

सरगुजा विश्वविद्यालय
अम्बिकापुर (सरगुजा-छ.ग.)

(छ.ग. विश्वविद्यालय अधिनियम क्र. 18/2008 द्वारा स्थापित व निगमित)



पाठ्यक्रम

B. Sc. Part - I

बी.एस.सी. भाग - 1

परीक्षा वर्ष : 2011

कुलसचिव
सरगुजा विश्वविद्यालय, अम्बिकापुर
छत्तीसगढ़

: अधिकृत मुद्रक एवं प्रकाशक :

गीता पब्लिकेशन, महामाईपारा, रायपुर (छत्तीसगढ़)

REVISED ORDINANCE NO.21

(As per State U.G.C. Scheme)

BACHELOR OF SCIENCE

1. The Three year course has been broken up into three Parts. Part-I known as B.Sc. Part-I examination at the end of the first year. Part-II known as B.Sc. Part-II examination at the end of the second year and Part-III known as B.Sc. Part-III examination at the end of the third year.
2. A candidate who, after passing (10+2) Higher Secondary or Intermediate examination of M.P. Board of Secondary Education Bhopal or any other Examination recognised by the University or M.P. Board of Secondary Education as equivalent thereto, has attended a regular course of study in an affiliated College or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.Sc. Part-I examination.
3. A candidate who, after passing the B.Sc. Part-I examination of the University or any other examination recognised by the University as equivalent thereto, has attended a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-II examination.
4. A candidate who, after passing the B.Sc. Part-II examination of the University, has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-III examination.
5. Besides regular students, subject to their compliance with this Ordinance ex-student and non-collegiate students shall be eligible for admission to the examinations as per provisions of Ordinance No. 6 relating to Examinations (General). Provided that non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular student at any of the University Teaching Department or College.
6. Every candidate appearing in B.Sc. Part-I, Part-II and Part-III examination shall be examined in -
 - (i) Foundation Course ;
 - (ii) Any one of the following combinations of three subjects:
 1. Physics, Chemistry & Mathematics.
 2. Chemistry, Botany & Zoology.
 3. Chemistry, Physics & Geology.
 4. Chemistry, Botany & Geology.
 5. Chemistry, Zoology & Geology.
 6. Geology, Physics & Mathematics.
 7. Chemistry, Mathematics & Geology.
 8. Chemistry, Botany & Defence Studies.
 9. Chemistry, Zoology & Defence Studies.
 10. Physics, Mathematics & Defence Studies.
 11. Chemistry, Geology & Defence Studies.
 12. Physics, Mathematics & Statistics.
 13. Physics, Chemistry & Statistics.
 14. Chemistry, Mathematics & Statistics.
 15. Chemistry, Zoology & Anthropology.
 16. Chemistry, Botany & Anthropology.
 17. Chemistry, Geology & Anthropology.
 18. Chemistry, Mathematics & Anthropology.

19. Chemistry, Anthropology & Defence Studies.
20. Geology, Mathematics & Statistics.
21. Mathematics, Defence Studies & Statistics.
22. Anthropology, Mathematics & Statistics.
23. Chemistry, Anthropology & Applied Statistics.
24. Zoology, Botany & Anthropology.
25. Physics, Mathematics & Electronics.
26. Physics, Mathematics & Computer Application/Information Technologies.
27. Chemistry, Mathematics & Computer Application/Information Technologies.
28. Chemistry, Bio-Chemistry & Pharmacy.
29. Chemistry, Zoology & Fisheries.
30. Chemistry, Zoology & Agriculture.
31. Chemistry, Zoology & Sericulture.
32. Chemistry, Botany & Environmental Biology.
33. Chemistry, Botany & Microbiology.
34. Chemistry, Zoology & Microbiology.
35. Chemistry, Industrial Chemistry, Mathematics.
36. Chemistry, Industrial Chemistry, Zoology.
37. Chemistry, Biochemistry, Botany.
38. Chemistry, Biochemistry, Zoology.
39. Chemistry, Biochemistry, Microbiology.
40. Chemistry, Biotechnology, Botany.
41. Chemistry, Biotechnology, Zoology.

