Scheme of Examination
in the subject of Chemistry
(B.P.S.M. Vishwavidhalya, Khanpur Kalan) w.e.f 2017
Year I

Semester I:

Sr. No.	Paper Code	Name of Paper	Marks		Periods (in hours)	Credits	Time (in hours)
			Internal Marks	External Marks			
1	CHE 101 A	Inorganic Chemistry	6	27	2	2	3
2	CHE 101 B	Physical Chemistry	7	27	2	2	3
3	CHE 101 C	Organic Chemistry	7	26	2	2	3
4	CHP 101	Chemistry Practical	10	40	4	2	4

Total Marks-=150

Semester 2:

Sr. No.	Paper Code	Name of Paper	Marks		Periods (in hours)	Credits	Time (in hours)
			Internal Marks	External Marks			
1.	CHE 102 A	Inorganic Chemistry	6	27	2	2	3
2	CHE 102 B	Physical Chemistry	7	27	2	2	3
3	CHE 102 C	Organic Chemistry	7	26	2	2	3
4	CHP 102	Chemistry Practical	10	40	4	2	4

Total Marks-=150

Year II

Semester 3:

Sr. No.	Paper Code	Name of Paper	Marks		Periods (in hours)	Credits	Time (in hours)
			Internal Marks	External Marks			
1	CHE 201 A	Inorganic Chemistry	6	27	2	2	3
2	CHE 201 B	Physical Chemistry	7	27	2	2	3
3	CHE 201 C	Organic Chemistry	7	26	2	2	3
4	CHP 201	Chemistry Practical	10	40	4	2	4

Total Marks-=150

Semester 4:

Sr. No.	Paper Code	Name of Paper	Marks		Periods (in hours)	Credits	Time (in hours)
			Internal Marks	External Marks			
1	CHE 202 A	Inorganic Chemistry	6	27	2	2	3
2	CHE 202 B	Physical Chemistry	7	27	2	2	3
3	CHE 202 C	Organic Chemistry	7	26	2	2	3
4	CHP 202	Chemistry Practical	10	40	4	2	4

Total Marks-=150

Year III

Semester 5:

Sr.No.	Paper Code	Name of Paper	Marks		Periods (in hours)	Credits	Time (in hours)
			Internal Marks	External Marks			
1	CHE 301 A	Inorganic Chemistry	6	27	2	2	3
2	CHE 301B	Physical Chemistry	7	27	2	2	3
3	CHE 301 C	Organic Chemistry	7	26	2	2	3
4	CHP 301	Chemistry Practical	10	40	4	2	4

Total Marks-=150

Semester 6:

Sr. No.	Paper Code	Name of Paper	Marks		Periods (in hours)	Credits	Time (in hours)
			Internal Marks	External Marks			
1	CHE 302 A	Inorganic Chemistry	6	27	2	2	3
2	CHE 302 B	Physical Chemistry	7	27	2	2	3
3	CHE 302C	Organic Chemistry	7	26	2	2	3
4	CHP 302	Chemistry Practical	10	40	4	2	4

Total Marks-=150

B. Sc. Ist Year (Ist Semester)

Paper - Inorganic Chemistry **Max. Marks: 27**
CHE-101 A **Time: 3 Hrs.**

Note: Examiner will set nine questions and the candidates will be to attempt five questions in all .Question number one wiil be compulsory covering the entire syllabus and will be of seven marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

Atomic Structure

Idea of de Broglie matter waves, Heisenberg uncertainty principle, atomic orbitals, quantum numbers, radial and angular wave functions and probability distribution curves, shapes of s, p, d orbitals.

Section-B

Periodic Properties

General principles of periodic table .Aufbau and Pauli exclusion principles, multiplicity rule .Electronic configurations of the elements, effective nuclear charge, Slater's rules. Atomic and ionic radii , ionization energy, electron affinity and electronegativity definition , methods of determination or evaluation, trends in periodic table (in s, p block elements).

Section-C

Covalent Bond

Valence bond theory and its limitations , directional charac teristics of covalent bond, various types of hybridization and shapes of simple inorganic molecules and ions (BeF_2, BF_3, CH_4, PF_5, SF_6, IF_7 SO_4^{2-}, ClO_4^-) Valence shell electron pair repulsion (VSEPR) theory to NH_3, H_3O^+, SF_4, ClF_3, ICl_2^- and H_2O. MO theory of heteronuclear (CO and NO) and honi nuclear(O2,F2,N2, H2)diatomic molecules,bond strength and bond energy, pe rcen tage ionic character from dipole moment and electronegativity difference .

C

Section-D

Ionic Solids

Ionic structures (NaCl,CsCl,ZnS(Zinc Blende), CaF_2) radius ratio effect and coordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy (methamtical derivation excluded) and Born-Haber cycle, solvation energy and its relation with solubility of ionic solids, polarizing power and polarisability of ions, Fajans rule.

C

2056
D-18

B. Sc. Ist Year (Ist Semseter)

Paper - Physical Chemistry

CHE-101 B

Marks: 27
Time: 3 hrs.

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all.Question number one will be compulsory covering the entire syllabus and will be of seven marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section – A

Gaseous States

Maxwell's distribution of velocities and energies (derivation excluded) Calculation of root mean square velocity, average velocity and most probable velocity. Collision diameter, collision number, collision frequency and mean free path. Deviation of Real gases from ideal behaviour. Derivation of Vander Waal's Equation of State, its application in the calculation of Boyle's temperature (compression factor) Explanation of behaviour of real gases using Vander Waal's equation.

Sec ton-B

Critical Phenomenon:

Critical temperature, Critical pressure ,critical volume and their determination .PV isotherms of real gases, continuity of states, the isotherms of Vander Waal's equation, relationship between critical constants and Vander Waal's constants. Critical compressibility factor. The Law of corresponding states. Lequifaction of gases.

C

Section-C

uid States

cture of liquids. Properties of liquids - surface tension osity vapour pressure and optical rotations and their rmination.

Section-D

id State

ssification of solids, Laws of crystallography - (i) Law of stancy of interfacial angles (ii) Law of rationality of indices) Law of symmetry. Symmetry elements of crystals. Definition nit cell & space lattice. Bravais lattices, crystal system. X- diffraction by crystals. Derivation of Bragg equation.De nination of crystal structure of NaCl, KCl. Liquid crystals : ference between solids, liquids and liquid crystals,types of uid crystals.Applications of liquid crystals.

C

2257

B. Sc. Ist Year (Ist Semester)

Paper -Organic Chemistry **Max. Marks: 26**
CHE -101C **Time: 3 Hrs.**

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of six marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

1. Structure and Bonding

Localized and delocalized chemical bond, van der Waals interactions, resonance: conditions, resonance effect and its applications, hyperconjgation,, inductive effect, Electromeric effect & their comparison.

2. Stereochemistry of Organic Compounds–I

Concept of isomerism. Types of isomerism. Optical isomerism , elements of symmetry, molecular chirality, enantiomers, stereogenic centre, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centres, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization.

Section-B

Stereochemistry of Organic Compound

Relative and absolute configuration, sequence rules, R & S systems of nomenclature. Geometric isomerism, determination of configuration of geometric isomers. E & Z system of nomenclature ,Conformational isomerism, conformational analysis of ethane and n-butane, conformations of cyclohexane, axial and equatorial bonds,. Newman projection and Sawhorse formulae, Difference between configuration and conformation.

Section-C

Mechanism of Organic Reactions

Curved arrow notation, drawing electron movements with arrows, half-headed and double-headed arrows, homolytic and heterolytic bond breaking.Types of reagents – electrophiles and nucleophiles. Types of organic reactions. Energy considerations. Reactive intermediates carbocations, carbanions, free radicals, carbenes ,arynes and nitrenes (formation, structure & stability). Assigning formal charges on intermediates and other ionic species.

Section-D

Alkanes and Cycloalkanes

IUPAC nomenclature of branched and unbranched alkanes, the alkyl group, classification of carbon atoms in alkanes. Isomerism in alkanes, sources, methods of formation (with special reference to Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids), physical properties .Cycloalkanes : nomenclature, synthesis of cycloalkanes and their derivatives –photochemical (2+2) cycloaddition reactions, , dehalogenation of α,ω-dihalides, , pyrolysis of calcium or barium salts of dicarboxylic acids, Baeyer's strain theory and its limitations., theory of strainless

B.Sc. I Year(1st sem)

Practical (CHP- 101)

Max. Marks: 50 [10(int.)+40(ext.)]
Time: 4 Hrs.

Section-A (Inorganic)

Volumetric Analysis

1. **Redox titrations**: Determination of Fe^{2+}, $C_2O_4^{2-}$(using $KMnO_4$, $K_2Cr_2O_7$)
2. **Complexometric titrations:** Determination of Mg^{2+}, Zn^{2+} by EDTA.

Section-B (Physical)

1. To determine the specific reaction rate of the hydrolysis of methyl Acetate /ethyl acetate catalyzed by hydrogen ions at room temperature.
2 To determine the viscosity of given liquid.

SECTION – C (Organic)

1. Preparation and purification through crystallization or distillation and ascertaining their purity through melting point or boiling point

(i) Iodoform from ethanol (or acetone)

- To study the process of sublimation of camphor .

Books suggested:-

1. A. D. Chawla , New College Practical Chemistry ,B.Sc. -1 , Vijay Pub. 2011.
2. V. Alexeyev ,Quantative Analysis , Mir Pub. Moscow.
3. S.C. Kheterpal ,S.N. Dhawan ,P.N. Kapil : Advanced Practical Chemistry , Vol -1 ,2011.
4. R.L. Madan ,Practical Chemistry ,B.Sc. Part-1.

B. Sc. Ist Year (IInd Semester)

Paper -Inorganic Chemistry **Max. Marks: 27**
CHE-102 A **Time: 3 Hrs.**

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of seven marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

Hydrogen Bonding & Vander Waals Forces

Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties of substances, application

Brief discussion of various types of Vander Waals Forces

Metallic Bond and Semiconductors

Metallic Bond- Brief introduction to metallic bond, band theory of metallic bond

Semiconductors- Introduction, types and applications.

Section-B

s-Block Elements

Comparative study of the elements including, diagonal relationships, salient features of hydrides (methods of preparation excluded), solvation and complexation tendencies including their function in biosystems.

Chemistry of Noble Gases

Chemical properties of the noble gases with emphasis on their low chemical reactivity, chemistry of xenon, structure and bonding of fluorides, oxides & oxyfluorides of xenon.

9/3/20

1

1

SECTION – C

p-Block Elements

Emphasis on comparative study of properties of p-block elements (including diagonal relationship and excluding methods of preparation).

Boron family (13th gp):-

Diborane – properties and structure (as an example of electron – deficient compound and multicentre bonding), Borazene – chemical properties and structure Trihalides of Boron – Trends in lewis acid character structure of aluminium (III) chloride.

Carbon Family (14th group) _

Catenation, $p\pi$– $d\pi$ bonding (an idea), carbides, fluorocarbons, silicates (structural aspects), silicons - general methods of preparations, properties and uses.

Section-D

Nitrogen Family (15th group)

Oxides - structures of oxides of N, P oxoacids – structure and relative acid strengths of oxoacids of Nitrogen and phosphorus. Structure of white, yellow and red phosphorus.

Oxygen Family (16th group)

Oxyacids of sulphur – structures and acidic strength H_2O_2 – structure, properties and uses.

Halogen Family (17 th group)

Basic properties of halogen, interhalogens types properties, hydro and oxyacids of chlorine - structure and comparison of acid strength.

4/3/2020

B. Sc. Ist Year (IInd Semester)

Paper- Physical Chemistry

CHE-102B

Marks: 27
Time: 3 Hrs.

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of seven marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section – A

Kinetics-I

Rate of reaction, rate equation, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst. Order of a reaction, integrated rate expression for zero order, first order, second and third order reaction. Half life period of a reaction. Methods of determination of order of reaction,

Section – B

Kinetics-II

Effect of temperature on the rate of reaction – Arrhenius equation. Theories of reaction rate – Simple collision theory for unimolecular and bimolecular collision. Transition state theory of Bimolecular reactions.

4/3/2020

Section-C

Electrochemistry-I

Electrolytic conduction, factors affecting electrolytic conduction, specific, conductance, molar conductance,equivalent conductance and relation among them, their vartion with concentration. Arrhenius theory of ionization, Ostwald's Dilution Law. Debye-Huckel – Onsager's equation for strong electrolytes (elementary treatment only) Transport number, definition and determination by Hittorfs methods, (numerical included),

Section-D

Electrochemistry-II

Kohlarausch's 'Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlarausch's Law in calculation of conductance of weak electrolytes at infinite dilution. Applications of conductivity measurements: determination of degree of dissociation, determination of K_a of acids determination of solubility product of sparingly soluble salts, conductometric titrations. Definition of pH and pK_a, Buffer solution, Buffer action, Henderson – Hazel equation, Buffer mechanism of buffer action.

4/3/2020

B. Sc. Ist Year (IInd Semester)

Paper -Organic Chemistry **Max. Marks: 26**
CHE-102 C **Time: 3 Hrs.**

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of six marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

Alkenes

Nomenclature of alkenes, , mechanisms of dehydration of alcoholsand dehydrohalogenation of alkyl halides,. The Saytzeff rule Hofmann elimination, physical properties and relative stabilitiesof alkenes Chemical reactions of alkenes mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration oxidation, oxymercuration -reduction, ozonolysis, hydration, hydroxylation and oxidation with $KMnO_4$,

Section-B

.Arenes and Aromaticity

Nomenclature of benzene derivatives:. Aromatic nucleus and side chain. Aromaticity: the Huckel rule, aromatic ions, annulenes up to 10 carbon atoms, aromatic, anti - aromatic and non – aromatic

Aromatic electrophilic substitution , general pattern of the mechanism, mechansim of nitration, halogenation, sulphonation, and Friedel-Crafts reaction. Energy profile diagrams. Activating , deactivating substituents and orientation.

4/3/2020

Section-C

Dienes and Alkynes

Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene,. Chemical reactions , 1,2 and 1,4 additions (Electrophilic & free radical mechanism), Diels-Alder reaction, Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration-oxidation of alkynes,

Section-D

Alkyl and Aryl Halides

Nomenclature and classes of alkyl halides, methods of formation ,chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, S_N2 and S_N1 reactions with energy profile diagrams. Methods of formation and reactions of aryl halides, The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides.

4/3/2020

B.Sc. I (2^{nd}sem)

Practical CHP-102

Max. Marks: 50 [10(int.)+40(ext.)]

Time: 4 Hrs.

Section-A (Inorganic)

Volumetric Analysis

1. **Iodometic titrations:** Determination of Cu^{2+} (using standard hypo Solution).
2. **Paper Chromatography**
3. Qualitative Analysis of the any one of the following Inorganic cations and anions by paper chromatography (Pb^{2+} Cu^{2+}, Ca^{2+} Ni^{2+}, Cl^- Br^-, I^- and PO_4^{3-} and NO_3^-).

Section-B (Physical)

1. To determine the surface tension of a given liquid by drop number method.
2. To determine the viscosity of a given liquid.
3. To determine the specific refractivity of a given liquid

SECTION – C (Organic)

1. Preparation and purification through crystallization or distillation and ascertaining their purity through melting point or boiling point.

i) p - Bromoacetanilide from acetanilide
ii) Dibenzalaceton from acetone and benzaldehyde
iii) Aspirin from salicylic acid.
iv) To study the process of sublimation of phthalic acid ,

Books Suggested:-

1. A. D. Chawla , New College Practical Chemistry ,B.Sc. -1 , Vijay Pub. 2011.
2. V. Alexeyev ,Quantative Analysis ,Mir Pub. Moscow.
3. S.C. Kheterpal,S.N. Dhawan ,P.N. Kapil : Advanced Practical Chemustry, Vol -1
4.R.L. Madan ,Practical Chemistry ,B.Sc. Part-I

B.Sc. II Year (IIIrd Semester)

Paper - Inorganic Chemistry **Max. Marks: 27**

CHE-201A **Time: 3 Hrs.**

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of seven marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

Chemistry of Elements of Ist transition series:

Definition of transition elements, position in the periodic table, General characteristics & properites of Ist transition elements,. Structures & properties of some compounds of transition elements – TiO_2, $VOCl_2$, $FeCl_3$, $CuCl_2$ and $Ni(CO)_4$

Section-B

Chemistry of Elements of IInd & IIIrd transition series

General characteristics and properties of the IInd and IIIrd transition elements Comparison of properties of 3d elements with 4d & 5d elements with reference only to ionic radii, oxidation state, magnetic and

Spectral properties and stereochemistry

Section-C

Coordination Compounds

Werner's coordination theory, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes

Section-D

Non-aqueous Solvents

Physical properties of a solvent, types of solvents and their general characteristics,,reactions in non-aqueous solvents with reference to liquid NH_3 and liquid SO_2

B. Sc. IInd Year (IIIrd Semester)

Paper - Physical Chemistry

CHE-201B

Max.Marks: 27
Time: 3 Hrs.

