4 bond pairs and one lone pairs
7. Which of the following is not pseudo halide ion?
   a)CNO b)CN^- c) SCN^- d)S^{2-}
8. In the known inerthalogen compounds the maximum number of atoms are
   a)4 b)5 c)8 d)7
9. Boron compounds behave as Lewis acid because of their
   a) Acidic nature b)Electron deficiency c)Ionic property d)smaller size
10. Which of the following wrong regarding the structure of diborane
    a)four terminal H atoms and two Bridged H atoms
    b)The terminal H atoms and boron atoms lie in the plane
    c)Four two centre bonds and three centre bonds
    d)B is SP^2 Hybridised

11. What is the formula using to find no of electron pairs in arachno carboranes?
    a) m+1 b) m+2 c)m+3 d) none
12. Why Borazine is called inorganic benzene?
    a)Iso electronic with benzene b) Iso structural with benzene
    c)same kind of reactions d) none of the above
13. The oxidation state of Fe in K4$[Fe(CN)_6]$ is
    a)1 b) 2 c)3 d)4
14. Which of the following is a π-donor ligand?
    a)Cl^- b)NH_3 c) CO d)PF_3
15. Which one is having strong trans directing ability to upcoming ligands?
    a) NH_3 b) CO c) CN d)NO_2
16. Which ion is kinetically inert?
    a)Cr^{2+} b)CO^{3+} c)CO^{2+} d) Fe^{3+}
17. Which of the following is the incorrect statement about Zeise's salt?
    a) Zeise's salt is diamagnetic
    b)oxidation state of Pt in Zeise's salt is +2
    c)All the Pt-Cl bond length in Zeise's salt are equal.
    d)c-c bond length of ethylene moiety in Zeise's salt longer than that of free ethylene molecule
18. Which of the following complexes show easy oxidation?
    a)(η^5-C_5H_5) Fe b) (η5-C5H5) Ru c) (η5-C5H5) Co d) (η5-C5H5) Co^+

19. Which statement about ferrocene is correct?

a)I_2 oxidisez ferrocence to give a diamagnetic cation

b)The ligands in ferrocence undergo electrophilic substitution with ROCl

c)The Fe centre in ferrocence can be protonated by treatment with con H2So4

D)In the gas phase the C5H5 rings in ferrocence are eclipsed

20.An organometallic bond is defined as bond between

a)metal and non metal b)carbon & metal c)carbon &non metal d)carbon & metalloid

PART - B

Answer all the questions. 5 X 5 = 25

11. (a) Write a note on the applications of radius ratio rule. (OR)

(b) Write a brief note on metal excess and metal deficiency defects.

12. (a) What are the similarities and differences between halogens and pseudohalogens. (OR)

(b) Explain the preparation, properties and uses of IF5 and BrF3.

13. (a) Why borazine is said to be inorganic benzene? (OR)

(b) Explain the preparation properties and uses of boron nitride.

14. (a) Discuss the uses of trans effect. (OR)

(b) Write a note on trans effect series.

15. (a) Explain the preparation and structure of Zeise's salt. (OR)

(b) What is meant by non – classically bonded organometallics? Explain using examples.

PART - C

Answer ANY three questions. 3 X 10 = 30

16. Explain the structure of NaCl crystal.

17. Explain the preparation, properties and structure of cyanogen.

18. Describe the structure of diborane.

19. Explain electrostatic polarization and pi-bonding theories of trans effect.

20. Discuss the properties and bonding in ferrocene.

17U6CHC10

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(Autonomous)
B.Sc. CHEMISTRY DEGREE EXAMINATION
PHYSICAL CHEMISTRY-II
MODEL QUESTION – SEMESTER V