(iii) Practicals in case prescribed for core subjects.

7. Any candidate who has passed the B.Sc. examination of the University shall be allowed to present himself for examination in any of the additional subjects prescribed for the B.Sc. examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.Sc. Part I examination in the subjects which he proposes to offer and then the B.Sc. Part II and Part III examination in the same subject. Successful candidates will be given a certificate to that effect.
8. In order to pass at any part of the three year degree course examination an examinee must obtain not less than 33% of the total marks in each subject/group of subjects. In subject/group of subjects where both theory and practical examination are provided an examinee must pass in both theory and practical parts of the examination separately.
9. Candidate will have to pass separately at the Part I, Part II and Part III examinations. No division shall be assigned on the result of the Part I and Part II examinations. In determining the division of the final examination, total marks obtained by the examinees in their Part-I, Part II and Part III examination in the aggregate shall be taken into account. Provided in case of candidate who has passed the examination through supplementary examination having failed in one subject/group only, the total aggregate marks being carried over for determining the division shall include actual marks obtained in the subject/group in which he appeared at the supplementary examination.
10. Successful examinee at the Part-III examination obtaining 60% or more marks shall be placed in the First Division, those obtaining less than 60% but not less than 45% marks in the Second Division and other successful examinees in the Third Division.

SCHEME OF EXAMINATION

Subject	Paper	Max. Marks	Total Marks	Min. Marks
Environmental Studies		75	100	33
Field Work		25		
Foundation Course				
Hindi Language	I	75	75	26
English Language	II	75	75	26
नोट : प्रत्येक खंड में से 2 (दो) प्रश्न हल करने होंगे। सभी प्रश्न समान अंक के होंगे।				
Three Elective Subject :				
1. Physics	I	50	100	33
	II	50		
		Practical		50
2. Chemistry	I	33	100	33
	II	33		
	III	34		
		Practical		50
3. Mathematics	I	50	150	50
	II	50		
	III	50		
4. Botany	I	50	100	33
	II	50		
		Practical		50
5. Zoology	I	50	100	33
	II	50		
		Practical		50
6. Geology	I	50	100	33
	II	50		
		Practical		50
7. Statistics	I	50	100	33
	II	50		
		Practical		50
8. Anthropology	I	50	100	33
	II	50		
		Practical		50

आधार पाठ्यक्रम

प्रश्न पत्र - प्रथम

हिन्दी भाषा

पूर्णांक - 75

नोट :

1. प्रश्न पत्र 75 अंक का होगा।
2. प्रश्न पत्र अनिवार्य होगा।
4. इसके अंक श्रेणी निर्धारण के लिए जोड़े जावेगे।
5. प्रत्येक इकाई के अंक समान होंगे।

पाठ्य विषय -

- इकाई-1 पल्लवन, पत्राचार तथा अनुवाद एवं पारिभाषिक शब्दावली।
- इकाई-2 मुहावरे-लोकोक्तियाँ, शब्दशुद्धि, वाक्य शुद्धि, शब्द ज्ञान-पर्यायवाची, विलोम, अनेकार्थी, समश्रुत (समानोचरित) अनेक शब्दों के लिए एक शब्द।
- इकाई-3 देवनागरी लिपि की विशेषता, देवनागरी लिपि एवं वर्तनी का मानक रूप।
- इकाई-4 कम्प्यूटर में हिन्दी का अनुप्रयोग, हिन्दी में पदनाम।
- इकाई-5 हिन्दी अपठित, संक्षेपण, हिन्दी में संक्षिप्तीकरण।

पाठ्य क्रम के लिए पुस्तकें -

1. भारतीयता के स्वर साधन धनंजय वर्मा - म. प्र. ग्रंथ अकादमी।
2. नागरी लिपि और हिन्दी - अनंत चौधरी - ग्रंथ अकादमी पटना।
3. कम्प्यूटर और हिन्दी - हरिमोहन - तक्षशिला प्रकाशन, दिल्ली।

FOUNDATION COURSE

PAPER - II

ENGLISH LANGUAGE

M.M. 75

UNIT-1 Basic Language skills ; Grammar and Usage.