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of seven marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

SECTION – A

Thermodynamics-I

Definition of thermodynamic terms: system surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work.

Zeroth Law of thermodynamics, First law of thermodynamics: statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law – Joule – Thomson coefficient for ideal gass and real gas: and inversion temperature.

SECTION – B

Thermodynamics-II

Calculation of w.q. dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process, Temperature dependence of enthalpy, Kirchffs equation.

Bond energies and applications of bond energies.

SECTION – C

Chemical Equilibrium

Equilibrium constant and free energy, concept of chemical potential, Thermodynamic derivation of law of chemical equilibrium. Temperature dependence of equilibrium constant; Van't Hoff reaction isochore, Van't Hoff reaction isotherm. Le-Chatetier's principle and its applications Clapeyron equation and Clausius – Clapeyron equation its applications.

SECTION – D

Distributioln Law

Nernst distribution law – its thermodynamic derivation ,Modification of distribution law when solute undergoes dissociation, association and chemical combination. Applications of distribution law: (i) Determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride. (ii) Determination of equilibrium constant of potassium tri-iodide complex and process of extraction.

B. Sc. IInd Year (IIIrd Semester)

Paper - Organic Chemistry **Max. Marks: 26**
CHE-201C **Time: 3 Hrs.**

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of six marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

1. Alcohols

Monohydric alcohols , nomenclature, methods of formation by reduction of

aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding. Acidic nature.

Reactions of alcohols.

Dihydric alcohols — nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [$Pb(OAc)_4$ and HIO_4] and pinacol –pinacolone rearrangement.

2. Epoxides

Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation of epoxide ring opening, reactions of Grignard and organolithium reagents with epoxides

Section-B

Phenols

Nomenclature, structure and bonding. Preparation of phenols, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols — electrophilic aromatic substitution, Mechanisms of Fries rearrangement, Claisen rearrangement, Reimer-Tiemann reaction, Kolbe's reaction and Schotten and Baumann reactions.

Section-C

Ultraviolet (UV) absorption spectroscopy

Absorption laws (Beer-Lambert law), molar absorptivity, presentation and analysis of UV spectra. types of electronic transitions, effect of conjugation. Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts. UV spectra of conjugated enes and enones,Woodward- Fieser rules, calculation of λ_{max} of simple conjugated dienes and α,β-unsaturated ketones. Applications of UV Spectroscopy in structure elucidation of simple organic compounds.

Section-D

.Carboxylic Acids & Acid Derivatives

Nomenclature of Carboxylic acids, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Reduction of carboxylic acids. Mechanism of decarboxylation.

Structure , nomenclature and preparation of acid chlorides, esters, amides and acid anhydrides. Relative stability of acyl derivatives. Physical properties, interconversion of acid derivatives by nucleophilic acylsubstitution.

Mechanisms of esterification and hydrolysis (acidic and basic).

B.Sc. II Year(3rd sem)

Practical – CHP 201

Max. Marks: 50 [10(int.)+40(ext.)]
Time: 4 Hrs.

SECTION – I (Inorganic)

1. **Gravimetric Analysis**
Quantitative estimations of, Cu^{2+}as copper thiocyanate and Ni^{2+} asNi – dimethylglyoxime.
2. **Preparations**: Preparation of Cuprous chloride, prussionbluefrom iron fillings, tetraammine cupric sulphate,

Section-B (Physical)

1. To determine the CST of phenol – water system.
2. To determine the solubility of benzoic acid at various temperatures and to determine the ▲H of the dissolution process

Section-C (Organic)

Systematic identification (detection of extra elements, functional groups, determination of melting point or boiling point and preparation of at least one pure solid derivative) of the following simple mono and bi functional organic compounds: Naphthalene,
Anthracene , acenaphthene , benzyl chloride, *p*-dichlorobenzene , *m*-dinitrobenzene , *p*nitrotoluene , resorcinol , hydroquinone, α-naphthol, β-naphthol , benzophenone, ethyl methyl ketone, benzaldehyde , vanillin.

1. A. D. Chawla , New College Practical Chemistry ,B.Sc. -II , Vijay Pub. 2011.
2. V. Alexeyev ,Quantative Analysis ,Mir Pub. Moscow.
3. S.C. Kheterpal,S.N. Dhawan ,P.N. Kapil : Advanced Practical Chemustry, Vol -II .
4.R.L. Madan ,Practical Chemistry ,B.Sc. Part-II.
5. ArunChhikara ,S.P. Bhutani : Qualitative Organic Chemistry .

B. Sc. II Year (IVth Semester)

Paper - Inorganic Chemistry **Max. Marks: 27**

CHE-202A **Time: 3 Hrs.**

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of seven marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

Chemistry of f – block elements

Lanthanides

Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.

Section-B

Chemistry of f – block elements

Actinides

General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from U, Comparison of properties of Lanthanides and Actinides and with transition elements.

Section-C

Theory of Qualitative and Quantitative Inorganic Analysis-I

Chemistry of analysis of various acidic radicals, Chemistry of identification of acid radicals in typical combinations, Chemistry of interference of acid radicals including their removal in the analysis of basic radicals.

Section-D

Theory of Qualitative and Quantitative Inorganic Analysis-II

Chemistry of analysis of various groups of basic radicals, Theory of precipitation, co-precipitation, Post- precipitation, purification of precipitates.

4/3/2020

B. Sc. IInd Year (IVth Semester)

Paper - Physical Chemistry

CHE-202B

Max.Marks: 27
Time: 3 Hrs.

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of seven marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

Thermodynamics-III

Second law of thermodynamics, need for the law, different statements of the law, Carnot's cycles and its efficiency, Carnot's theorem, Thermodynamics scale of temperature. Concept of entropy - entropy as a state function, entropy as a function of V & T, entropy as a function of P & T, entropy change in physical change ,entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.

Section-B

Thermodynamics-IV

Third law of thermodynamics: Nernst heat theorem, statement of concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, A & G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V and T.

4/3/2020

Section-C

Electrochemistry-III

Electrolytic and Galvanic cells – reversible & Irreversible cells, conventional representation of electrochemical cells. EMF of cell and its measurement, Weston standard cell, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction (ΔG, ΔH & K).

Types of reversible electrodes - metal- metal ion gas electrode, metal –insoluble salt- anion and redox electrodes. Electrode reactions, Nernst equations, derivation of cell EMF and single electrode potential. Standard Hydrogen electrode, reference electrodes, standard electrodes potential, sign conventions, electrochemical series and its applications.

Section-D

Electrochemistry-IV

Concentration cells with and without transference, liquid junction potential, application of EMF measurement i.e. valency of ions, solubility product activity coefficient, potentiometric titration (acid- base and redox). Determination of pH using Hydrogen electrode, Quinhydrone electrode and glass electrode by potentiometric methods.

4/3/2020

B. Sc. IInd Year (IVth Semester)

Paper - Organic Chemistry

CHE-202C

Marks: 26
Time: 3 Hrs.

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of six marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

Infrared (IR) absorption spectroscopy

Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds. Applications of IR spectroscopy in structure elucidation of simple organic compounds.

Section-B

Amines

Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds. Gabriel-phthalimide reaction, Hofmann bromamide reaction. electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.

4/3/2020

Section-C

1. Diazonium Salts

Mechanism of diazotisation, structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO_2 and CN groups, reduction of diazonium salts to hyrazines, coupling reaction and its synthetic application.

2. Nitro Compounds

Preparation of nitro alkanes and nitro arenes and their chemical reactions. Mechanism of electrophilic substitution reactions in nitro arenes and their reductions in acidic, neutral and alkaline medium.

Section-D

Aldehydes and Ketones

Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, advantage of oxidation of alcohols with chromium trioxide (Sarett reagent) pyridinium chlorochromate (PCC) and pyridinium dichromate., Physical properties. Comparison of reactivities of aldehydes and ketones. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction.Oxidation of aldehydes, Baeyer–Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, $LiAlH_4$ and$NaBH_4$ reductions.

4/3/2020

BSc.2nd (4thsem)
Practicals-CHP 202

Max. Marks: 50 [10 (int.) + 40(ext.)]
Time: 4 Hrs.

SECTION – I (Inorganic)

1 .**Colorimetry:**
To verify Beer - Lambert law for $KMnO_4/K_2Cr_2O_7$and determine the concentration of the given $KMnO_4/K_2Cr_2O_7$ solution.
2. Preparations: Preparation of chrome alum,
Potassium trioxalatochromate (III).

Section-B (Physical)

1. To determine the enthalpy of neutralisation of a weak Acid /weak base vs. strong base /strong acid and determine the enthalpy of ionisation of the weak acid /weak base.
2. To determine the enthalpy of solution of solid calcium chloride
3. To study the distribution of iodine between water and benzene .

Section-C (Organic)

Systematic identification (detection of extra elements, functional groups, determination of melting point or boiling point and preparation of at least one pure solid derivative) of the following simple mono and bifunctional organic compounds: oxalic acid , succinic acid , benzoic acid , salicyclic acid aspirin, phthalic acid, cinnamic acid, benzamide , urea, acetanilide, benzanilide, aniline hydrochloride, p-toluidine, phenyl salicylate (salol), glucose, fructose, sucrose, *o* , *m*, *p*-nitroanilines , thiourea.

Books Suggested:-

1. A. D. Chawla , New College Practical Chemistry ,B.Sc. II , Vijay Pub. 2011.

2. V. Alexeyev ,Quantative Analysis ,Mir Pub. Moscow.

3. S.C. Kheterpal,S.N. Dhawan ,P.N. Kapil : Advanced Practical Chemistry, Vol -II ,2011.

4.R.L. Madan ,Practical Chemistry ,B.Sc. Part-II.

5. ArunChhikara ,S.P. Bhutani : Qualitative Organic Chemistry .

4/3/2020

B. Sc. III Year (Vth Semester)

Paper - Inorganic Chemistry | Max. Marks: 27

CHE-301A | Time: 3Hrs.

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of seven marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

SECTION–A

Metal-ligand Bonding in Transition Metal Complexes

Limitations of valence bond theory, an elementary idea of crystal-field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-field parameters.

SECTION–B

Thermodynamic and Kinetic Aspects of Metal Complexe

A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, substitution reactions of square planar complexes of Pt(II).

SECTION-C

Magnetic Properties of Transition Metal Complexe

Type of magnetic behavior , methods of determining magnetic susceptibility , Spin only formula , LS coupling ,correlation of μ_s and μ_{eff} values , orbital contribution to magnetic moments , application of magnetic moment data for 3d metal complexes

SECTION-D

Electron Spectra of Transition Metal Complexes

Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectrochemical series. Orgel-energy level diagram for d^1 and d^6 states, discussion of the electronic spectrum of $[Ti(H_2O)]^{3+}$ complex ion.

B. Sc. IIInd Year (Vth Semester)

Paper -Physical Chemistry

CHE-301B

Max.Marks: 27
Time: 3 Hrs.

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of seven marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

Quantum Mechanics-I

Black-body radiation, Plank's radiation law, photoelectric effect, heat capacity of solids, Compton effect,wave function and its significance of Postulates of quantum mechanics , quantum mechanical operator, commutation relations, Hamiltonial operator, Hermitian operator, average value of square of Hermitian as a positive quantity, Role of operators in quantum mechanics, To show quantum mechanically that position and momentum cannot be predicated simultaneously, Determination of wave function & energy of a particle in one dimensional box, Pictorial representation and its significance,

Section-B

Physical Properties and Molecular Structure

Optical activity, polarization – (clausius – Mossotti equation).

Orientation of dipoles in an electric field, dipole moment, included dipole moment, measurement of dipole moment-temperature method and refractivity method, dipole moment and structure of molecules, Magnetic permeability, magnetic susceptibility and its determination. Application of magnetic susceptibility, magnetic properties – paramagnetism, diamagnetism and ferromagnetics

Section-C

Spectroscopy-I

Introduction: Electromagnetic radiation, regions of spectrum, basic features of spectroscopy, statement of Born-oppenheimer approximation, Degrees of freedom.

Rotational Spectrum

Diatomic molecules. Energy levels of rigid rotator (semi-classical principles), selection rules, spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution), determination of bond length, qualitative description of non-rigid rotor, isotope effect.

Section-D

Spectroscopy-II

Vibrational spectrum

Infrared spectrum: Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies, effects of anharmonic motion and isotopic effect on the spectra., idea of vibrational frequencies of different functional groups.

Raman Spectrum:

Concept of polarizibility, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules, Quantum theory of Raman spectra.

B. Sc. IIIrd Year (Vth Semester)

Paper - Organic Chemistry

CHE-301C

Max.Marks: 26
Time: 3 Hrs.

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of six marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

NMR Spectroscopy-I

Principle of nuclear magnetic resonance, the PMR spectrum, number of signals, peak areas, equivalent and non equivalent protons positions of signals and chemical shift, shielding and deshielding of protons, proton counting, splitting of signals and coupling constants, magnetic equivalence of protons..

Section-B

NMR Spectroscopy-II

Discussion of PMR spectra of the molecules: ethyl bromide, n-propyl bromide, isopropyl bromide, 1,1-dibromoethane, 1,1,2-tribromoethane, ethanol, acetaldehyde, ethyl acetate, toluene, benzaldehyde and acetophenone.. Simple problems on PMR spectroscopy for structure determination of organic compounds.

SECTION – C

Carbohydrates-I

Classification and nomenclature. Monosaccharides, mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses. Configuration of monosaccharides. Erythro and threo diastereomers. Conversion of glucose into mannose. Formation of glycosides, ethers and esters. Determination of ring size of glucose and fructose. Open chain and cyclic structure of D(+)-glucose & D(-) fructose. Mechanism of mutarotation. Structures of ribose and deoxyribose.

SECTION – D

1. Carbohydrates-II

An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) without involving structure determination.

2. Organometallic Compounds

Organomagnesium compounds: the Grignard reagents-formation, structure and chemical reactions. Organozinc compounds: formation and chemical reactions. Organolithium compounds: formation and chemical reactions.

B.Sc. III Year(Vth Semester)
Practical –CHP 301

Max. Marks: 50 [10(int.)+40(ext.)]
Time: 4 Hrs.

SECTION – I (Inorganic)

Semimicro qualitative analysis of mixture containing not more than four radicals (excluding interfering radicals $C_2O_4^{2-}$,PO_4^{3-}, BO_3^{3-}):

Basic Radicals : Pb^{2+}, Hg_2^{2+},Hg^{2+}, Ag^{+}, Bi^{3+},Cu^{2+} ,Cd^{2+}, As^{3+},Sb^{3+}, Sn^{2+}, Fe^{3+}, Cr^{3+},Al^{3+}, Co^{2+}, Ni^{2+}, Mn^{2+}, Zn^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+},NH_4^{+}

Acid Radicals: CO_3^{2-}, S^{2-},SO_3^{2-}, $S_2O_3^{2-}$, NO_2^{-}, CH_3COO^{-}, Cl^{-}, Br^{-}, I^{-}, NO_3^{-} ,SO_4^{2-}

Section-B (Physical)

1. To determine the strength of the given acid solution (mono and dibasic acid) conductometrically.
2. To determine the solubility and solubility product of a sparingly soluble electrolyte conductometrically.