Time : 3 Hours **Maximum : 75 Marks**

SECTION A – (20x 1 = 20 marks)
ANSWER ALL QUESTIONS

1. Which of the following have two components in the system?
   a)water + KCl = KCl hydrate b)a solution of common salt
   c) $MgCO_3 = MgO + CO_2$ d) all of these
2. How many degrees of freedom will be present in a solution of sodium sulphate in equilibrium with water vapour?
   a)1 b) 2 c) d) 4
3. The reduced phase rule for a condensed system is
   a) F=C-P+2 b) F=C-P+1 c) F=C-P d) F=C-P+3
4. The phase rule is applicable to
   a) homogeneous system b) reversibly systems
   c) irreversibly systems d) heterogeneous system
5. Specific conductance is the conductance of
   a) 1cm cube of solution of an electrolyte b) 1cm cube of a solid electrolyte
   c) 1gm of the solution of an electrolyte d) 1gm of the solid electrolyte
6. The molar conductance of solution of an electrolyte is measured in
   a) ohm cm mol^{-1} b) $ohm^{-1}cm^{-1}mol^{-1}$ c) ohm $cm^{-1}mol^{-1}$ d) $ohm^{-1}cm^{2}mol^{-1}$
7. The fraction of the total current carried by the cation or anion is termed as
   a) fractional number b) speed number c) carrier number d) transport number
8. When a strong acid is titrated against a strong base the end point is the point of
   a) zero conductance b)maximum conductance c) minimum conductance d) none of these
9. When a salt is added to a solution of another salt having a common ion the degree of dissociation is
   a) increases b) remains the same c) decreases d) none of these
10. the precipitation of a salt takes place if its ionic product is
    a) equal to its KSp b) less than its KSp c)greater than its KSp d) none of these

11. The addition of HCl will not suppress the ionisation of

a)Acetic acid b) sulphuric acid c)H_2Sd) benzoic acid

12. The product of concentration of ions in the saturated solution at given temperature is called

b) Ionic product b) solubility product c) solubility d) solubility constant

13. The site of oxidation in an electrochemical cell is

a) the anode b) the cathode c) the electrode d) the salt brige

14. A voltaic cell has an E0 value of -1.00V. the reaction

a) is spontaneous b) has a positive standard free energy c) has a negative standard free energy d) has k=1

15.which of the following can we use to measure pH?

a) a glass electrode b) a concentration cell

c) a hydrogen electrode d) all of these

16. The salt bridge in the electrochemical cell serves to

a) increase the rate at which equilibrium is attained b) increase the voltage of the cell

c) maintain electrical neutrality d) increase the oxidation / reduction rate

17. Photochemical activation is highly selective. This statement is

a) true b) falsec) sometimes true d) none of these

18. The emission of light as a result of chemical action is called

a) phosphorescenceb) fluorescence c) chemiluminescence d) none of these

19. Organic dyes like eosin, chlorophyll, ultrarine etc., show in the visible or uv region

a) fluorescence b) phosphorescence c) chemiluminescence d) none of these

20. In photochemical reaction the absorption of light takes place in

a) only primary processb) only secondary process **c)** either primary or secondary proces

d) both primary and secondary

SECTION B – (5x 5 = 25 marks)

ANSWER ALL QUESTIONS

21. Define the following terms: (i) phase (ii) components (iii) degree of freedom **(OR)**

Draw phase diagram for sulphur system

22. Discuss the variation of conductance with dilution **(OR)**

Draw and explain ionic mobility

23. Write the determination of pH **(OR)**

Explain the application of solubility product

24. Draw and explain standard cell **(OR)**

Discuss about LJP conjuction

25. Define the following terms: (i) Grothus draper Law (ii) Stark Einstein Law

(iii) quantum yield **(OR)**

Explain the kinetics reaction for H_2-Br_2 mechanism

SECTION C – (3x 10 = 30 marks)

ANSWER ALL QUESTIONS

26. Draw and explain the phase diagram for KI-H_2O system
27. Briefly explain conductometric titrations
28. Explain – Hydrolysis of salt
29. Briefly explain potentiometric titrations
30. Explain Jablonski diagram

17U6CHE02

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN
(AUTONOMOUS)
DEPARTMENT OF CHEMISTRY
B.Sc. DEGREE EXAMINATION - VI SEMESTER
MODEL QUESTION- MEDICINAL CHEMISTRY

Time : Three hours **Max Marks: 75**

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

1. A substance used in the diagnosis, treatment, or prevention of a disease will be called as

   a) Amine b) ketone c) drug target d) drug
2. The dose of a substance which is fatal to 50% of the test animals will be called as

   a) LD_{50} b) KD_{50} c) toxin d) oxidant
3. The organic compound which is starting material in, intermediate in, or an end product of metabolism will be called as

   a) antimetabolite b) metabolite c) toxin d) oxidant
4. Parasite with a noncellular structure composed mainly of nucleic acid within a protein coat is called as

   a) drug b) metabolite c) virus d) oxidant
5. A chemical substance that is produced by a microorganism and, in dilute solutions, can inhibit the growth of, and even destroy, other microorganisms is called as

   a) drug b) antibiotic c) virus d) fungus
6. Penicillin was discovered by ----------
   a) Charles Darwin b) Alexander Fleming c) John Dalton d) Arrehenius