Grammar and Vocabulary based on the prescribed text.

To be assessed by objective / multiple choice tests.

(Grammar - 20 Marks)

Vocabulary - 15 Marks)

05

UNIT-2 Comprehension of an unseen passage.

This should imply not only (a) an understanding of the passage in question, but also (b) a grasp of general language skills and issues with reference to words and usage

within the passage and (c) the Power of short independent composition based on themes and issues raised in the passage.

To be assessed by both objective multiple choice and short answer type tests

10

UNIT-3 Composition : Paragraph writing

10

UNIT-4 Letter writing (The formal and one Informal)

Two letters to be attempted of 5 marks each. One formal and one informal.

15

UNIT-5 Texts :

Short prose pieces (Fiction and not fiction) short poems, the pieces should cover a range of authors, subjects and contexts. With poetry it may sometimes be advisable to include pieces from earlier periods, which are often simpler than modern examples. In all cases, the language should be accessible (with a minimum of explanation and reference to standard dictionaries) to the general body of students schooled in the medium of an Indian language.

Students should be able to grasp the contents of each piece; explain specific words, phrases and allusions; and comment on general points of narrative or argument. Formal Principles of Literary criticism should not be taken up at this stage.

To be assessed by five short answers of three marks each.

BOOKS PRESCRIBED -

English Language and Indian Culture - Published by M.P. Hindi Granth Academy Bhopal.

CHEMISTRY

The new curriculum will comprise of Three papers of 33.33 and 34 marks each and practical work of 50 marks. The curriculum is to be completed in 180 working days as per the UGC norms & conforming to the directives of the Govt. of Chhattisgarh. The theory papers are of 60 hrs. each duration & the practical work of 180 hrs. duration.

PAPER-I INORGANIC CHEMISTRY

M.M. 33

UNIT-1 A ATOMIC STRUCTURE

Idea of de-Broglie matter-waves, Heisenberg Uncertainty principle, Schrodinger wave equation, significance of Ψ and Ψ^2 , radial & angular wave functions and probability distribution curves, Atomic orbital and shapes of s, p, d orbital's, Aufbau and Pauli exclusion principles, Hund's Multiplicity rule, electronic configuration of the elements, effective nuclear charges.

B. PERIODIC PROPERTIES

Ionization energy, electron gain enthalpy and electro negativity, trend in periodic table and applications in predicting and explaining the chemical behavior.

UNIT-2 CHEMICAL BONDING

Covalent Bond : Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization & shapes of simple inorganic molecules and ions. Valence shell electron pair repulsion (VSEPR) theory to NH_3 , H_3O^+ , SF_4 , ClF_3 , ICl_2 and H_2O . M.O. Theory, homonuclear & heteronuclear bond strength & bond energy, percentage ionic character from dipole moment & electronegativity difference.

UNIT-3 CHEMICAL BONDING

Ionic Solids- Ionic structures, radius ratio & co-ordination number, limitation of radius, ratio rule, lattice defects, semiconductors, lattice energy Born- Haber cycle, Solvation energy and solubility of ionic solids, polarising power & polarisability of ions, Fajans rule, Metallic bond-free electron, Valence bond & band theories.

UNIT-4 A s-BLOCK ELEMENTS

Comparative study, salient features of hydrides, solvation & complexation tendencies including their function in biosystems and Introduction to alkyl & aryls, Derivatives of alkali and alkaline earth metals.

B. CHEMISTRY OF NOBLE GASES

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

UNIT-5 A. p-BLOCK ELEMENTS

Halides hydrides, oxides and oxyacids of Boron, Aluminum, Nitrogen and Phosphorus, boranes, borazines, fullerenes and silicates, interhalogens and pseudohalogens.

B. INORGANIC CHEMICAL ANALYSIS

Chemical principles involved in the detection of acids and basic radicals including interfering radicals.