Section-C (Organic)

1. Laboratory Techniques (a) Steam distillation (non evaluative) naphthalene from its suspension in water,

Separation of *o*-and *p* -nitrophenols

(b) Column chromatography (non evaluative)

Separation of fluorescein and methylene blue .Separation of leaf pigments from spinach leaves

2. Synthesis of the following organic compounds:

(a) To prepare o- chlorobenzoic acid from anthranilic acid..

Books Suggested:-

1. A. D. Chawla , New College Practical Chemistry ,B.Sc. -III , Vijay Pub. 2011.

2. S.C. Kheterpal, S.N. Dhawan ,P.N. Kapil : Advanced Practical Chemustry, Vol -III , 2011.

3..R.L. Madan ,Practical Chemistry ,B.Sc. Part-III.

4. A.L. Vogal ,A text book of Micro and Semi-micro quantativeanalysis, Orient Longman Pub.

B. Sc. III Year (VIth Semester)

Paper - Inorganic Chemistry **Max. Marks: 27**

CHE-302A **Time: 3 Hrs.**

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of seven marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

Organometallic Chemistry

Definition, nomenclature and classification of organometallic compounds. Preparation, properties, and bonding of alkyls of Li, Al, Hg, and Sn a brief account of metal- ethylenic complexes, mononuclear carbonyls and the nature of bonding in metal carbonyls.

Section-B

Acids and Bases, HSAB Concept

Arrhenius, Bronsted – Lowry, the Lux – Flood, Solvent system and Lewis concepts of acids & bases, relative strength of acids & bases, Concept of Hard and Soft Acids & Bases. Symbiosis, electronegativity and hardness and softness

Section—C

Bioinorganic Chemistry

Essential and trace elements in biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca^{2+}. Nitrogen fixation.

Section—D

Silicones and Phosphazenes

Silicones and phosphazenes, their preparation, properties,structure and uses

4/3/2020

B. Sc. IIIrd Year (VIth Semester)

Paper - Physical Chemistry

CHE-302B

Max.Marks: 27
Time: 3 Hrs.

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of seven marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

Section-A

Spectroscopy-III

Electronic Spectrum

Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck- Condon principle.

Qualitative description of sigma and pie and n molecular orbital (MO) their energy level and respective transitions.

Section-B

Photochemistry

Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grotthus -Drapper law, Stark-Einstein law (law of photochemical equivalence) Jablonski diagram depiciting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes (simple examples).

4/3/2020

Section-C

Solutions:

Dilute Solutions and Colligative Properties

Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solution, Colligative properties, Raolut's law, relative lowering of vapour pressure, molelcular weight determination, Osmosis law of osmotic pressure and its measurement, determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point, Thermodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solutes.

Section-D

Phase Equillibrium

Statement and meaning of the terms – phase component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system –Example – water and Sulpher systems.

Phase equilibria of two component systems solid-liquid equilibria, simple eutectic

Example Pb-Ag system, desilerisation of lead

4/8/2020

B. Sc. IIIrd Year (VIth Semester)

Paper -Organic Chemistry

CHE-302C

Max.Marks: 26
Time: 3 Hrs.

Note: Examiner will set nine questions and the candidates will be required to attempt five questions in all. Question number one will be compulsory covering the entire syllabus and will be of six marks. Further, examiner will set two questions from each section and the candidates will be required to attempt one question from each section which will be of five marks each.

SECTION – A

Heterocyclic Compounds-I

Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole

SECTION – B

1. Heterocyclic Compounds-II

Introduction to condensed five and six- membered heterocycles. Prepration and reactions of indole, quinoline and isoquinoline with special reference to Fisher indole synthesis, Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline

4/3/2020

2.Organosulphur Compounds

Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphaguanidine. Synthetic detergents alkyl and aryl sulphonates.

SECTION – C

1. Organic Synthesis *via* Enolates

Acidity of α-hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto - enol tautomerism of ethyl acetoacetate.

2. Synthetic Polymers

Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers. Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy resins and polyurethanes. Natural and synthetic rubbers.

Section – D

Amino Acids, Peptides& Proteins

Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation of α-amino acids. Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides. Classical peptide synthesis, solid–phase peptide synthesis. Structures of peptides and proteins Primary & Secondary structure.

4/3/2020

B.Sc. III Year(6th sem)
Practical-CHP 302

Max. Marks: 50[10(int.)+40(ext.)]
Time: 4 Hrs.

SECTION – I (Inorganic)

Semimicro qualitative analysis of mixture containing not more than four radicals (including interfering, Combinations and excluding insolubles):

Basic Radicals : Pb^{2+}, Hg_2^{2+},Hg^{2+}, Ag^{+}, Bi^{3+},Cu^{2+} Cd^{2+}, As^{3+},Sb^{3+}, Sn^{2+}, Fe^{3+}, Cr^{3+},Al^{3+}, Co^{2+}, Ni^{2+}, Mn^{2+}, Zn^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+},NH_4^{+}

Acid Radicals: CO_3^{2-}, S^{2-},SO_3^{2-}, $S_2O_3^{2-}$, NO_2^{-}, CH_3COO^{-}, Cl^{-}, Br^{-}, I^{-}, $C_2O_4^{2-}$, NO_3^{-} ,SO_4^{2-}, PO_4^{3-}, BO_3^{3-}.

Section-B (Physical)

1. To determine the strength of given acid solution (mono and dibasicacid) potentiometrically.
2. To determine the molecular weight of a non-volatile solute by Rast method.
3. To standardize the given acid solution (mono and dibasic acid) Ph metrically.

Section-C (Organic)

1. Thin Layer Chromatography

Determination of R_f values and identification of organic compunds

(a) Separation of green leaf pigments (spinach leaves may be used)

(b) Separation of a mixture of coloured organic compounds using common organic solvents.

2. Synthesis of the following organic compounds:

(a) To prepare p-bromoaniline from p-bromoacetanilide.

(b) To prepare m-nitroaniline from m-dinitrobenzene.

Distribution of marks

Distribution of marks

External -	**Total**
1. Section I	08 marks
2. Section II	08 marks
3. Section III	08 marks
4. Viva-voce	06 marks

Internal -

Copy+Attendence(8+2)= 10Marks

Books suggested:-1. A. D. Chawla , New College Practical Chemistry ,B.Sc. -III , Vijay Pub. 2011.
2. S.C. Kheterpal,S.N. Dhawan ,P.N. Kapil : Advanced Practical Chemistry, Vol -III ,2011.
3.R.L. Madan ,Practical Chemistry ,B.Sc. Part-III.
4.A.L. Vogal ,A text book of Micro and Semi-micro quantativeanalysis,Orient Longman Pub

4/3/2020

(25)

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(1st Semester)
ZOOLOGY

Paper Code: ZOO – 101A Animal Diversity Nonchordata-I
(Protozoa to Annilida)

L – T – P
3 -- --
External Marks: 40
Internal Marks: 10

Total Credits:03
Total Marks: 50

Unit-I

General characters and classification up to orders with examples.
Detailed study of the following animal types:-

Protozoa : *Plasmodium* and *Paramecium*, Parasitic Protozoans Life History, Mode of infection and Pathogenicity of *Entamoeba, Trypanosoma, Leshmania* and *Giardia*

Unit-II

Parazoa (Porifera) : Sycon, Canal System in Sponges, Spicules Sponge
Cnidaria (Coelenterata) : Obelia, Coral & Coral reefs, Polymorphism in Siphonophora

Unit-II

General characters and classification up to orders with examples.
Detailed study of the following animal types:-

Platy helminthes : *Fasciola* and *Taenia*
Helminths parasites : Brief account of History, Mode of infection & Pathogenicity of *Schistosoma, ancyclostoma, Trichinilla, Wuchereria* and *Oxyuris*
Aschelimenthes : *Ascaris*

UNIT-IV

Annelida : Leech

Suggested Books:-

1. Dhami,P.S. and Dhami, J.K., Invertebrates, R. Chand and Co., New Delhi, 2001.
2. Barnes, R.D. Invertebrates Zoology, W.B. Saunders, Philadelphia, 1999.

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(1st Semester)
ZOOLOGY

Paper Code: ZOO – 101B Bio Chemistry and Cell Biology

L – T – P
3 -- --

Total Credits:03
Total Marks: 50

External Marks: 40
Internal Marks: 10

Unit-I

Bio Chemistry:- Introduction, Classification, Structure, Function and General properties of various biomolicules.

Biomolecules	:	Proteins, Carbohydrates, Lipids
Enzymes	:	Nomenclature, classification and mechanism of enzyme action

Unit-II

Vitamins	:	Name, Source and Function
Hormones	:	Chemical nature and function, and mechanism of action.

Unit-IV

Cell Biology:-

Immunology:- Overview of immune system, cells of immune system and organs, innate and acquired immunity, Generation of immunogenicity, recognition of antigens of B-cell epitops, Antigen – Antibody interactions, immune system in health and disease,

Unit-III

Cancer Biology:- Types of Cancer, An elementary idea of cell transformation in cancer, Types of tumors, Therapy of cancer

Structural and functional components eukaryotes, polytene and lampbrush chromosome.

Golgi bodies, centrosomes, structure of cilia and flagillae.

Suggested Books:-

1 De Robertis, E.D.P., De Robertis, E.M.F., Cell Biology and Molecular Biology, 8th ed., W.B. Saunders Co.. Philadelhia,1995.
2 Rechard, A.G. Kidt, T.J. Osborme, B.A. and Rodwell, V.W., 2003. Immunology, W. H. Freeman and Co. New York.
3 Roitt. T.M. Essential Immunology. Blackwell Scientific Publications. 2001.

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(1st Semester)
ZOOLOGY

Paper Code: ZOP 101 Practical

L – T – P
-- -- 4

Total Credits:02
Total Marks: 50

External Marks: 40
Internal Marks: 10

1. **Classification up to orders with ecological notes and economic importance of the following animals.**

(1) A . Protozoa:
(a) Examination of eluters of Amoeba *Euglena* and *Paramecium.*
(b) **Permanent Slides :** *Amoeba, Euglena, Trypnosoma, Noctiluca, Ememeria, Monocystis, Paramicium* (Binary fission and conjugation) *Opalina, Vorticella, Blantidium, Nictotherus* and *Polytomella.*

B. Parazoa:
(a) Specimens : *Sycon, Grantia, Euplectella, Hylonema, Spongilla and Euspongia.*
(b) Permanent Slides : T.S.*Sycon*, L.S. of *Sycon*

C . Coelenterata:
(a) Specimens: *Porpita, Velella, Physalia, Aurelia, Rhizostoma, Metridium, Millipora and Alcyonium, Tubipora, Zoanthus, Medrepora, Favia, Fungia and Astrea.*

(b) Permanent Slides : *Hydra* with buds, *Obelia* (colony and medusa), *Sertularia, Plumularia, Bouganvillea*

D. Platyhelminthies:
(a) Specimens: *Dugesia, Faciola, Taenea* and *Echinococcus.*

(b) Permanent Slides: Miracidium, Sorocyst, Redia, Cercaria larva of *Fasciola,* Scolex and Proglotids of *Taenia* (mature and gravid).

E. Aschelminthes:
(a) Specimens: *Ascaris* (male and female), *Trichinella, Ancylostoma Meloidogyne.*

(b) Permanent Slides: T.S. of *Ascaris* (male and female).

F. Annelida:

(a) **Specimens:** *Pheritima, Nareis, Hetronereis, Polynoe, Aphrodite, Tubifix Arenicola* and *Potobdella.*

(b) **Permanent Slides :** T.S. of earthworm through pharynx, gizzard, seminal vesicles, prostate Glands and typhlosol, intestine of earthworm and T.S. of Leech through pharynx.

2. **Dissection of Leech** Demonstruction of - Digestive , Reproductive and nervous systems.
3. Temporary and permanent slide formation (staining and mounting) and identification of class working material –
   (a) Gemmules, Spicules and Sponginfibers of Sponge.
   (b) *Euglena, Hydra, Obelia, Plumularia, Sertularia. Bougainvillea* etc.
4. Biochemical test for Sugar, Protein and Fat.
5. Test of Salivary amylase activity : Effect of temperature, PH, Concentration.
6. Estimation of abnormal constituents of Urine (Albumin, Sugar, Ketonebodies)

Kant 01/03/19

3198 M-18

2713 M.20

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(2nd Semester)
ZOOLOGY

Paper Code: ZOO-102A Animal Diversity Non Chordata-11
(Arthropoda to Hemichordata)

Total Credits:03
Total Marks: 50

External Marks: 40
Internal Marks: 10

Unit- I

General character and classification up to orders with examples.

Arthropod : Periplaneta (cockroach), Prawn, Social Organizations in insects (honey bee and termite), life cycle of Anopheles and Culex and economic importance of insects.

Unit-II

Mollusca : Type study - Pila
Torsion and Detorsion in Gastopoda

Unit- III

General character and classification upto orders with examples.

Echinodermata : Asterias (Starfish), Larval forms in Echinodermata, Phylogeny and Affinities of Echinoderms.

Unit-IV

Hermichordata : Balanoglossus, Habitat an Habits External Characters Bodywall, Coelom skeleton Various Systems and affinities.
Aristotale's Lantern

Suggested Books:-

Dhami,P.S. and Dhami, J.K., Invertebrates, R. Chand and Co., New Delhi, 2001.
Barnes, R.D. Invertebrates Zoology, W.B. Saunders, Philadelphia, 1999.

Kavi 01/3/19

Parveen 4-3-2020

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(2nd Semester)
ZOOLOGY

Paper Code: ZOO-102B Ecology

Total Credits:03
Total Marks: 50

External Marks: 40
Internal Marks: 10

Unit- I

Ecology	:	Definition, Significance, Concept of habitat and ecological Niche, Subdivisions and scope of ecology.
Ecosystem	:	Components, ecological energetic, food web, introduction to major ecosystems of the world.

Unit-II

Ecological factors	:	Abiotic factors (Temperature, light and soil as ecological factors), Distribution of animals based on ecological factors.
Biotic Community	:	Characteristics,. Ecological succession.
Nutrients Cycle	:	Biogeochemical cycles & concept of limiting factors..

Unit – III

Ecological adaptations	:	Morphological , physiological and behavioral adaptations In animals in different habitats
Population	:	Characteristics, Growth and regulation of population. Migration in fishes and birds, Parental care in Animals. Inter and intraspecific relationship – Competition, Predation, Parasitism, Commensalisms and Mutualism

Unit-IV

Natural resources	:	Renewable and nonrenewable natural resources Conservations.
Environmental Pollution	:	Causes, impact and control of environmental pollution (Air water, soil, Plastic and noise), Environmental degradation.

Suggested Book :

1. Kormondy, E.J., Concepts of Ecology, Englewood Cliffs, N.J., Prentice Hall Inc., 1975.
2. Kreb, C.J., Ecology, Harper & Row, New York, 1982.
3. Odum, E.P., Fundamentals of Ecology W.B. Saunders Co., Philadelphia, 1995.
4. Dhami, P.S. & Dhami, J.K. , Invertebrates, R. Chand & Co., New Delhi, 2001

Kaul 01/03/19 Kanika 4 March 2020

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(2nd Semester)
ZOOLOGY
Practical

Paper Code: ZOP-102

L – T – P
-- -- 4
External Marks: 40
Internal Marks: 10

Total Credits:02
Total Marks: 50

1. A **Arthropoda** : *Periapts Palaemon* (Prawn),*lobster Cancer* (crab) , *Sacculina*, *Eupagurus*_ (Hermit crab) *Lepas* ,*Balanus, Cyclops, Daphnia, Lepisma, Periplaneta* (Cockroach), *Schistocerca*_(Locust) *Poecilocerus* (Ak grasshopper), *Gryllus* (Cricket), *Mantis* (Pryingmantis) *Cicada, Forjicula* (Earwig), Dragonfly, termite queen, bug,moth, beetle, *Polistes* (Wasp), *Apis* (honey bee), *Bombyx, Pediculus* (Body louse), *Millipede and Centipede*, *Palamnaeus* (Scorpion), *Aranea* (Spider) and *Limulus* (King crab).