7. Streptomycin is an ---------- antibiotic.
   a) Narrow spectrum b) broad spectrum c) IR spectrum d) Both a and b
8. In terms of chemical structure, tetracyclines are a ---------- condensed system with various substituents.
   a) Bicyclic b) tricyclic c) tetracyclic d) Monocyclic
9. A class of organic compounds that are amides of sulphonic acids containing the group $--SO_2NH_2$ or a group derived from this will be called as

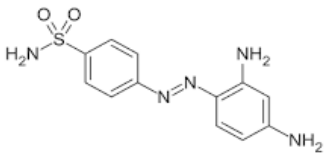
   a) Carboxylic acids b) antibiotics c) Sulphonamides d) Both a and b
10. Sulpha pyridine possess ---------- group

    a) $-C_6H_5NH_2$ b) c) $--SO_2NH$ d) pyridine d) all the above

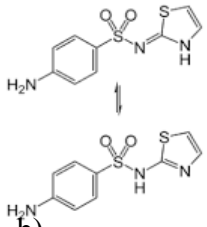
11. Sulphathiazole possess ---------- group

    a) $-C_6H_5NH_2$ b) c) $--SO_2NH$ d) thiazole d) all the above

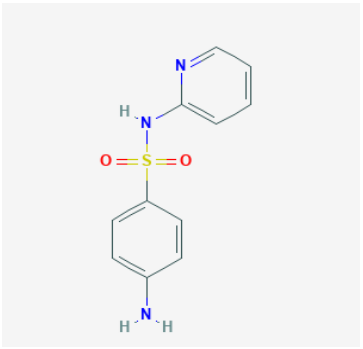
12. Which one of the following is the structure of prontosil



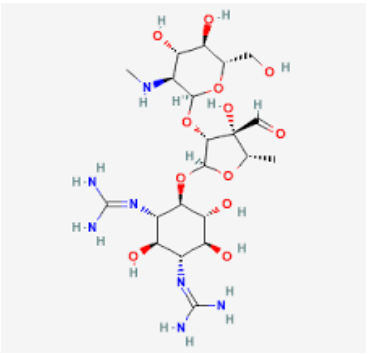
a).



b)



c).



d)

13. The role of blood in our body is

a) to remove wastes such as urea, CO_2 b) to supply oxygen to tissues

c) to regulate the core body temperature d) all the above

14. The constituent of blood in our body is

a) red blood cells b) thrombocytes c) plasma d) all the above

15. Which of the following impart colour to our blood?

a) white blood cells b) hemoglobin c) plasma d) all the above

16. What is the pH range of our blood?

a) 7.35 – 7.45 b) 6.5 – 7.8 c) 7.5 - 8.5 d)None of the above

17. 90–95% of cancer cases are due to

a) Genetic mutations from environmental and lifestyle factors.

b) Inherited genetics c) Radiation d) None of the above

18. Over ---------- types of cancers affect humans

a) 20 b) 250 c) 100 d) None of the above

19. ---------- is a group of blood cancers that start in bone marrows

a) carcinoma b) polycythemia c) Leukemia d) . all the above.

20. ---------- is an example for cytotoxic anticancer drug

a) alkylsulfonate b) mechlorethamine c) bis-chloroethylamines d) . all the above.

SECTION B – (5 x 5 = 25 marks)

Answer ALL Questions

21. (a) Explain drug metabolism with suitable example. **(OR)**

(b) Write short note on pharmacology and pharmacodynamics.

22. (a) Write the preparation & properties of tetracycline. **(OR)**
(b) Write the preparation & properties of streptomycin.
23. (a) Write short note on prontosil. **(OR)**
(b) Write short note on sulphathiazole
24. (a) Write short note on blood pressure. **(OR)**
(b) Explain the physiological functions of plasma protein.
25. (a)Write short notes on treatment of cancer . **(OR)**
(b)Explain the Cytotoxic anticancer drugs .

SECTION B – (3 x 10 = 30 marks)
Answer any THREE Questions

26. Explain the assay of drugs.
27. Explain the action of penicillin.
28. Write the preparation, properties and uses of sulphanilamides.
29. Briefly explain the role of blood as oxygen carrier.
30. Explain the mode of action of alkylating agents.