REFERENCE BOOKS :

1. Basic Inorganic Chemistry, F.A Cotton, G. Wilkinson and P.L. Gaus, Wiley
2. Concise Inorganic Chemistry, J.D. Lee, ELBS
3. Concepts of models of Inorganic Chemistry, B. Douglas, D. Mc Daniel and J Alexander, John Wiley.
4. Inorganic Chemistry, D.E. Shriver, P.W. Atkins and C.H.L. Angford, Oxford.
5. Inorganic Chemistry, W.W. Porterfield, Addison- Wesley.
6. Inorganic Chemistry, A.G. Sharp, ELBS.
7. Inorganic Chemistry, G.L. Micssels and D.A. Tarr, Prentice Hall.
8. Advanced Inorganic Chemistry, Satya Prakash
9. Advanced Inorganic Chemistry, Agarwal & Agarwal
10. Advanced Inorganic Chemistry, Puri & Sharma, S. Naginchand
11. Inorganic Chemistry, Madan, S. Chand
12. Aadhunik Akarbnic Rasayan, R.K. Shrivastav & P.S. Jain, Goel Publication.
13. Uchchattar Akarbnic Rasayan, Satya Prakash & G.D. Tuli, Shyamal Prakashan.
14. Uchchattar Akarbnic Rasayan, Puri & Sharma
15. Akarbnic Rasayan, Bhagchandni, Sahitaya Publication.
16. Rasayan Vigyan, Bhatnagar. Arun Publication.

PAPER - II ORGANIC CHEMISTRY

M.M. 33

UNIT-I ELECTRONIC STRUCTURE & BONDING

- A. Resonance, Hyperconjugation, Inductive and other field effects, Aromaticity, hydrogen bonding.
- B. MECHANISM OF ORGANIC REACTIONS
Homolytic & heterolytic bond breaking, types of reagents-electrophiles & nucleophiles. Structure and reactivity of reaction intermediates-Carbocation, carbanions free radicals, carbenes and nitrenes.

UNIT-2 STEREOCHEMISTRY OF ORGANIC COMPOUNDS

- A. Optical Isomerism - enantiomers, diastereomers, threo and erythro meso compound, resolution of enantiomers, inversion, retention and racemization of nomenclature. Relative and absolute configuration, Sequence rules, D and L and R & S systems
- B. Geometrical isomerism - Syn and anti forms, E & Z system of nomenclature. properties of cis-trans isomers.

UNIT-3 ALIPHATIC AND AROMATIC RING COMPOUNDS

- A. Cycloalkanes- Nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane), theory of strainless rings. The case of cyclopropane ring: banana bonds.

B.Sc.-I

(18)

- B. Mono-nuclear and polynuclear aromatic ring. Structure of benzene & naphthalene. Molecular formula and Kekule structure. Aromatic electrophilic substitution. General pattern of the mechanism, role of σ and π complexes. Electrophilic substitution in naphthalene

UNIT-4 ALKENES, DIENES AND ALKYNES

- A. Mechanism of dehydration of alcohols.
- B. Chemical reactions of alkenes- Mechanisms involved in electrophilic and free radical additions, hydroboration-oxidation, oxymercuration- reduction, epoxidation. Substitution at the allylic and vinylic positions of alkenes. Structure of allenes and butadiene, chemical reaction- 1,2 and 1,4 addition, Diel-Alder reaction.
- Chemical reactions of alkynes and acidity of alkynes. Electrophilic and nucleophilic addition reactions, hydroboration and oxidation with ozone and KMnO_4 .

UNIT-5 ARENES AND AROMATICITY

A. Alkyl halides and Aryl Halides

Mechanism and stereochemistry of nucleophilic substitution reactions and alkyl halides and aryl halides with energy profile diagrams. SN_1 , SN_2 , SN_i mechanisms.

- B. Mechanisms and stereochemistry of elimination reaction and alkyl halides. Elimination Vs Substitution.