B. Mollusca : *Mytilus, Ostrea, Cardium, Pholas, Solen* (Razor fish), *Pecten, Haliotis, Patella, Aplysia, Doris, Limax, Loigo, Sepia, Octopus, Nautilus* shell (Complete andT.S.),*Chiton* and *Dentalium*.

C. Echinodermata : *Asterias, Echinus, Ophiothrix*_and *Antedon cucumaria, Asterophyton.*

D. Hemichordata : *Balanoglossus.*

2. Study of the following permanent stained preparations:
   a. Insect trachea, Mouth parts of *Periplaneta* (Cockroach).
   b. Radula and osphradium of *Pila.*
   c. T.S. Starfish (Arm).
   d. T.S. *Balanoglossus* (Through various regions).

3. Preparation of the following slides:
   a. Temporary preparation of Slide of Mouth parts and trachea of Grasshopper,
   b. Radula and osphradium of *Pila.*
   c. Pedicillarae of *Asterias.*

4. Dissections of the following animals:
   a. *Periplanenta* / Grass Hopper : Digestive system, mouth parts and trachea.
   b. *Pila* : Pallial complex, digestive and nervous systems.(Demonstration only)

5. ECOLOGY
   a. Study of animal adaptations with the help of specimens, charts and model.

Kanika 4 March 2020

Kanika 21/03/19

Parveen 4-3-2020

b. Study of Zoogeographical regions and their fauna.
c. Study of biotic components of an ecosystem (pond ecosystem, artificial ecosystem i.e. grassland, cropland).
d. Study of different types of nests in birds, different type of beak & feet of various birds.
e. Study & preparation of zoogeographical charts.

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(3rd Semester)
ZOOLOGY

Paper Code: ZOO-201A Animal Diversity Chordata-1
(Protochordate to Amphibia)

L – T – P
3 -- --
External Marks: 40
Internal Marks: 10

Total Credits:03
Total Marks: 50

Unit- I

Chordate : General characters and classification up to order level with examples.

Origin and evolutionary tree of chordates.

Protochordates : Systematic position, distribution, ecology, Morphology & Anatomy, Affinities
Type study of *Herdmania* (Urocordate).

Unit-II

Amphioxus (Cephalochordate).

Cyclostomes : Type study of *Petromyzone.*

Unit- III

Chordate : General characters and classification up to order level with examples.

Pisces : Type study of *Labeo*
Scales & fins of fishes, Parental care in fishes, Fish migration.

Unit-IV

Amphibia : Type study of frog (*Rana Tigrina*).

Suggested Books:-

1. Colbert, E.H., Evolution of vertebrates, II Edition Wiley Ltd. 1989.
2. Dhami,P.S. and Dhami, J.K., Vertebrates, R. Chand and Co., New Delhi, 1997.
3. Kotpal's vertebrates.

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(3rd Semester)
ZOOLOGY

Paper Code: ZOO-201B Developmental biology and Evolution

L – T – P
3 -- --
External Marks: 40
Internal Marks: 10

Total Credits:03
Total Marks: 50

Unit- I

.Developmental biology

Historical perspectives, aims and scope of developmental biology.
Generalize structure of mammalian ovum & sperm/ spermatogenesis and oogenesis, fertilization, parthenogenesis, different types of eggs and patterns of cleavage.
Process of blastulation and fate-map construction in chick.

Unit-II

Gastrulation in chick upto the formation of three germinal layers.
Elementary knowledge of primary organizer.
Concepts of competence, determination of differentiation.
Extra embryonic membranes and regeneration.

Unit II

Evolution ; Origin of life.
Concept and evidences of organic evolution.
Theories` of organic evolution: Lamarckism, Darwinism, Neo- Darwinism,

Unit-IV

De' Varies mutation theory, Modern theory of evolution .
Concept of micro-evolution, macro-evolution and mega-evolution. Concepts of species, Modes of speciation.
Evolution of man.

Suggested Book:

1. Dobzhansky, Ayala, Stebbins & valentine, Evolution, W.H. Freeman . 1952.
2. Colbert, E.H., Evolution of Vertebrates, II Edition Wily Easten Ltd .,1989
3. Bhamrah, H.S. Juneka, K., Cytogenetics & Evolution, Anmol Publication Pvt.Ltd . 1993.
4. Davenport. An out line of Animal Development Addisom-Wesly.

5. Gilbert, S.F. (1991) Developmental Biology. Sinaurer AssociatesInc Publishers.
6. Oppenheimor, S.B.(1981) Insoduction to Embryology, Allyn and Baeon. Sussman Animal Growth and Developmental Prentiahall.

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(3rd Semester)
ZOOLOGY
Paper Code: ZOP-201 Practical

L – T – P
-- -- 4

Total Credits:02
Total Marks: 50

External Marks: 40
Internal Marks: 10

Protochordata	:	*Branchiostoma, balanoglossus, Herdmania* and a colonial *Urochordata*
Fishes	:	*Petromyzone pristis, Zygarna, Opiocephalus Clarius. Labeo, Mystis, Anguila, Syngnathus, Hippocampus, Tetradon, Ostacodon, Solea, Exocoetus.*
Amphibia	:	*Salamender , Necturus, Hyla, Raeophorus, Bufo,* limbless amphibian.
Skeleton	:	*Labeo* and Frog.
Temporary mounts	:	Placoid, cycloid and ctenoid scales . Wheel organ of *amphioxus.*
Dissection	:	*Hedrmania*: General Anatomy (Demonstration only) *Labeo*: Digestive System, Reproductive system and Excretory System.
Slides	:	Study of permanent slides of WM of chick and frog embryo (13-18h, 24-36h, 36-48h, 48-72h) Window preparation and identification of development in chick egg.
Project	:	Based on theory papers.

Kaur 21/03/19

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(4th Semester)
ZOOLOGY

Paper Code: ZOO-202A Animal Diversity Chordata-11
(Reptilia to Mammals)

Total Credits:03
Total Marks: 50

External Marks: 40
Internal Marks: 10

Unit-I

Chordate : General characters and classification up to order level with examples.

Reptilia :
1. Type Study of Lizard (*Hemidactylus*).
2. Origin, Evolutionary tree, Extinct reptiles.
3. Poisionous and Non Poisionous Snakes, Poision Appratus in Snakes.

Unit-II

Aves : Type study of Pigeon (*Columba Livia*), Flight Adaptations, Airodynamics in birds, feathers, migration in birds.

Unit-III

Chordate : General characters and classification up to order level with examples.

. Mammals : Type Study of Rat. (Includes detailed study of various systems of The animal)

Unit-IV

Skin and its derivatives, Dentition, Stomach and Adaptive radiation.

Suggested Books:-

4. Dhami,P.S. and Dhami, J.K., Vertebrates, R. Chand and Co., New Delhi, 1997.
5. Parker,T.J. and Haswell, W.A. Text Book of Zoology, Vol.II (vertebrates) ELBS and Macmillan Press Ltd. 1981.

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(4th Semester)
ZOOLOGY

Paper Code: ZOO-202B Physiology

L – T – P
3 -- --
External Marks: 40
Internal Marks: 10

Total Credits:03
Total Marks: 50

Unit-I

Digestion : Nutritional components: Proteins, carbohydrates, fats, lipids, vitamins and minerals. Types of nutrition and feeding. Digestion and dietary constituents, viz, lipids, proteins, carbohydrates and nucleic acids. Symbiotic digestion. Absorption of nutrients and assimilation. Control of enzyme secretion.

Unit-II

Circulation : Origin, Conduction and regulation of heart beat, Cardiac cycle, Electrocardiogram, Cardiac output, Fluid pressure and flow pressure in closed and open circulatory system, Composition and functions of blood and lymph. Mechanism of coagulation factors, anticoagulants, Haemopoiesis.

Unit-III

Control and Coordination: Nervous integration and chemical integration of endocrinology, Nature, origin and propagation of nerve impulse, Structure and mechanism of hormone action, Physiology of Pituitary, Thyroid, Parathyroid, Adrenal, Pancreas and Gonads.

Respiration : Exchange of respiratory gases, Transport of gases, lung air volumes, Oxygen dissociation curve of Haemoglobin. Bohr's effect.Hamburger's phenomenon(Chloride shift), control of respiration.

Unit-IV

Excreation : Patterns of excretory products viz., Ammonotelic, ureotelic and uricotelic , Ornithin cycle (Kreb's- Hanseleit cycle) for urea formation in liver. Urine formation, counter-current mechanism of urine concentration, osmoregulation, Micturition.

Reproduction : Gametogenesis, Structure of Gametes, Ovulation, Capicitation, Fertilization, gestation and parturition.

Suggested Books:-

Kant 01/03/19 Ravika 4/03/2020

1. Taneja, S.K., Biochemistry & animal phsiology, Truman Book Co., 1997.
2. Guyton, A.S., Text Book of Medical Physiology, 7th ed., W.B. Saunders.
3. Marub, A. Human Anatomy and Physiology. The Benjamin Cumming publishing Company, California.

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(4th Semester)
ZOOLOGY
Practical

Paper Code: ZOP-202

L – T – P
-- -- 4

Total Credits:02
Total Marks: 50

External Marks: 40
Internal Marks: 10

General characters and classification up to orders with examples. (Reptilia to mammalia)

Reptila Specimen : *Chelone, Testudo, Trionyx, Hemidactylus, Calots, Varanus, Uromastix, Ophiosaurus, Chamaeleon, Draco,Python, Eryx, Natrix, Ptyas, Dendrelaphi, Bungarus, Naja, Hydrus Enhydrina, Viper* and *Crocodilus*.

Aves Specimen :Casuarius, Arden, Anas, Milvis, Pavo, Eudynamis, Tyto, Alerdo and Halcyon. Temporary mounts-barbs, Study of a dozen common birds of Haryana, types of feathers .

Mammalia Specimen : Study of *Ornithorhynchus, Pteropus, Echidna, Dedelphis Pteropus, Macropus ,cannis, Loris, Oryctolagus, Funambulus* and *Herpestes Capra,* Cat, langur, *macacca,* hedgehog, shrew, insectivorous bat,

Osteology - :Disarticulated skeleton of fowl; different types of palate in birds.Disarticulated skeleton of *Varanus*, skull lower jaw, carapace and Plastron of tortoise. Rabbit and Human skull.

Dietary Adaptation- Frugivorous bat , squirrel and mongoose.

Dissections - Arterial, venous and Urinogenital systems, Neck region, rar ossicles and brain of white rat. (Demonstration only)

Permanent Slides :-

Mammalian skin, salivary glands, oesophagus, stomach, duodenum, ileum, rectum, liver, pancreas; spleen, trachea , lung, kidney, cartilage, bone, pituitary, adrenal, thyroid, Parathyroid, ovary and testis.

2. Report on field trip to Zoological Park, National Museum of Natural History or a Wildlife sanctuary/national park.
3. Effects of isotonic, hypotonic and hypertonic solution on erythrocytes.

Kaur 21/03/19 Kavita 4/03/2020

4. Enumeration of red blood cells using haemocytometer
5. Enumeration of the total and different types of white blood cells
6. Estimation of hemoglobin content of blood using Sahli's haemometer.
7. Preparation of haemin crystals.
8. Demonstration of the knee jerk reflex.
9. Recording of blood pressure using a sphygmomanometer.

Kav 01/03/19 Vanika 4/03/2020

VT

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(5th Semester)
ZOOLOGY

Paper Code: ZOO-301A **Economic Zoology-I**

L – T – P
3 -- --

Total Credits:03
Total Marks: 50

External Marks: 40
Internal Marks: 10

Unit- I

Study of importance of insect pests of crops and vegetable crops:

1. **Sugarcane :**
   a) Sugarcane leaf hopper (*Pyrilla perpusilla*)
   b) Sugarcance whitefly (*Aleruolobus barodensis*)
   c) Sugarcance top borer (*Scirpophaga nivella*)
   d) Sugarcance root borer(*Emalocera depresella*)
   e) Gurudaspur boror (*Bissetia Steniellus*)

   With their systemic position, habit and nature of damage caused. Life cycle and control of *Pyrilla. Perpusilla* only.

2. Cotton :
   a) Pink bollworm (*pectinophora gossypiela*)
   b) Red cotton bug (*Dysdercus koenigii*)
   c) Cotton grew weevil (*Myllocerus undercimpustulatus*)
   d) Cotton jessed (*Empoasca devastans*)

   With their systemic position. habits and nature of damage caused. Life cycle of control of *pectinophora gossypiella*.

3. Wheat :
   Wheat stem borer (*Sesamia inferens*) with systemic position, habit, and nature of damage caused Life cycle of & control.

4. Paddy :
   a) Gundhy bug (*Leptocorisa varicornus*)
   b) Rice grasshopper (*Hieroglyphus banian*)
   c) Rice stem borer (*Scirpophaga incertullus*)
   d) Rice hipsa (*Hispa armigera*)

   With their systemic position, habits and nature of damage caused. Life cycle and control of *leptocorisa varicornus*.

Unit- II

1. **Vegetables pests :**

   a) *Raphidopalpa faveicollis* - The red pumpkin beetle.
   b) *Dacus cucurbitas* - The red pumpkin fruit fly.
   c) *Tetarnychus tecarius* - The vegetable mite.
   d) *Epilachna* - The Hadda beetle
   With their systemic position, habits and nature of damage caused.
   Life cycle & control of *Aulacophora faveicollis*

2. **Pests of stored grains:**
   a) Pulse beetle (*Callosobruchus maculates*)
   b) Rice weevil (*Sitophilus oryzae*)
   c) Wheat weevil (*Trogoderma granarium*)
   d) Lesser grain borer (*Rhizopertha dominica*)
   e) Grain and flour moth (*Sitotroga cerealell*)

Unit-III

3. **Pest Control:**
   i) Physical Control
   ii) Chemical Control : History, categories of pesticides, from each category of pest against which they can used, Insect repellent and attractant.
   iii) Biological Control : History, requirement and precautions and Feasibility of biological agents for control.
   iv) Hormonal Control : History, requirement and precautions and Feasibility of biological agents for control.
   v) Legal Control.
   vi) Integrated Pest Management.

Unit-IV

Some Useful Insects :
Their systemic position, life cycles & their uses.
(honey bee, lac insect, silk moth etc.)

Suggested books :

1. Perry A.S Yamamoto, I.I shaay and R.Perry , Inseetides in Agriculture and Environment-Narora Publishing House.
2. B.S Parmer & S.S Tomar Pesctides formulation CBS Publishers and distributors, New Delhi .
3. R.Wade, M.Dekker, Pesticide Formulation.
4. G. Shukla G.S Upadhay Economic Zoology .V.B Rastogi publications Meerut.

Kant 01/03/19

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(5th Semester)
ZOOLOGY

Paper Code: ZOO-301B **Genetics**

L – T – P
3 -- --
External Marks: 40
Internal Marks: 10

Total Credits:03
Total Marks: 50

Unit- I

DNA as Information :

Discovery of Gene
Structure of Gene
Mapping of gene
Translation
Transcription
DNA Replication

Unit-II

Recombination in bacteria (Conjugation, transformation and transduction).

Mutation :

Spontaneous & induced mutations, gene mutations, physical and chemical basis of mutations, transversion, structural chromosomal aberrations .

Unit III

Human genetics :

Human karyotype, Chromosomal abnormalities involving autosomes and sex chromosomes, Monozygotic twins, Sex determination, Inborn errors of metabolism.

Unit-IV

Eugenics, euthenics & euphenics :

Genetic counseling, Pre-natal diagnostics, DNA-finger printing, transgenic animals.

Population Genetics: Hardy-Weinberg equilibrium, Role of Migration, mutation & genetic drift in altering gene frequency.

Suggested Books :

1. Benjamen P.A.B. (2002) Genetics : A conceptual Approach, W.H. Freeman and Co. New York.
2. Brown, T.A. Genome : John Wiley & Sons (Asia) PTE Ltd.
3. Russel, P.J. (1998) Genetics : The Benjamin Cummings Publishing cone . Inc.
4. Benjamen Lewin, Gene Oxford.