17U6CHS02

VIVEKANANDHA COLLEGE OF ARTS & SCIENCES FOR WOMEN
(AUTONOMOUS)
DEPARTMENT OF CHEMISTRY
B.Sc. DEGREE EXAMINATION – VI SEMESTER
MODEL QUESTION - SKILL BASED ELECTIVE COURSE-II
POLYMER CHEMISTRY

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

PART - A
Answer all the questions. **20 X 1=20**

1. Which of the following polymer type is not classified on the basis of its application and properties?

(a) rubbers b) plastics (c) fibres (d) synthetic

2. As the crystallinity increases The brittleness of the polymer

   (a) Increases (b) Decreases (c) Moderate (d) Remains constant

3. Which of the following kind of polymers are known for their high crystallinity?

   (a) isotactic (b)syndiotactic (c)atactic (d) none of the mentioned

4. Which of the following is true for the resultant polymer product formed, when molecules of pthalic acid react with molecules of glycerol?

   (a) branch polymer (b) cross-link polymer (c)linear polymer (d) none

5. The characteristics of condensation polymerization are given below-

   I. only −C−C− linkages present in the polymer structure
   II. use of bifunctional or polyfunctional monomers
   III. elimination of a small byproduct molecule

   Which of the following is true?

   (a) I, II, III (b) II and III (c) I and II (d) Only III

6. The bi products like water, methyl alcohol are produced in …… polymerization.

   (a) free radical (b) cationic (c) anionic (d) condensation

7. In how many steps the mechanism of the chain polymerisation is carried out?

   (a) Two (b) Three (c) Four (d) One

8. Which of the following is a thermosetting polymer?

   (a) polystyrene (b) polyolefins (c) nylons (d) phenolic resins

9. The _____ is always higher than the number average molecular weight, except for the special case when they are equal if all of the polymers have the exact same molecular weight.

   (a) Weight average molecular weight (b) Weight average cation weight

   (c) Weight average anion weight (d) Weight average quinon weight

10. The weight average molecular weight of a polymer is determined by..... method.

    (a) light scattering (b) ultracentrifugation (c) both A and B (d) none

11. The number average molecular weight is determined using…….method

    (a) viscometry (b) osmometry (c) sedimentation (d) light scattering

12. Weight average molecular weight _____ on the weight of molecules in a polymer.

    (a) Dependent (b) Independent

    (c) Partially dependent (d) Neither dependent nor independent

13. Thermal degradation of polymers follow ---------- pathways

    (a) Side group elimination (b) random scission

    (c) depolymerization (d) all of the above

14. Photodegradation of polymers is degradation phenomena happening in presence of

    (a) light (b) heat (c) nitrogen (d) nitric acid

15. Ball milling is a type of …….. degradation

    (a) Thermal (b) Photo (c) Bio (d) Mechanical

16. Ammonolysis if a type of …….. degradation

    (a) Thermal (b) Photo (c) hydrolytic (d) Mechanical

17. Antioxidant is used to prevent ……

(a) Oxidation (b) reduction (c) dehydration (d) friction

18. Kevlar is commercial name for ……..

(a) Glass fibers (b) Carbon fibers (c) Aramid fibers (d) Cermets

19. Vulcanization is a process of adding …….. to the rubber.

(a) Nitrogen (b) Oxygen (c) selenium (d) Sulphur

20. …….. Polymer can be used for biological applications.

(a) Polyethylene glycol (b) Cellulose (c) PMMA (d) all of the above

PART - B

Answer all the questions. 5 X 5 = 25

21. (a) Write short notes on tacticity of polymers. **(OR)**

(b) Write short notes on nomenclature of polymers.

22. (a) Sketch the mechanism of Addition Polymerization. **(OR)**

(b) Write short notes on zigler-natta Polymerization.

23. (a) Write short note on Osmometry methods. **(OR)**

(b) Give an account on viscometry method.

24. (a) Give an account on thethermal degradation of Polymers. **(OR)**

(b) Write note on compounding of polymers?

25. (a) Write note on Electrically Conducting Polymers? **(OR)**

(b) Write the importance of FRP?

PART - C

Answer ANY three questions. 3 X 10 = 30

26. Define T_g. What are the factors affecting T_g?

27. (a) Explain emulsion polymerization.

(b) Give the difference between thermoplastics and thermosetting plastics

28. How will determine molecular weight by sedimentatiom method?

29. Give a detail on biodegradation and photodegradation of polymers.

30. Explain in detail about the preparation, properties and uses of FRP.