REFERENCE BOOK :

1. Organic Chemistry, Morrison and Boyd, Prentice- Hall
2. Organic Chemistry, L.G. Wade Jr, Prentice-Hall
3. Fundamentals of Organic Chemistry, Solomons, John Wiley
4. Organic Chemistry, Vol. I, II, III, S.M. Mukherjee, S.P. Singh and R.P. Kapoor, wiley-eastern (New-Age).
5. Organic Chemistry, F.A. Carey, MC Graw Hill
6. Introduction to Organic Chemistry, Struikweisser, Heathcock and Kosover, Macmillan.
7. Organic Chemistry, P.L.Soni.
8. Organic Chemistry, Bahi & Bahl
9. Organic Chemistry, Joginder Singh.
10. Carbanic Rasayan, Bashi & Bahi
11. Carbanic Rasayan, R.N. Singh, S.M.I. Gupta, M.M. Bakodia & S.K. Wadhwa.
12. Carbanic Rasayan, Joginder Singh.
13. Carbanic Rasayan, P.L. Soni.
14. Corbanic Rasayan, Bhagchandani, Sahitya Bhawan Publication.
15. Rasayan Vigyan, Bhatnagar, Arun Prakashan.

PAPER - III
PHYSICAL CHEMISTRY

M.M.34

UNIT-1 MATHEMATICAL CONCEPTS FOR CHEMIST AND COMPUTER

- A. Logarithmic relations, curve sketching linear graphs. Properties of straight line sloped and intercept, Differentiation of functions, Partial differentiation, Integration of some useful and relevant functions, Maxima and minima, Permutation and combination, Probability
- B. General introduction to computers, components of computer, hardware and software, input and output devices; binary numbers, Introduction to computer languages, Programming, Operation systems.

UNIT-2 A. MOLECULAR VELOCITIES :

Root mean square velocity average and most probable velocities, Maxwell's law of distribution of molecular velocities of gases, (Graphical interpretation), effect of temperature on distribution of molecular velocities, collision frequency, mean free path, Joule-Thompson effect, Liquification of gases.

- B. Deviation from ideal behavior, Real gases, Vander Waal equation of state, Relationship, Vander waal constant and critical constants, Law of corresponding state.

UNIT-3 A. LIQUID STATE

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

- B. Ideal and non ideal solutions, modes of representing concentration of solutions, activity and activity coefficient.

Dilute solution : Colligative Properties, Lowering of vapor pressure of solvent, Raoult's law, Osmosis, Vant Hoff Theory of dilute solutions, measurements of Osmotic pressure, relationship between lowering of vapour pressure and osmotic pressure, Elevation of boiling point, Depression in freezing point, abnormal molar masses, Degree of dissociation and association of solutes, Vant Hoff factor

UNIT-4 A. LIQUID CRYSTALS :

Difference between liquid Crystal, solids and liquids, Classification, Structure of nematic and cholesteric phases, Thermography, Seven segment cell, applications of liquid Crystals.

B. COLLOIDAL STATE :

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

C. SOLID STATE

Space lattices, unit cells, Elements of Symmetry in crystalline solids, X-ray diffraction, Miller indices, identification of unit cell by Bragg's Spectrometer, Powder method, Neutron and electron diffraction (Elementary idea only)

UNIT-5 A. CHEMICAL KINETICS

Rate of reaction, Factors influencing rate of reaction, rate constant, Order and

molecularity of reactions, Zero, first and second order reaction, methods of determining order of reaction, Complex reactions : Consecutive, opposing and side reactions, Chain reactions.

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

B. CATALYSIS :

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

REFERENCE BOOKS :

1. Physical chemistry, G.M. Barrow, International student edition, MC Graw Hill
2. Basic programming with application, V.K. Jain, Tata Mc Graw-Hill
3. Computers & Common sense, R. Hunt & Shelly, Prentice-Hall
4. University general chemistry, C.N.R. Rao Macmillan.
5. Physical Chemistry, R.A. Alberty, Wiley Eastern.
6. The elements of Physical Chemistry, P.W. Atkins, Oxford.
7. Physical Chemistry thought problems, S.K. Dogra & Dogra, Wiley Eastern.
8. Physical Chemistry, B.D. Khosla
9. Physical Chemistry, Puri & Sharma
10. Bhoutic Rasayan, Puri, Sharma & Palhanian, Vishal Publishing Company.
11. Bhoutic Rasayan, P.L. Soni
12. Bhoutic Rasayan, Bahi & Tuli.
13. Bhoutic Rasayan, I. R. Gambin
14. Bhoutic Rasayan, Bhagchandani, Sahitya Bhawan Publication.
15. Rasayan Vigyan, Bhatnagar, Arun Prakashan.