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(5th Semester)
ZOOLOGY
Paper Code: ZOP-301 Practical

L – T – P
- -- - 4

Total Credits:02
Total Marks: 50

External Marks: 40
Internal Marks: 10

1. **External morphology, identification marks, nature of damage & host of the following pests;-**

   i) **Sugarcane :** Sugarcans leaf hopper, sugar cans whitefly, sugarcane top borer, sugarcane root borer, Gurdaspur borer.
   ii) **Cotton :** red cotton bug.
   iii) **Wheat :** Wheat stem borer
   iv) **Paddy :** Gundhi bug, rice grasshopper, rice stem borer, rice hispa.
   v) **Vegetable:** *Aulocophora faviecollis*, Dacus cucurbitas, Tetranychus tecarious, Epilachna (Any three).
   vi) **Pest of stored grains:** Pulse beetle, Rice weevil, Grain & flour moth fust Red flour bettle, lessor grain borer (Any three).

2. Stages of life history of silk moth & honey bee.

3. Demonstration of law of segregation, Independent assortment & epistasis. Numerical for segregation & Independent assortment .

4. Segregation demonstration in preserved material.

5. Inheritance of other human characteristics, ability to taste PTC, thiourea.

6. Study of polytene chromosomes of *Chironomus/ Drossophila* through permanent slide .

7. Dermatographics: Plam print taking & finger tip patterns.

8. Collection & Identification of Pests.

Kaj 01/03/19

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(6th Semester)
ZOOLOGY
Paper Code: ZOO-302A Economic Zoology-II

L – T – P
3 -- --

Total Credits:03
Total Marks: 50

External Marks: 40
Internal Marks: 10

Note- Attempt five questions in all, selecting two questions from each unit. Question number 1 is compulsory (short answer type). Nine questions are to be set, spread over the entire syllabus.

Unit- I

Aquaculture :

Introduction to world Fisheries
Fresh water fishes of India.
River System, Reservoir, Pond/ Tank fisheries, captive and culture fisheries, Cold water fisheries.
Fishing crafts & gears.

Unit-II

Seed production.
Fish Feed.
Fish Culture technology.
Composite Culture& Monoculture.
Fin Fish, Crustaceans, Molluscs and their culture.

Unit- III

Poultry Culture :

Introduction, Habitat, Houses, Food & Feeding of fowl.
Breeds of fowl.
Precautions for Hatching, rearing of chicken.
Poultry Products.

Unit-IV

3 **Piggery :**

i) Introduction, Habitat, Houses, Food & Feeding .
ii) Breeds.
iii) Products.

Kant 01/03/19

V-4

Received 14-3-2019

Suggested Books:-

1. Jhingran V.G:- Fish and fisheries of India, Hindustan publishing corporation of India , Delhi 1991.
2. Fishes of India vols . I & II :-Frances Days , Reprinted Edition Jagmander Book Agency, New Delhi 1994.
3. Johal M.S & K.L:- Monograph on the Fishes of Reorganized Panjab, Pb Fisheris Bulletin, vol. I& II,1980.
4. Agarwal S.C & Johal M.S:- Fishery Development, Narendra Publishing House, Delhi 1907.
5. Johal M.S & Tandon K.K. :- Fishes of Punjab, Res, Bull, Panjab Universety vol . 32.PP . 103-104 1981.
6. Karl f legler :- Freshwater fish ery Biology, wn c-Brown company Pub, Dubaque. Iowa, USA 1969.
7. Shukla G S and Upadhaya V. B: Economic Zoology Rastogi Publications Meerut.
8. Satnaragana, U. `Bioteehnology` Books and Allied CP, Ltd. Kolkata 7000 10 (India)
9. Brown T.D (1999) Gene cloning and DNA Analysis. Blackwall Sciena.
10. Powar C.B; Cell Biology; Himalayan Publishing house. Mumbai 400004.

01/03/19

Parveen
4-3-2020

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(6th Semester)
ZOOLOGY

Paper Code: ZOO-302B Biotechnology and Bioinformatics

L – T – P
3 -- --

Total Credits:03
Total Marks: 50

External Marks: 40
Internal Marks: 10

Note- Attempt five questions in all, selecting two questions from each unit. Question number 1 is compulsory (short answer type). Nine questions are to be set, spread over the entire syllabus.

Unit-I

Definition, Scope & History of Biotechnology, Biotechnology tree, Structure of DNA & RNA.

Basic tools In Biotechnology:-

(i) Enzymes: Types of enzymes, Most commonly used enzyme
(ii) Vectors: Types of vector
(iii) Passenger DNA

Unit-II

Techniques in Biotechnology:- Agarose gel electrophrosis, Isolation and purification of nucleic acid, Isolation of Chromosomes, Nucleic acid blotting techniques, DNA Sequenceing, Alternate method of DNA Sequencing, Chemical Synthesis of DNA. Methods of gene transfer, Polymerase chain Reaction, Production of monoclonal antibodies,

Unit-III

Construction of gene library, Radiolabeling of nucleic acids, Cloning of DNA, Chimeric DNA ,Copying of messenger RNA into DNA.

4. Regulation of gene expression.

Unit-IV

Culture Technology & Bioinformatics

Animal cell culture, Tissue and organ cultures, *In vitro* Fertilization & Embryo Transfer, Transfection methods and transgenic animals, Cryopreservation.

Definition, components of Bioinformatics, Internet and Bioinformatics. Biological database and Application of Bioinformatics in drug designing. Use of Computer in the field of Zoology.

Kaul 01/03/19 Kanika 31/04/2020

VF

Syllabus of B.Sc. (Medical)
w.e.f. July 2017
(6th Semester)
ZOOLOGY

Paper Code: ZOP-302 **Practical**

L – T – P
-- -- 4

Total Credits:02
Total Marks: 50

External Marks: 40
Internal Marks: 10

1. Identification of food Fish :
Catla ,Labiorohita, L. Calbasu , Cirrhina mrigala, Barbus Sarana, Ophlocephalus punctatus, O. Marulis, O. satiates, Trichogaster,, Mystus Seenghala, M. cavasius, M. tengara, Callichrous pabola,. C.bimaculatus & Wallago attu etc.
2. Other aquatic Animals used as food:-
Prawns, Crabs, Lobsters & Oysters etc.
3. Structure of Mouth of different fishes in relation to feeding habits.
4. A study of the fish parasites.
5. A study of different types of Nets. Egg net, Cast net, Gill net, Drift net & Drag net.
6. A visit to lake / Reservoir/ fish breeding center/ Poultry.
7. Histology : Preparation of permanent histological slides of testes, Ovary, Kidney, intestine, liver of rat. (Microtomy)
8. Demonstration of detailed structures of DNA & RNA Through model.
9. Fish Feed formulation - Artificial
   - Live-Culture, identify slide and preparation
10. Fish diseases- slides (infected fishes).
11. Biotechnological techniques.
12. Computer based experiments.

01/03/19 Kanika 4/03/2020

Praveen 4-3-2020

(31)

B.P.S. INSTITUTE OF HIGHER LEARNING KHANPUR KALAN

B.P.S. MAHILA VISHWAVIDYALAYA KHANPUR KALAN (SONEPAT)

Minutes of the Meeting of Undergraduate Board of Studies in Physics & M.Sc.Physics

A meeting of BOS in Physics was held in the office of Principal, BPSHL, on August 12, 2017 at 11.00 a.m. to discuss and approve the following agenda items.

i. The Scheme and Syllabi for M.Sc. Physics (1st Semester) w.e.f. 2017-18
ii. The Scheme and Syllabi for B.Sc. Non-Medical& Computer Science (1st to 6th Semesters and B.Sc.Home Science (~~1st~~ 2nd Semester) w.e.f. 2017-18

The following members were present in the meeting:

1. Dr. Veena, Dean , Faculty of Sciences, BPSMV (Chairperson)
2. Dr. Ashwani Sharma, Prof., MDU External Member
3. Dr. M.S.Yadav, Prof., KUK External Member
4. Mrs.Sushma Joshi, Associate Prof. in Physics Member
5. Ms.Renu Jakhar, Asst.Prof., Arya Adrash Girls College, Madlauda, Panipat (Special Invitee)
6. Mr.Mukesh Chander, Asstt.Prof., Arya Adrash Girls College, Madlauda, Panipat (Special Invitee)
7. Dr.Lalita Taneja, Asstt.Prof., Hindu Girls College, Sonipat (Special Invitee)
8. Ms.Sunita Arora, Asstt.Prof., GVM Girls College, Sonipat (Special Invitee)
9. Dr.O.P.Garg, Asstt.Prof., GVM Girls College, Sonipat (Special Invitee)

The Board unanimously approved the scheme and syllabi for undergraduate courses (B.Sc. Non-Medical & Computer Science (1st to 6th Semesters for Physics subject), B.Sc. Home Science (~~1st~~ 2nd semesters) and M.Sc. Physics (1st Semester) w.e.f. 2017-18 with minor changes.

The meeting ended with the thanks to the chair.

Dr. Veena | Dr. Ashwani Sharma | Dr. M.S.Yadav | Mrs.Sushma Joshi

Ms.Renu Jakhar | Mr.Mukesh Chander | Dr.~~Lalita~~ Taneja | Ms.Sunita Arora | Dr.O.P.Garg

Indu Dahiya

BHAGAT PHOOL SINGH MAHILA VISHWAVIDYALAYA, KHANPUR KALAN(SONEPAT)

(State University established under legislature act xxxi of 2006)

Course Currienlum & Scheme of Examination
For Physics
B. Sc. I (Non Medical + Computer Science)
2017-18

Paper Code	Course Title	Teaching Schedule L	T	P	Internal Assessment	External Assessment	Credit (Hrs)	Total Marks
PHY 101 A	Classical Mechanics and Theory of Relativity	3	0	0	10	40	3	50
PHY 101-B	Electricity, Magnetism and Electromagnetic Theory	3	0	0	10	40	3	50
PHP 101	Practical	0	0	4	10	40	2	50
		6	0	4	30	120	8	150

2nd Semester

Paper Code	Course Title	Teaching Schedule L	T	P	Internal Assessment	External Assessment	Credit (Hrs)	Total Marks
PHY 102 A	Properties of Matter and Kinetic Theory of gases	3	0	0	10	40	3	50
PHY-102- B	Semiconductor Devices	3	0	0	10	40	3	50
PHP-102	Practical	0	0	4	10	40	2	50
		6	0	4	30	120	8	150

Practical examination will be held at the end of each semester
Pass percentage is 40% and It is necessary to pass in theory and Practical Paper separately.
One Day scientific tour is compulsory.

I (Non -Medical /Computer Science)
Semester-I
Subject: Physics
Paper-I

CLASSICAL MECHANICS AND THEORY OF RELATIVITY

Course Code: PHY-101-A
3-0-0
Internal Marks: 10 (8+2)
(Sessional /project + Attendance)

Total Credits: 3 L-T-P
Total Marks 50 External Marks: 40

Unit 1: Basic concepts of Classical mechanics:
Mechanics of single and system of particles, Conservation law of linear momentum, Angular momentum and mechanical energy for a particle and a system of particles Centre of Mass and equation of motion. Constrained Motion

Unit 2: Generalized Notations:
Degrees of freedom and Generalized coordinates, Transformation equations. Generalized Displacement, Velocity, Acceleration, Momentum, Force, and Potential. Hamilton's variational principle, Lagrange's equation of motion from Hamilton's principle. Linear Harmonic oscillator, Simple pendulum, Atwood's machine

Unit 3: Theory of relativity:
Reference system, Inertial and Non-inertial frames, Galilean invariance and Conservation laws, Newtonian relativity Principle, Michelson-Morley experiment search for ether, Lorentz transformations

Unit 4: Applications of theory of relativity:
Length Contraction, Time Dilation, Twin Paradox, Velocity addition theorem, Variation of mass with velocity, Mass energy equivalence

Textbooks and references:

- Classical Mechanics by H. Goldstien
- Berkely Physics Course by E. M. Purcell vol I
- Sound by Brijlal and Subramanium
- Classical Mechanics by Landau Lifshitz
- Concepts of Modern Physics by Arthur Beiser

Note:

- Nine Questions will be set in total.
- Question number One will be compulsory and will be based on the conceptual aspects of entire syllabus. This question may have five parts and the answer should be in brief but not in Yes/ No.
- Four more questions are to be attempted, selecting one question out of two questions set from each unit. Each question may contain two or more parts.
- All questions will carry equal marks.
- Pass percentage is 40% and It is necessary to pass in theory and Practical Paper separately.
- 20% numerical problems are to be set.
- Use of scientific (non-programmable) calculator is allowed.

B. Sc. I(Non-Medical / Computer Science)
Semester-I
Subject: Physics
Paper-II

ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY

urse Code: PHY-101-B
:4-0
ternal Marks: 10
ssional + Attendance)

Total Credits: 3 L-T-P
Total Marks 50 External Marks: 40

it I: Vector background and Electric field:

adient of a scalar and its physical significance. Line, Surface and Volume integrals of a vector and their sical significance. Flux of a vector field, Divergence and curl of a vector and their physical significance, uss's divergence theorem, Stoke's theorem. Derivation of electric field E from potential as gradient, Derivation Laplace and Poisson equations. Electric flux, Gauss's Law, Mechanical force of charged surface, Energy per nit volume

it 2: Magnetism:

agnetic induction, Magnetic flux, Solenoidal nature of vector field of induction, properties of $\vec{B}$ (i) $\vec{B} = 0$, (ii) $\vec{B} = \vec{J}$, Electronic theory of dia and paramagnetism, Domain theory of ferromagnetism (Langevin's theory), cle of magnetization- hysteresis loop (Energy dissipation, Hysteresis loss and importance of Hysteresis Curve)

it 3: Electromagnetism

axwell equations and their derivations, Displacement current, Vector and Scalar potentials, Boundary nditions at interface between two different media, Propagation of electromagnetic wave (Basic idea, no ivation), Poynting vector and Poynting theorem

it 4: Electromagnetic Induction:

Electromagnetic induction, Faradays law of electromagnetic induction, Lenz's law, Self induction and mutual duction, self inductance of a long solenoid, Mutual induction of long solenoid, Energy stored in an inductor, owth and decay of current in a circuit with (a) resistance and capacitance (b) resistance and inductance (c) ductance and capacitance (d) resistance, inductance and capacitance. A.C. circuit analysis using complex riable with (a) capacitance and resistance (CR) (b) resistance and inductance (LR) (c) capacitance and nductance (LC) (d) capacitance and inductance (LR) (e) Capacitance, Inductance and Resistance (LCR), Series nd parallel resonance circuit,
uality factor (sharpness of resonance)

xtbooks and references :

Electricity and Magnetism by Reitz and Milford (Prentice Hall of India)
Electricity and Magnetism by A. S. Mahajan and A. A. Rangwala (Tata McGraw Hill)
Electronics & Fundamental by Joseph D. Ryde
Basic Electronics and Linear circuits by N. N. Bhargav DC Kulshreshtha and S C Gupta(TTTCTRO)
Introduction to Electronics by J. K. Brauson (Prentice Hall)
Electronics Devices and circuit by Motershed

ue Questions will be set in total.
estion number One will be compulsory and will be based on the conceptual aspects of entire s. This question may have five parts and the answer uld be in brief but not in Yes/ No.
more questions are to be attempted, selecting one question out of two stions set from each unit. Each question may contain two or more parts.
questions will carry equal marks.
ercentage is 40% and It is necessary to pass in theory and Practical Paper separately.
umerical problems are to be set.
ientific (non-programmable) calculator is allowed.

Veerd 12/8/17

B. Sc. I (Non Medical + Computer Science)
Semester -I
Paper III
Subject: Physics
PRACTICAL'S

Code: PHP-101 Total Credits: 3

Total Marks 50 External Marks: 40

+7)
riment+ copy + Viva Voice)

al Marks: 10(5+5)
ctice + Seminar)

al notes:-
lo any Ten experiments.
The students are required to calculate the error involved in a particular experiment.

iments
find out the moment of inertia of flywheel
find the moment of inertia of an irregular using a torsion pendulum.
find the Young's modulus by bending of beam.
etermine the modulus of rigidity by Maxwell' needle.
find Young's modulus, modulus of rigidity and Poisson's ratio for the material of a wire by Searle's method.
etermine the surface tension of water by noting its rise in a capillary tube.
etermine the surface tension of water by Jaeger's method.
find the co-efficient of viscosity of water by noting its flow through a capillary tube
uniform bore
find out the value of g by bar pendulum
find out radius of gyration by bar pendulum
find out thermal conductivity of a good conductor by searle's Method
etermine mechanical equivalent of heat by Calander and Barn's method.
sics of computer MS-Word, MS-Excel, MS Powepoint (Compulsory)
day Scientific Tour (Compulsory)

:
Practical examination will be held at the end of each semester
ass percentage is 40% and it is necessary to pass in Practical
Paper separately
The students are required to calculate the error involved in a
articular experiment Minimum ten experiments have to be done
he practical examination will held in 3 hours
xperiment Examination - 50

Distribution of Marks -

External Examination 40(Experiment+Copy + Viva-Voce)
(25+8+ 7)

Internal Examination 10 (Seminar + Attendance)
(5+5)

Total Marks 50

iving Marks and lab record each college will maintain practical assessment record by using the
ol ing procedure given below
tudent has to perform a minimum number of experiment prescribed in the syllabus.

12/8/17

...er the completion of a practical the teacher concerned will check the notebook and conduct the viva-voce of each student to find out how much concepts related to the theoretical and experimental part of the experiment she has understood. According to her performance marks will be recorded on their practical notebook. These marks will constitute the lab record.

- To compute the final marks for lab record, a separate register will be maintained. Each student will be assigned a separate page on this register. On this page the marks obtained by the student in different practical's will be entered. This record will be signed by the concerned teacher.
- One Day scientific tour is compulsory.

...books References:

...shnop and Flint, Advanced Practical Physics
...son M and Ogborn, Advanced Level Practical Physics, Heinemann Education Books Ltd, New Delhi
...astava S S and Gupta M K, Experiments in Electronics, Atma Ram & Sons, Delhi
...pta S L and Kumar V, Practical Physics, Pragati Prakashan, Meerut

Veeru 12/8/17

5/3/19

B. Sc. I (Non Medical + Computer Science)
Semester-II
Subject: Physics
Paper-I

PROPERTIES OF MATTER AND KINETIC THEORY OF GASES

...e Code: PHY-102-A | Total Credits: 3 L-T-P
Total Marks 50 External Marks: 40

...al Marks: 10
...ional / project + Attendance)

...I: Moment of inertia

...ion of rigid body, Moment of inertia, Torque, angular momentum, Kinetic energy of rotation. Theorem of ...ndicular and parallel axes (with proof). Moment of inertia of solid sphere, hollow sphere, spherical shell, solid ...nder, hollow cylinder and solid bar of rectangular cross section. Acceleration of a body rolling down on an ...ed plane

...II: Elasticity

...sticity, Stress and Strain, Hook's law, Elastic constant and their relations, Poisson's ratio, Torsion of cylinder ...wisting couple. Bending of beam (Bending moment and its magnitude), Cantilever and Centrally loader beam

...III: Kinetic theory of gases-I

...mption of Kinetic theory of gases, pressure of an ideal gas (no derivation), Kinetic interpretation of ...perature, Ideal Gas equation, Degree of freedom, Law of equipartition of energy and is application for specific ...of gases, Real gases, Vander wall's equation, Brownian motion(Qualitative)

...IV: Kinetic theory of gases -II

...well's distribution of speed and velocities (derivation required), Experimental verification of Maxwell's law of ...d distribution most probable speed, average and r.m.s. speed, Mean free path, Transport of energy and ...entum, Diffusion of gases

...books and References:

Properties of Matter by D.S. Mathur
Heat and Thermodynamics (5^{th} Edition) by Mark W. Zemansky.
Berkely Physics course, Vol I, Mechanics by E.M. Purchell

...te:-

Nine Questions will be set in total.
Question number 1 will be compulsory and will be based on the conceptual aspects of entire syllabus. This ...tion may have five parts and the answer should be in brief but not in Yes/ No.
...r more questions are to be attempted, selecting one question out of two questions ...t from each unit. Each question may contain two or more parts.
...l questions will carry equal marks.

Veer 12/8/17

4/3/2020

5/3/19

B. Sc. I (Non Medical + Computer Science)
Semester – II
Subject: Physics
Paper II
SEMICONDUCTOR DEVICES

2673
M.20

...se Code: PHY-102-B

Total Credits: 3 L-T-P
Total Marks 50 External Marks: 40

...nal Marks: 10
...sional / project + Attendance)

...I: Semiconductors
...gy bands in solids. Intrinsic and extrinsic semiconductors, p-n junction diode and their characteristics, Zener and ...anche breakdown. Zener diode, Light emitting diodes (LED). Photoconduction in semiconductors. Photodiode, ...Cell. P-n junction half wave and full wave rectifiers. Zener diode as a voltage regulator

...II: Transistors
...tion transistors. Working of NPN and PNP transistors. Three configurations of transistor (C-B, C-E, C-C ...es). Constants of a transistor. Relation between alpha and beta. Common base. Common emitter and common ...ctor characteristics of transistor. Advantages and disadvantages of C-E configuration

...III: Transistor Amplifiers
...nsistor biasing. Methods a of transistor biasing and stabilization. D.C. load line . Common base and Common ...ter biasing. Common base and common emitter amplifiers. Classification of amplifiers. Resistance- Capacitance ...) coupled amplifier (two stage, concept of band width, no derivation). Feedback in amplifiers. Advantages of ...tive feedback. Emitter follower

...IV: Oscillators
...illators. Principle of oscillation. classification of oscillators. Condition for self sustained oscillation: Barkhausen ...ion for oscillation. Tuned collector common emitter oscillator. Hartley oscillator. C.R.O. (Principle and ...king).

...tbooks and References:

...sic Electronics and Linear Circuits by N.N.Bhargava. D.C. Kulshreshtha and S.C.Gupta (TTI CHD).
...lid State Electronics by J.P. Aggarwal. Amit Aggarwal (Pragati Prakashan, Meerut)
...ectronics Fundamentals and Applications by J.D. Ryder (Prentice Hall of India).
...lid State Electronics by B.L. Theraja

...:

...e Questions will be set in total.
...uestion number 1 will be compulsory and will be based on the conceptual aspects of entire syllabus. This ...uestion may have five parts and the answer should be in brief but not in Yes/ No.
... more questions are to be attempted, selecting one question out of two questions set from each unit. ...ach question may contain two or more parts.
...questions will carry equal marks.
... percentage is 40% and It is necessary to pass in theory and Practical ... separately

12/8/17

4/3/2020

6/3/19

B. Sc. I (Non Medical + Computer Science)
Semester -II
Subject: Physics
Paper III
PRACTICALS

Course Code: PHP - 102

Total Credits: 3 L-T-P

Total Marks: 50 External Marks: 40

4-0

(25+8+7)

(Experiment + copy + Viva Voice)

Internal Marks: 10(5+5)

(Attendance + Seminar)

Special notes:-

Do any Ten experiments.

The students are required to calculate the error involved in a particular experiment.

Experiments

- To Study forward and reverse Bias Characteristics of a semiconductor diode.
- To study the Characteristics of a Zener diode
- To study the Characteristics of a Solar Cell and find out the Fill Factor.
- To Study AND, OR and NOT Gate
- To study NAND and NOR Gate
- To find out the Low resistance by Carey Foster Bridge
- To Find out the high resistance by substitution method
- To verify the inverse square law by Photo Cell.
- To find out the E.C.E of Hydrogen using water Voltammeter.
- To find out the frequency of A.C. Mains using sonometer.
- To find out the frequency of A.C. Mains using electrical Vibrator.
- To find out the Impedance of A.C mains in given Circuit
- To find out the Inductance By Anderson Bridge Method
- To study the Phenomenon of electromagnetic Induction by Python Language.
- To find out the value of g using Python Language
- To plot the Forward and reverse bias characteristics of Diode Using Python Language.
- Project Work Compulsory)
- One Scientific Tour (Compulsory)

Practical examination will be held at the end of each semester

Pass percentage is 40% and It is necessary to pass in Practical Paper separately

The students are required to calculate the error involved in a particular experiment Minimum ten experiments have to be done

The practical examination will held in 3 hours

Experiment Examination - 50

Distribution of Marks:-

External Examination - 40(Exp + Copy + Viva-Voce)
(25+8+7)

Approved by 19th Academic Council held in 14-09-2017 for implementation from the Academic session 2017-18.

Internal Examination 10 (Seminar Attendance)

Total Marks 40

For giving Marks and lab record each college will maintain practical assessment record by using the following procedure given below

1. Each student has to perform a minimum number of experiment prescribed in the syllabus
2. After the completion of a practical the teacher concerned will check the notebook and conduct the viva-voce of each student to find out how much concepts related to the theoretical and experimental part of the experiment she has understood According to her performance marks will be recorded on then practical notebook These marks will constitute the lab record
3. To compute the final marks for lab record a separate register will be maintained Each student will be assigned a separate page on this register On this page the marks obtained by the student in different practicals will be entered This record will be signed by the concerned teacher
4. One Day scientific tour is compulsory

Textbooks and References:

Worshnop and Flint Advanced Practical Physics
Nelkon M and Ogborn, Advanced Level Practical Physics, Heinemann Education Books Ltd. New Delhi
Srivastava S S and Gupta M K, Experiments in Electronics, Atma Ram & Sons, Delhi
Gupta S L and Kumar V, Practical Physics Pragati Prakashan, M

BHAGAT PHOOL SINGH MAHILA VISHWAVIDYALAYA, KHANPUR KALAN(SONEPAT)

(State University established under legislature act xxxi of 2006)

Course Curriculum & Scheme of Examination
For Physics
B. Sc. II (Non Medical + Computer Science)
2017-18

3rd Semester

	Paper Code	Course Title	Teaching Schedule L	T	P	Internal Assessment	External Assessment	Credit (Hrs)	Total Marks
Paper-I	PHY-201- A	Computer Programming and Thermodynamics	3	0	0	10	40	3	50
Paper-II	PHY-201-B	Wave and Optics -I	3	0	0	10	40	3	50
Paper-III	PHP -201	Practical	0	0	4	10	40	2	50
Total Credits Marks			6	0	4	30	120	8	150

4th Semester

	Paper Code	Course Title	Teaching Schedule L	T	P	Internal Assessment	External Assessment	Credit (Hrs)	Total Marks
Paper-I	PHY- 202-A	Statistical Physics	3	0	0	10	40	3	50
Paper-II	PHY- 202-B	Wave and Optics - II	3	0	0	10	40	3	50
Paper-III	PHP- 202	Practical	0	0	4	10	40	2	50
Total Credits			6	0	4	30	120	8	150

Note:

1. Practical examination will be held at the end of each semester
2. Pass percentage is 40% and It is necessary to pass in theory and Practical Paper separately.
3. One Day scientific tour is compulsory.

Approved by 19th Academic Council held in 14-09-2017 for implementation from the Academic session 2017-18.

BHAGAT PHOOL SINGH MAHILA VISHWAVIDYALAYA, KHANPUR KALAN(SONEPAT)

(State University established under legislature act xxxi of 2006)

Course Curriculum & Scheme of Examination For Physics B. Sc. III (Non Medical + Computer Science) 2017-18

5rd Semester

	Paper Code	Course Title	Teaching Schedule L	T	P	Internal Assessment	External Assessment	Credit (Hrs)	Total Marks
I	PHY-301-A	Quantum and Laser Physics	3	0	0	10	40	3	50
II	PHY-301-B	Nuclear Physics	3	0	0	10	40	3	50
III	PHP-301	Practical	0	0	4	10	40	2	50
Credits			6	0	4	30	120	8	150

6th Semester

	Paper Code	Course Title	Teaching Schedule L	T	P	Internal Assessment	External Assessment	Credit (Hrs)	Total Marks
	PHY-302-A	Solid State and Nano Physics	3	0	0	10	40	3	50
	PHY-302-B	Atomic and Molecular Spectroscopy	3	0	0	10	40	3	50
	PHP-302	Practical	0	0	4	10	40	2	50
dits			6	0	4	30	120	8	150

Note:

1. Practical examination will be held at the end of each semester
2. Pass percentage is 40% and It is necessary to pass in theory and Practical Paper separately.
3. One Day Scientific tour is compulsory.

B. Sc. IInd (Non Medical / Computer Science)
Semester –III
Subject: Physics
Paper I
COMPUTER PROGRAMMING AND THERMODYNAMICS

Course Code: PHY- 201-A **Total Credits: 3**
L-T-P
3-0-0 **Total Marks: 50**
External Marks: 40
Internal Marks: 10
(Sessional/Project +Attendance)

UNIT-1: Computer Programming

Computer organization, Binary representation, Algorithm development, Flow charts and their interpretation. FORTRAN Preliminaries: Integer and floating point arithmetic expressions, built in functions, executable and non-executable statements, input and output statements, Formats, IF, DO and GO TO statements, Dimension arrays, statement function and function subprogram.

UNIT –2: Applications of FORTRAN programming

Algorithm, flow chart and programming for Print out of natural numbers, Range of the set of given numbers, Ascending and descending order, Mean and standard deviation, Least square fitting of curve, Roots of quadratic equation, Product of two matrices, Numerical integration (Trapezoidal rule and Simpson 1/3 rule) .

UNIT-3: Thermodynamics-I

Second law of thermodynamics, its significance, Carnot theorem, Absolute scale of temperature, Absolute Zero, Joule's free expansion, Joule-Thomson effect, Joule-Thomson(Porous plug) experiment, Conclusions and explanation, Analytical treatment of Joule-Thomson effect. Entropy, T-S diagram, Entropy of prefect gas, Nernst heat law (Third law of Thermodynamics), Liquefaction of gases: Oxygen
(Coscade Method), air(Linde's Method), hydrogen(Dewar Method), helium(K Onnes Method).

UNIT-4: Thermodynamics-II

Derivation of Clausius-Clapeyron latent heat equation and their significance, Specific heat of saturated vapours, phase diagram and triple point, Development of Maxwell thermodynamical relations. Thermodynamic function: Internal energy (U), Helmholtz function (F), Enthalpy (H), Gibbs function (G) and relations between them, Derivation of Maxwells thermodynamical relations from thermodynamical functions, Application of Maxwell relations: relation between two specific heats of gas, derivation of Clausius-Clapeyron equation, variations of intrinsic energy with volume for (i) perfect gas, (ii) Van der wall gas, (iii) solids and liquids, derivation of stefan's law, adiabatic compression and expansion of gas and deduction of theory of joule Thomson effect.

Textbooks and References:

1. Ian C and Malcon C, Interactive FORTRAN 77, Affiliated East West Press

Pvt Ltd, New Delhi
2. Rajaraman V, Computer Programming in FORTRAN 77, Prentice-Hall of India Pvt Ltd, New Delhi.
3. Suresh C, Computer Applications in Physics, Narosa ublishing House, New Delhi
4. Roy S K, Thermal Physics and Statistical Mechanics, New Age International Publishers, New Delhi
5. Sharma J K and Sarkar K K, Thermodynamics and Statistical Physics, Himalaya Publishing House, Bambay
6. Stowe Keith, Introduction to Thermodynamics and its Applications, University press (India) Pvt Ltd, Hyderabad
7. Infelta Pierre P. Introductory Thermodynamics Publisher: BrownWalker Press
8. Johnson J. E., Fundamentals of Thermodynamics University of Pittsburgh 2009
9. Jefferson Tester, Michael Modell, Thermodynamics and Its Applications 3rd Edition
10. Thomas Engel, Philip Reid, Thermodynamics, Statistical Thermodynamics, & Kinetics 2nd Edition

Note:-

1. Nine Questions will be set in total.

2. Question number 1 will be compulsory and will be based on the conceptual aspects of entire syllabus. This question may have five parts and the answer should be in brief but not in Yes/ No.

3. For more questions are to be attempted, selecting one question out of two questions set from each unit. Each question may contain two or more parts.