PAPER - IV LABORATORY COURSE

180 Hrs.

The following experiments are to be conducted during the curriculum

1. Inorganic Chemistry

Semimicro Analysis - cations analysis, separation and Identification of ions from Pb^{2+} , Bi^{3+} , Cu^{2+} , Cd^{2+} , Sb^{3+} , Sn^{2+} , Fe^{3+} , Al^{3+} , Cr^{3+} , Ni^{2+} , Co^{2+} , Zn^{2+} , Mn^{2+} , Ba^{2+} , Sr^{2+} , Ca^{2+} , Mg^{2+} , NH_4^+ and Anions CO_3^{2-} , SO_3^{2-} , S^{2-} , SO_4^{2-} , NO_2^- , NO_3^- , Cl^- , Br^- , I^- , CH_3COO^- , $C_2O_4^{2-}$, BO_3^{3-} , F^- .

2. Organic Chemistry

i. Calibration of Thermometer

$80^\circ - 82^\circ$ (Naphthalene), $113.5^\circ - 114^\circ$ (Acetanilide), $132.5^\circ - 133^\circ$ (Urea), 100° (Distilled Water)

ii. Determination of Melting Point

- 80° – 82° (Naphthalene), Benzoic acid 121.5° – 122°, Urea 132.5° – 133°, Succinic acid 184.5° – 185°, Cinnamic acid 132.5° – 133°, Salicylic acid 157.5° – 158°, Acetanilide 113.5° – 114°, m- Dinitrobenzene 90°, p-Dichlorobenzene 52° Aspirin 135°
- iii. Determination of boiling points
Ethanol = 78°, Cyclohexane 81.4°, Toluene 110.6°, Benzene 80°.
 - iv. Mixed Melting point Determination
Urea- Cinnamic acid mixture of various compositions (1 : 4, 1 : 1, 4' : 1)
 - v. Distillation (Demonstration)
Simple distillation of ethanol- water mixture using water condensor.
Distillation of nitrobenzene and aniline using air condenser.
 - vi. Crystallization
Phthalic acid from hot water (using fluted filter paper and stemless funnel).
Acetanilide from boiling water
Naphthalene from ethanol
Benzoic acid from water.
 - vii. Decolorisation and crystallisation using charcoal
Decolorisation of brown sugar with animal charcoal using gravity filtration
Crystallization and decolorisation of impure naphthalene (100g of naphthalene mixed with 0.3g of congo red using 1g of decolorising carbon) from ethanol.
 - viii. Sublimation
Camphor, Naphthalene, Phthalic acid and Succinic acid
 - ix. Qualitative Analysis
Detection of elements (N, S and halogens) and functional groups (Phenolic, Carboxylic, Carbonyl, Esters, Carbohydrates, Amines, Amides, Nitro and Anilide) in simple organic compounds.

3. Physical Chemistry

(i) Chemical Kinetics

To determine the specific rate of hydrolysis of methyl/ ethyl acetate catalysed by hydrogen ions at room temperature.

To study the effect of acid strength on the hydrolysis of an ester

To compare the strengths of HCl & H₂SO₄ by studying the kinetics of hydrolysis of ethyl acetate

To study kinetically the reaction between H₂O₂ & Iodide

(ii) Distribution Law

To study distribution of iodide between water & CCl₄

To study distribution of benzoic acid between benzene & water.

(iii) Colloids

To prepare arsenious sulphide sol & compare the precipitating power of mono-, bi, & tri valent anions.

(iv) Viscosity & Surface Tension

To determine the of % composition of a given mixture (Non interacting system) by viscosity mehtod.

To determine the viscosity of amyl alcohol in water at differnt concentrations & calculate the excess viscosity of these solutions.

To determine the % composition of a given binary mixture by surface tension method (acetone & ethyl methyl ketone).

BOOK :

1. ogeps qualitive analysis, revised svehla, orient longman
2. Standered methods of chemical analysis, W.W. scott, The Technical Press
3. Experimental Organic Chemistry, Vol. I & II, P.R. Singh, D.S. Gupta & K.S. bajpai, Tata Mc Graw Hill
4. Manual ingorganic chemistry, R.K. Bansal Wiley Eastern
5. vogel's text book of practical organic chemistry, B.S. Furnis A.J. Hannaford, V. Rogers, P.W.G. Smith & A.r. Tatchel, ELBS
6. Experiments in general chemistry, CNR Rao & U.C. Agarwal
7. Experiments in physical chemistry, R. C. Das & B. Behara Tata Mc Graw Hill
8. Advanced practical physical chemistry, J.B. Yadav, Goel publishing house

PRACTICAL EXAMINATION

05 Hrs.

M.M. 50

Three experiments are to be performed

1. Inorganic Mixture Analysis, four radicals two basic & two acid (insoluble, Interfering & combination of acid radicals) any one to be given. 12 Marks.
2. Detection of functional group in the given organic compound and determine its MPt/BPt. 8 marks

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

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

3. Any one physical experiment that can be completed in two hours including calculations. 14 marks

4. Viva 10 marks

5. Sessionals 06 marks

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

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ZOOLOGY

PAPER - I

(CELL BIOLOGY & INVERTEBRATES)

M.M. 50

- UNIT-1** The Cell (Prokaryotic & Eukaryotic)
Methods in cell biology (Microscopy light & Electron)
Organisation of cell extranuclear and nuclear (Plasma membrane, mitochondria, chromosomes, ER, Golgi bodies, Ribosomes)
- UNIT-2** Cell divisions (Mitosis & Meiosis)
An elementary idea of cell transformation & Cancer Immunity (elementary idea)
- UNIT-3** General Characteristics & Classification of invertebrates upto orders with examples
Protozoa - type study *Paramecium*, protozoa & disease
Porifera - type study *Sycon*
Coelenterata - type study *Obelia*
- UNIT-4** Helminths - type study *fasciola*
Annelida - type study *Pheretima*
Arthropoda - type study *Palaemon*
- UNIT-5** Mollusca - type study *Asterias* (starfish)
Protochordata - type study *Balanoglossus*

PAPER - II

M.M. 50

(VERTEBRATES & EMBRYOLOGY)

- UNIT-1** Origin and classification of Chordates.
Protochordata - type study *Amphioxus*.
A comparative account of *Petromyzon* & *Myxine*
- UNIT-2** Fishes - Skin and scales
Migration in fishes
Parental care
Amphibia - Parental care
Neoteny
Reptilia - Poisonous & non poisonous snakes, Poison apparatus, snake venom.
- UNIT-3** Aves - Flight adaptation in birds
Discuss - Birds are glorified reptiles
Mammals- comparative account of prototheria, metatheria & Eutheria and Affinities.
- UNIT-4** Gametogenesis, Fertilization & Parthenogenesis.
Development of frog upto formation of three germ layers
- UNIT-5** Development of Chick upto formation of three germ layer, Extra embryonic membranes.
Placenta in mammals.
Embryonic induction organisers & differentiation.

PARACTICAL

M.M. 50

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

1. Dissection of earth worm.
2. Dissection of Cockroach, *Palaemon*, *Pila*.

B.Sc.-I

3. Minor Dissection- Appendages of Prawn & hastate plate, Mouth-parts of Insects, Radula of Pila
4. Mounting-Setae, Spermatheca, Septal Nephridia, Nerve ring & ovary of earth worm/ Parapodia of Nereis Salivary gland of Cockroach, ctenidium of pila, Malpighian tubules.
5. Cytological preparation- Onion root-tip "Squash Preparation" for mitosis/Grasshopper testis squash for meiosis.
6. Osteology-Frog & Rabbit
7. Museum Specimen invertebrate & Vertebrate, frog embryology.
8. Slides-Chick embryology, Cytology, Mammal Histology, Bird feather & invertebrate Slides.