4. All questions will carry equal marks.

5. Pass percentage is 40% and It is necessary to pass in theory and Practical Paper separately

B. Sc. II (Non- Medical /Computer Science)

Semester -III

Paper II

Subject: Physics

WAVE OPTICS I

Course Code: PHY-201-B

L-T-P

3-0-0

External Marks: 40

Internal Marks: 10

(Sessional +Attendance)

Total Credits: 3

Total Marks: 50

Unit-I: Interference I

Interference by Division of Wave front: Young's double slit experiment, Coherence, Conditions of interference, Fresnel's biprism and its applications to determine wavelength of sodium light and thickness of a mica sheet, Lloyd's mirror, Difference between Bi-prism and Llyod mirror fringes, phase change on reflection.

Unit- II: Interference II

Interference by Division of Amplitude: Plane parallel thin film, Production of colours in thin films, Classification of fringes in films, wedge shaped film, Newton's rings. Interferometers: Michelson's interferometer and its applications to (i) Standardization of a meter (ii) determination of wavelength.

Unit- III: Diffraction I

Fresnel's diffraction: Fresnel's assumptions and half-period zones methods, rectilinear propagation of light, zone plate, diffraction at a straight edge, rectangular slit and circular aperture, Diffraction due to a narrow slit and wire.

Unit –IV: Diffraction II

Fraunhoffer diffraction: Single-slit diffraction, Double slit diffraction, N-slit diffraction, plane transmission granting spectrum, dispersive power of grating, limit of resolution, Rayleigh's criterion, resolving power of telescope and a grating. Difference between prism and grating spectra.

Textbooks and References

1. Hecht, Optics, Pearson Education, New Delhi
2. Brooker G, Modern Classical Optics, Ane Books Pvt Ltd, New Delhi
3. Chaudhuri R N, Waves and Oscillations, New Age International Publishers, New Delhi
4. Khandelwal D P, Text Book of Optics and Atomic Physics, Himalaya Publishing House Bombay
5. Subrahmanyam N, Lal B, Avadhanulu M N, A Text Book of Optics, S Chand & Co,New Delhi
6. Barton A w, atext Book on Light, Longmans Green & Co London
7. Longhurst R S, Geometrical and Physical Optics, University Press India Pvt Ltd,

Hyderabad.

Note:-

1. Nine Questions will be set in total.
2. Question number 1 will be compulsory and will be based on the conceptual unit of entire syllabus. This question may have five parts and the answer should be in brief not in Yes/ No.
3. For more questions are to be attempted, selecting one question out of two questions from each unit. Each question may contain two or more parts.
4. All questions will carry equal marks.
5. Pass percentage is 40% and It is necessary to pass in theory and Practical Paper separately

B. Sc. II(Non Medical + Computer Science)
Semester -III

Paper III
Subject: Physics
PRACTICALS

Course Code: PHP – 201 Total Credits: 3
L-T-P
3-0-0 Total Marks: 50
External Marks: 40 (25+8+7)
(Experiment+ copy+ Viva Voice)

Internal Marks: 10(5+5)
(Attendee + Seminar)

Special notes:-

3. Do any eight experiments.
4. The students are required to calculate the error involved in a particular experiment.

Experiments

1. To measure the (a)Area of window (b)Height of an accessible object.
2. Refractive index of a prism material by spectrometer.
3. Dispersive power a prism material by spectrometer.
4. To draw a graph between wave length and minimum deviation for various lines from mercury discharge source.
5. Determination of wavelength of sodium light and the number of lines per centimeter using a diffraction grating.
6. Wavelength by Newton's rings.
7. Comparison of illuminating power by a photometer.
8. Resolving power of a telescope.
9. To print out all natural numbers between given limits usig computer.
10. Find out the root of a Quadratic equation.
11. To find maximum, minimum and range of a given set of numbers using computer.
12. Toevaluate sum of finite series.
13. To find out area of triangle.
14. To find out area of Sphere.
15. To find out area of Cylinder.
16. To find integration of a definite Integral by hapezodial rule.
17. Project Work Compulsory).
18. One day Scientific Tour (Compulsory).

Note:-

1. Practical examination will be held at the end of each semester
2. Pass percentage is 40% and It is necessary to pass in Practical

Paper separately

3.The students are required to calculate the error involved in a

4.particular experiment Minimum ten experiments have to be done

5.The practical examination will held in 3 hours.

6.Experiment Examination : = 50

Distribution of Marks:-

External Examination = 40(Exp. +Copy+ Viva-Voce)
(25+8+ 7)

Internal Examination = 10 (Seminar Attendance)
(5+5)

Total Marks : 50

7. For giving Marks and lab record each college will maintain practical assessment record by using the following procedure given below.
8. Each student has to perform a minimum number of experiment prescribed in the syllabus.
9. After the completion of a practical the teacher concerned will check the notebook and conduct the viva-voice of each student to find out how much concepts related to the theoretical and experimental part of the experiment she has understood. According to her performance marks will be recorded on their practical notebook. These marks will constitute the lab record.
10. To compute the final marks for lab record, a separate register will be maintained. Each student will be assigned a separate page on this register. On this page the marks obtained by the student in different practicals will be entered. This record will be signed by the concerned teacher.
11. One Day scientific tour is compulsory.

Text books and References:

1 Worshnop and Flint, Advanced Practical Physics

2 Nelkon M and Ogborn, Advanced Level Practical Physics, Heinemann Education Bookd Ltd, New Delhi

3 Srivastava S S and Gupta M K, Experiments in Electronics, Atma Ran & Sons, Delhi

4 Gupta S L and Kumar V, Practical Physics, Pragati Prakashan, Meerut.

2675
M-20

B. Sc. II (Non Medical + Computer Science)
Semester -IV
Paper I
Subject: Physics
STATISTICAL PHYSICS

Course Code: PHY-202-A **Total Credits: 3**

L-T-P

3-0-0 **Total Marks: 50**

External Marks: 40

Internal Marks: 10

(Sessional +Attendance)

Course Objectives: To generate the

Unit –I: Statistical Physics I

Microscopic and Macroscopic systems, events-mutually exclusive, dependent and independent. Probability, statistical probability, A- priori Probability and relation between them, probability theorems, some probability considerations, combinations possessing maximum probability, combination possessing minimum probability, Tossing of 2,3 and any number of Coins, Permutations and combinations, distributions of N (for N= 2,3,4) distinguishable and indistinguishable particles in two boxes of equal size, Micro and Macro states, Thermodynamical probability, Constraints and Accessible states, Statistical fluctuations, general distribution of distinguishable particles in compartments of different sizes, Condition of equilibrium between two systems in thermal contact-- β parameter, Entropy and Probability (Boltzman's relation).

Unit –II: Statistical Physics II

Postulates of statistical physics, Phase space, Division of Phase space into cells, three kinds of statistics, basic approach in three statistics. M. B. statistics applied to an ideal gas in equilibrium- energy distribution law (including evaluation of σ and β) , speed distribution law & velocity distribution law. Expression for average speed, r.m.s. speed, average velocity, r. m. s. velocity, most probable energy & mean energy for Maxwellian distribution.

Unit-III: Quantum Statistics

Need for Quantum Statistics: Bose-Einstein energy distribution law, Application of B.E. statistics to Planck's radiation law B.E. gas, Degeneracy and B.E. Condensation, Fermi-Dirac energy distribution law, F.D. gas and Degeneracy, Fermi energy and Fermi temperature, Fermi Dirac energy distribution law, Fermi Dirac gas and degeneracy, Fermi energy and Fermi temperature, Fermi Dirac energy distribution law for electron gas in metals, Zero point energy, Zero point pressure and average speed (at 0 K) of electron gas, Specific heat anomaly of metals and its solution. M.B. distribution as a limiting case of B.E. and F.D. distributions, Comparison of three statistics.

4/3/2020

Unit-IV: Theory of Specific Heat of Solids

Dulong and Petit law. Derivation of Dulong and Petit law from classical physics. Specific heat at low temperature, Einstein theory of specific heat, Criticism of Einstein theory, Debye model of specific heat of solids, success and shortcomings of Debye theory, comparison of Einstein and Debye theories.

Textbooks and References

1. Prakash S and Agarwal J P, Statistical Mechanics, Kedar Nath Ram Nath & co, Meerut
2. Reif F, statistical Physics, Berleley Physics Course Volume 5, Mc Graw Hill Book Co Ltd, New Delhi
3. McQuarrie D A, Statistical Mechanics, Viva Books Pvt Ltd, New Delhi.
4. Ashley Carter (August 1999), Classical and Statistical Thermodynamics
5. Richard Fitzpatrick, Thermodynamics and Statistical Mechanics: An intermediate level course Lulu.com..

Note:-

1. **Nine Questions will be set in total.**
2. **Question number 1 will be compulsory and will be based on the conceptual aspects of entire syllabus. This question may have five parts and the answer should be in brief but not in Yes/ No.**
3. **For more questions are to be attempted, selecting one question out of two questions set from each unit. Each question may contain two or more parts.**
4. **All questions will carry equal marks.**
5. **Pass percentage is 40% and It is necessary to pass in theory and Practical Paper separately**

4/3/2020

2676
M-20

B. Sc. II (Non Medical + Computer Science)
Semester -IV
Paper II
Subject: Physics
WAVE AND OPTICS- II

Course Code: PHY-202-B
L-T-P
3-0-0
External Marks: 40
Internal Marks: 10
(Sessional +Attendance)

Total Credits: 3

Total Marks: 50

Unit-I: Polarization

Polarization: Polarisation by reflection, refraction and scattering, Law of Malus, Phenomenon of double refraction, Huygen's wave theory of double refraction (Normal and oblique incidence), Analysis of polarized Light. Nicol prism, Quarter wave plate and half wave plate, production and detection of (i) Plane polarized light (ii) Circularly polarized light and (iii) Elliptically polarized light. Optical activity, Fresnel's theory of optical rotation, Specific rotation, Polarimeters (half shade and Biquartz).

Unit-II: Fourier analysis

Fourier Theorem and Fourier series, Evaluation of Fourier coefficients, Importance and limitations of Fourier theorem, Fourier series of functions f(x) between limits (i) 0 to 2π (ii) $-\pi$ to $+\pi$ (iii) 0 to π, Application of Fourier Theorem for analysis of complex waves: rectangular and triangular waves, Half and Full wave rectifier outputs.

Unit-III: Fourier transforms

Fourier transforms and its properties, Application of Fourier transform (i) for evaluation of integrals (ii) for solutions of ordinary differential equations (iii) to the following functions following functions:

1 $f(x) = e^{-}$

2 $f(x) = \begin{cases} 1 & |X| < a \\ 0 & |X| > a \end{cases}$

Geometrical Optics I

Matrix methods in paraxial optics, effects of translation and refraction, derivation of thin lens and thick lens formulae, unit plane, nodal planes, system of thin lenses.

Unit IV: Geometrical Optics II

Chromatic, spherical, coma, astigmatism, distortion and aberrations and their remedies.

Fiber Optics

Optical fiber, Critical angle of propagation, Mode of Propagation, Acceptance [illegible] Fractional refractive index change, Numerical aperture, Types of optics fiber, Norma[illegible] frequency, Pulse dispersion, Attenuation, Applications, Fiber optic Commu[illegible] Advantages.

Textbooks and References:

1. Born M and Wolf E, Principles of Optics, Pergaman Press
2. Jenkins and white, Fundamentals of Optics, McGraw Hill Book Co Ltd, New Delhi
3. Moller K D, Optics, University Science Books, Mill ally California
4. Tolansky, An Introduction to Interferometery, John Wiley & Sons, New Delhi
5. Shurcliff, Polarized Light Production and Use, Harward University Press, Cambridge, MA A (USA)
6. Arora C L, Refresher Course in Physics Vol II, S Chand and Co, New Delhi.

Note:-

1. **Nine Questions will be set in total.**
2. **Question number 1 will be compulsory and will be based on the conceptual aspects of entire syllabus. This question may have five parts and the answer should be in brief but not in Yes/ No.**
3. **For more questions are to be attempted, selecting one question out of two questions set from each unit. Each question may contain two or more parts.**
4. **All questions will carry equal marks.**
5. **Pass percentage is 40% and It is necessary to pass in theory and Practical Paper separately**

B. Sc. II(Non Medical + Computer Science)
Semester -IV
Paper III
Subject: Physics
PRACTICALS

Course Code: PHP-202 **Total Credits: 3**
L-T-P
3-0-0 **Total Marks: 50**
External Marks: 40
Internal Marks: 10
(Sessional +Attendance)

Special notes:-
1. Do any ten experiments.
The students are required to calculate the error involved in a particular experiment.

Experiments

1. To find out the Resolving Power of a given Telescope.
2. To Compare the of Illuminating powers of photometer.
3. Measurement of (a) Specific rotation (b) Concentration of sugar solution using polarimeter.
4. Ordinary and extraordinary refractive indices for calcite and quartz.
5. To find out the equivalent focal length of a lens system by nodal slide assembly.
6. To Study of series and parallel resonance circuits.
7. To study Electronic voltmeter measurement of peak, Average and R.M.S. value of signal.
8. To study voltage doubler and trippler circuits.
9. To find integration of a definite integral by Trapezodial rule.
10. Give values of a, b, c and asset of values for the variable x evaluate the function defined by

    F(x)=ax +bx+c if x< d
    F(x)= 0 x=d
    F(x)=ax +bx -c if x>d

11. For each value of X and print the value of X and f(x).
12. Write the program for an arbitrary number of X values.
13. To find out the roots of Quadratic Equation.
14. To Draw common base and emitter characteristics of a transistor and calculate transistor characteristics parameters.
15. To study ripple factor in a D.C. Power supply.
16. To find out the frequency f given tuning fork by Melde's Experiment

5/3/19

12/3/17

17. To draw frequency response curve of R.C coupled amplifier.
18. Project Work Compulsory).
19. One day Scientific Tour (Compulsory).

Note:-

1. Practical examination will be held at the end of each semester
2. Pass percentage is 40% and It is necessary to pass in Practical Paper separately
3. The students are required to calculate the error involved in a
4. particular experiment Minimum ten experiments have to be done
5. The practical examination will held in 3 hours.
6. Experiment Examination : = 50

Distribution of Marks:-

External Examination = 40(Exp. +Copy+ Viva-Voce)
(25+8+ 7)

Internal Examination = 10 (Seminar Attendance)
(5+5)

Total Marks : 50

7. For giving Marks and lab record each college will maintain practical assessment record by using the following procedure given below.
8. Each student has to perform a minimum number of experiment prescribed in the syllabus.
9. After the completion of a practical the teacher concerned will check the notebook and conduct the viva-voice of each student to find out how much concepts related to the theoretical and experimental part of the experiment she has understood. According to her performance marks will be recorded on their practical notebook. These marks will constitute the lab record.
10. To compute the final marks for lab record, a separate register will be maintained. Each student will be assigned a separate page on this register. On this page the marks obtained by the student in different practicals will be entered. This record will be signed by the concerned teacher.
11. One Day scientific tour is compulsory.

5/3/19

Text books References:

1 Worshnop and Flint, Advanced Practical Physics
2 Nelkon M and Ogborn, Advanced Level Practical Physics, Heinemann Education Books Ltd, New Delhi
3 Srivastava S S and Gupta M K, Experiments in Electronics, Atma Ram & Sons, Delhi
4 Gupta S L and Kumar V, Practical Physics, Pragati Prakashan, Meerut.