Scheme of Practical Exam.

**Time 3 Hrs,
M.M. 50**

1. Major Dissection	8 Marks
2. Minor Dissection	6 Marks
3. Mounting	5 Marks
4. Cytological Preparation	5 Marks
5. Spots- 8 (Slides-4, Specimens-2, & Bones-2)	16 Marks
6. Sessional	10 Marks

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BOTANY
PAPER - I
(GENERAL DIVERSITY OF MICROBES AND CRYPTOGAMS)

M.M. 50

- UNIT-1** Viruses and Bacteria: General account of viruses and mycoplasma; bacteria structure; nutrition, reproduction and economic importance; general account of cyanobacteria.
12 Hrs.
- UNIT-2** Algae: General characters, classification and economic importance; important features and life history of Chlorophyceae-Volvox, Oedogonium, Coleochaete; Xanthophyceae-Vaucheria; Phaeophyceae- Ectocarpus, Sargassum; Rhodophyceae- Polysiphonia.
12 Hrs.
- UNIT-3** Fungi: General characters, classification and economic importance; important features and life history of Mastigomycotina- Pythium, Phytophthora; Zygomycotina- Mucor, Ascomycotina-Saccharomyces, Eurotium, Chaetomium, Peziza; Basidiomycotina- Puccinia, Agaricus; Deuteromycotina-Cercospora, Colletotrichum; general account of Lichens.
12 Hrs.
- UNIT-4** Bryophyta: Amphibians of plant kingdom displaying alternation of generations; structure, reproduction and classification of Hepaticopsida (e.g. Riccia Marchantia); Anthocerotopsida (e.g. Anthoceros), Bryopsida (e.g. Funaria)
12 Hrs.
- UNIT-5** Pteridophyta: The first vascular plants; important characteristics of Psilopsida, Lycopsidea, Sphenopsida and Pteropsida; structure, Reproduction in Rhynia, Lycopodium Selaginella, Equisetum, Pteris and Marsilea.

BOTANY
PAPER - II
CELL BIOLOGY AND GENETICS

- UNIT-1** The cell envelope: Plasma membrane; bilayer lipid structure; functions; the cell wall. Ultra structure and function of nucleus: nuclear membrane; nucleolus and other organelles: Golgi bodies, ER, peroxisomes, Vacuoles.
12 Hrs.
- UNIT-2** Chromosome organization: Morphology; centromere and telomere; chromosome alterations; deletions, duplications, translocations, inversions; variations in chromosome number aneuploidy, polyploidy; sex chromosomes.
Cell division : Mitosis; meiosis
12 Hrs.
- UNIT-3** DNA the genetic material: DNA structure; replication; DNA- protein interaction; the nucleosome model; genetic code; satellite and repetitive DNA.
Extranuclear genome: Presence and function of mitochondrial and plastid DNA; plasmids.
12 Hrs.

B.Sc.-I

UNIT-4 Gene expression: Structure of gene; transfer of genetic information; transcription, translation, protein synthesis; tRNA; ribosomes; regulation of gene expression in prokaryotes and eukaryotes; proteins, 1D, 2D and 3D structure. 12 Hrs.

UNIT-5 Genetic Variations: Mutations, spontaneous and induced; transposable genetic elements; DNA damage and repair:

Genetic inheritance: Mendelism; laws of segregation and independent assortment; linkage analysis; allelic and non-allelic interactions. 12 Hrs.

BOTANY PRACTICAL

Time : 3 Hrs

Marks-50

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|-------------------------------------|----|
| 1. Algae/Fungi | 10 |
| 2. Bryophyta/ Pteridophyta | 10 |
| 3. Disease Symptoms/Gram's Staining | 05 |
| 4. Cytology/Genetics | 05 |
| 5. Spots (1-5) | 10 |
| 6. Viva Voce | 05 |
| 7. Sessionals | 05 |

50 marks