B.Sc.-III (Non -Medical /Computer Science)
Semester – V
Subject:Physics
Paper I
QUANTUM AND LASER PHYSICS

Course Code: PHY-301A **Total Credits: 3**

L-T-P
3-0-0 **Total Marks: 50**

External Marks: 40
Internal Marks: 10
(Sessional/project +Attendance)

Unit I: Origin quantum physics (Experimental basis)

Overview, scale of quantum physics, boundary between classical and quantum phenomena, Photon, Photoelectric effect, Compton effect (theory and result), Frank-Hertz experiment, de-Broglie hypothesis. Davisson and Germer experiment, G.P. Thomson experiment. Phase velocity, group velocity and their relation. Heisenberg's uncertaintyprinciple. Time energy and angular momentum, position uncertainty. Uncertainty principle from de Broglie wave. (Wave-particle duality). Gamma Ray Microscope,Electron diffraction from a slit. Derivation of 1-D time-dependent Schrodinger wave equation (subject to force, free particle). Time-independent Schrodinger wave equation, eigen values, eigen functions, wave functions and its significance. Orthogonality and Normalization of function, concept of observer and operator. Expectation values ofdynamical quantities, probability current density

Unit II: Application of Schrodinger wave equation:

(i) Free particle in one-dimensional box (solution of Schrodinger wave equation, eigen functions, eigen values, quantization of energy and momentum, nodes and anti nodes, zero point energy).
(ii) One dimensional step potential E > Vo (Reflection and Transmissioncoefficient)
(iii) One dimensional step potential E < Vo (penetration depth calculation).
(iv) One dimensional potential barrier, E > Vo (Reflection and Transmissioncoefficient)
(v) One-dimensional potential barrier, E < Vo (penetration or tunnelingcoefficient).

(vi) Solution of Schrodinger equation for harmonic oscillator (quantization ofenergy, zero point energy, wave equation for ground state and excited states).

Unit III: Laser Physics –I

Absorption and emission of radiation, Main features of a laser: Directionality, highintensity, high degree of coherence, spatial and temporal coherence, Einstein'scoefficients and possibility of amplification, momentum transfer, life time of a level,kinetics of optical absorption (two and three level rate equation, Fuchbauer landerburgformula).population inversion: A necessary condition for light amplification, resonancecavity, laser pumping, Threshold condition for laser emission, line broadeningmechanism, homogeneous and inhomogeneous line broadening (natural, collision and
Doppler broadening).

Unit IV: Laser Physics – II

He-Ne laser and RUBY laser (Principle, Construction and working), Optical properties of semiconductor, Semiconductor laser (Principle, Construction and working),Applications of lasers in the field of medicine and industry.

Textbooks & References:

1 L I Schiff, Quantum Mechanics
2 Bransden B H and Joachain C J, Quantum Mechanics (2000), Pearson Education, New Delhi
3 Liboff R L, Introductory Quantum Mechanics
4 Eisberg R M and Resnick R, Quantum Physics of Atoms Molecules, Solids, Nuclei and Particles, Wiley Eastern Ltd, New Delhi
5 Verdeyen J T, Laser Electronics PHI, New Delhi
6 Thorenton S T and Rex A, Modern Physics, (2007) Cengage Learning, New Delhi
7 Taylor J R, Zafiratos C D and Dubson M A, Modern Physics, 2nd Ed (2004), PHI, NewDelhi
8 Laud B B, Laser Physics

Note:-

1. Nine Questions will be set in total.
2. Question number 1 will be compulsory and will be based on the conceptual aspects of entire syllabus. This question may have five parts and the answer should be in brief but not in Yes/ No.
3. For more questions are to be attempted, selecting one question out of two questions set from each unit. Each question may contain two or more parts.
4. All questions will carry equal marks.

5. Pass percentage is 40% and It is necessary to pass in theory and Practical separatel

B.Sc.-III (Non Medical /Computer Science)
Semester – VI
Subject:Physics
Paper I
SOLID STATE AND NANO PHYSICS

Course Code: PHY-302 -A Total Credits: 3

L-T-P

3-0-0 Total Marks: 50

External Marks: 40

Internal Marks: 10

(Sessional /Project +Attendance)

Unit I: Crystal Structure I

Crystalline and glassy forms, liquid crystals, crystal structure, periodicity, lattice andbasis, crystal translational vectors and axes. Unit cell and Primitive Cell, Winger Seitzprimitive Cell, symmetry operations for a two dimensional crystal, Bravais lattices in twoand three dimensions. Crystal planes and Miller indices, Interplaner spacing, Crystalstructures of Zinc Sulphide, Sodium Chloride and Diamond.

Unit II: Crystal Structure II

X-ray diffraction, Bragg's Law and experimental X-ray diffraction methods. K-space and reciprocal lattice and its physical significance, reciprocal lattice vectors, reciprocal latticeto a simple cubic lattice, b.c.c. and f.c.c.

Unit III: Super conductivity

Historical introduction, Survey of superconductivity, Super conducting systems, High TeSuper conductors, Isotopic Effect, Critical Magnetic Field, Meissner Effect, London Theory and Pippards' equation, Classification of Superconductors (type I and Type II),BCS Theory of Superconductivity, Flux quantization, Josephson Effect (AC and DC), Practical Applications of superconductivity and their limitations, power application of superconductors.

Unit IV: Introduction to Nano Physics

Definition, Length scale, Importance of Nano-scale and technology, History of Nantechnology,Benefits and challenges in molecular manufacturing, Molecular assemblerconcept, Understanding advanced capabilities. Vision and objective of Nano-technology,Nanotechnology in different field, Automobile, Electronics, Nano-biotechnology,Materials, Medicine.

Textbooks & References:

1. C. Kittel, *Introduction to Solid State Physics*, 7th Ed (1996) John Wiley & Sons,

NewDelhi.
2. H. Ibach and H. Lüth, *Solid State Physics, An Introduction to Theory and*
3. Springer-Verlag, Berlin, 1991
4. Pillai O S, *Solid State Physics*, New Age International Publishers (2007)

5. Mark R and Denial R, *Nano-tecnology* – A Gentle Introduction to the Next B Idea(2002)
6. M. Tinkham, *Introduction to Superconductivity*, McGraw-Hill, New York, 1975
7. Dekkar A J, Solid State Physics (2000), Mc Millan India Ltd New Delhi
8. Ascroft N W and Mermin N D, Solid State Physics (2003) Harcourt Asia, Singapore
9. Keer H V, Solid State Physics (1993), Wiley Eastern Ltd, New Delhi
10. Kachhava C M, Solid State Physics (1990) Tata Mc Graw Hill Co Ltd, New Delhi
11. Gupta, Solid State Physics (1995) Vikas Publishing House Pvt Ltd, New Delhi

Note:-

1. **Nine Questions will be set in total.**
2. **Question number 1 will be compulsory and will be based on the conceptual aspects of entire syllabus. This question may have five parts and the answer should be in brief but not in Yes/ No.**
3. **For more questions are to be attempted, selecting one question out of two**
4. **Questions set from each unit. Each question may contain two or more parts. All questions will carry equal marks.**
5. **Pass percentage is 40% and It is necessary to pass in theory and Practical Paper separately.**

4/3/2020

Verified 12/8/17

13/11/19

B.Sc.-III (Non Medical /Computer Science)
Semester – V
Subject:Physics
Paper II
NUCLEAR PHYSICS

Course Code: PHY-301 -B **Total Credits: 3**

L-T-P

3-0-0 **Total Marks: 50**

External Marks: 40

Internal Marks: 10

(Sessional +Attendance)

Unit I: Nuclear Structure and Properties of Nuclei

Nuclear composition (p-e and p-n hypotheses), Nuclear properties; Nuclear size, spin, parity, statistics, magnetic dipole moment, quadruple moment (shape concept). Determination of mass by Bain-Bridge, Bain-Bridge and Jordan mass spectrograph. Determination of charge by Mosley Law. Determination of size of nuclei by Rutherford Back Scattering. mass and binding energy, systematic of nuclear binding energy, nuclear Stability

Unit II: Nuclear Radiation decay Processes

Alpha-disintegration and its theory. Energetics of alpha-decay, Origin of continuous beta spectrum (neutrino hypothesis), types of beta-decay and energetics of beta-decay. Nature of gamma rays, Energetics of gamma rays.

Radiation interaction

Interaction of heavy charged particles (Alpha particles); Energy loss of heavy charged particle (idea of Bethe formula, no derivation), Range and straggling of alpha particles. Geiger-Nuttal law. Interaction of light charged particle (Beta-particle), Energy loss of beta-particles (ionization), Range of electrons, absorption of beta-particles. Interaction of Gamma Ray; Passage of Gamma radiations through matter (Photoelectric, Compton and pair production effect) electron-positron annihilation. Absorption of Gamma rays (Mass attenuation coefficient) and its application.

Unit III: Nuclear Accelerators

Linear accelerator, Tendem accelerator, Cyclotron and Betatron accelerators.

Nuclear Radiation Detectors.

Gas filled counters; Ionization chamber, proportional counter, G.M. Counter (detailed study), Scintillation counter and semiconductor detector.

4 78 - (2) 12 20 1-21

Unit IV:

Nuclear reactions.

Nuclear reactions, Elastic scattering, Inelastic scattering, Nuclear disintegration, Photonuclear reaction, Radiative capture, Direct reaction, Heavy ion reactions and spallation Reactions. Conservation laws, Q-value and reaction threshold.

Nuclear Reactors.

Nuclear Reactors, General aspects of Reactor Design. Nuclear fission and fusion reactors, (Principle, construction, working and use).

References:

1 Kaplan I, Nuclear Physics, 2nd Ed (1962), Oxford and IBH, New Delhi
2 Sriram K, Nuclear Measurement Techniques, (1986), AEWP, New Delhi
3 Tayal D C, Nuclear Physics (1994), HPH, Bombay
4 Ghoshal S N, Atomic and Nuclear Physics Vol II (1994), S Chand & Co New Delhi
5 Srivastava B N, Basic Nuclear Physics, (1993), Pragati Prakashan Meerut
6 Halliday, Introductory Nuclear Physics, Asia Publishing House, New Delhi
7 Sood D D, Ready A V R and Ramamoorthy, Fundamentals of Radiochemistry, IANCAS (2007), BARC, Bombay
8 Cohen B L, Comcepts of Nuclear Physics (1998), Tata Mc Graw Hill, New Delhi
9 Krane K S, Introductory Nuclear Physics (1988), John Wiley & Sons New Delhi
10 Patel S B, Nuclear Physics (1992), Wiley Eastern Ltd, New Delhi
11 Roy R R and Nigam B P, Nuclear Physics (1993), Wiley Eastern Ltd New Delhi.

Note:-

1. Nine Questions will be set in total.
2. Question number 1 will be compulsory and will be based on the conceptual aspects of entire syllabus. This question may have five parts and the answer should be in brief but not in Yes/ No.
3. For more questions are to be attempted, selecting one question out of two
4. Questions set from each unit. Each question may contain two or more parts. All questions will carry equal marks.
5. Pass percentage is 40% and It is necessary to pass in theory and Practical Paper separately.

2680
M-20

B.Sc.-III (Non Medical /Computer Science)
Semester – VI
Paper II
Subject:Physics
ATOMIC AND MOLECULAR SPECTROSCOPY

Course Code: PHY-302-B
L-T-P
3-0-0
External Marks: 40
Internal Marks: 10
(Sessional +Attendance)

Total Credits: 3

Total Marks: 50

Unit – I: Historical background of atomic spectroscopy

Introduction of early observations, emission and absorption spectra, atomic spectra, wave number, spectrum of Hydrogen atom in Balmer series, Bohr atomic model(Bohr's postulates) , spectra of Hydrogen atom , explanation of spectral series in Hydrogen atom, un-quantized states and continuous spectra, spectral series in absorption spectra, effect of nuclear motion on line spectra (correction of finite nuclear mass), variation in Rydberg constant due to finite mass, short comings of Bohr's theory, Wilson sommerfeld quantization rule, de-Broglie interpretation of Bohr quantization law, Bohr's corresponding principle, Sommerfeld's extension of Bohr's model, Sommerfeld relativistic correction, Short comings of Bohr-Sommerfeld theory, Vector atom model: space quantization, electron spin, coupling of orbital and spin angular momentum, spectroscopic terms and their notation, quantum numbers associated with vector atom model, transition probability and selection rules.

Unit –II: Vector Atom Model (single valance electron)

Orbital magnetic dipole moment (Bohr megnaton), behavior of magnetic dipole in external magnetic filed: Larmors' precession and theorem
Penetrating and Non-penetrating orbits, Penetrating orbits on the classical model Quantum defect, spin orbit interaction energy of the single valance electron, spin orbit interaction for penetrating and non-penetrating orbits, quantum mechanical relativity correction, Hydrogen fine spectra, Main features of Alkali Spectra and their theoretical interpretation, term series and limits, Rydeburg-Ritze combination principle, Absorption spectra of Alkali atoms, observed doublet fine structure in the spectra of alkali metals and its interpretation, Intensity rules for doublet, comparison of Alkali spectra and Hydrogen spectrum.

UNIT-III: Vector Atom model (two valance electrons)

Essential features of spectra of Alkaline-earth elements. Vector model for two valance electron atom. application of spectra.

Coupling Schemes:L S or Russell Saunders Coupling Scheme and JJ coupling scheme. Interaction energy in L -S coupling (sp, pd configuration). Lande interval rule. Pauli principal and periodic classification of the elements. Interaction energy in JJ Coupling (sp, pd configuration). equivalent and non-equivalent electrons. Two valance electron system-spectral terms of non-equivalent and equivalent electrons. comparison of spectral terms in L -S And J-J coupling. Hyperfine structure of spectral lines and its origin; isotope effect, nuclear spin

Unit –IV: Atom in External Field

Zeeman Effect (normal and Anomalous).Experimental set-up for studying Zeeman effect Explanation of normal Zeeman effect(classical and quantum mechanical). Explanation of anomalous Zeeman effect(Lande g-factor). Zeeman pattern of D1 and D2 lines of Naaton. Paschen-Back effect of a single valence electron system. Weak field Stark effect of Hydrogen atom

Molecular Physics

General Considerations. Electronic States of Diatomic Molecules. Rotational Spectra (Far IR and Microwave Region). Vibrational Spectra (IR Region). Rotator Model of Diatomic Molecule. Raman Effect. Electronic Spectra.

Text Books & References

1 Berser A. Concept of Modern Physics (1987). Mc Graw Hill Co Ltd. New Delhi

2 Rajab J B. Atomic Physics (2007). S Chand & Co. New Delhi

3 Hawkes I H and Yarwood J Atomic Physics Vol II (1991) Oxford University Press

4 Brainsden B H and Joachain C J. Physics of Atoms and Molecules 2nd Ed (2009). Pearson Education New Delhi

5 Banwell Molecular Spectroscopy

6 Ghoshal S N Atomic and Nuclear Physics Vol I (1996) S Chand & Co. New Delhi

7 Gopalkrishnan K. Atomic and Nuclear Physics (1982). Mc Millan India New Delhi

8 Raj Kumar. Atomic and Molecular Spectra Laser . Kedarnath Ram nathpub

9 S L Gupta V Kumar R C Sharma. Elements of Spectroscopy.Pragati Prakashan

Note:

1. Nine Questions will be set in total.
2. Question number 1 will be compulsory and will be based on the conceptual aspects of entire syllabus. This question may have five parts and the answer should be in brief but not in Yes/ No.
3. Four more questions are to be attempted, selecting one question out of two
4. Questions set from each unit. Each question may contain two or more parts. All questions will carry equal marks
5. Pass percentage is 40% and It is necessary to pass in theory and Practical

4/3/2017

Paper separately

Salient Features of Syllabi in Physics

As far as possible to promote: ---

1) Physics Education Through Master Texts :--

It helps in understanding the theoretical and mathematical development of the subject and to create interest in the subject. So we are going to adopt the Master Texts, wherever possible, As our text books.

2) Physics Education Through Experimentation :---

It helps in general to improve scientific attitude. So emphasis is given on the development of experimental skills, data analysis, calculations, and also on the limitations of the experimental method and data and, results obtained.

3) Physics Education Through Problem Solving:---

It helps in understanding the concepts of physics. It under line the strength of equations, formula, graphs, mathematical tools to tackle the problems. So accordingly, we have introduced compulsory problem part in the question paper.

4) Physics Education Through Awareness of Misconceptions :----

It improves the scientific awareness among the students. A discussion on Paradox etc. is encouraged.

5) Physics Education Through Proto-research:

It creates interest in the subject and improves technological aspect. Accordingly, mini projects, hands-on activities, projects, models and demonstrations etc. is included in the syllabi.

6) Physics Education through Qualitative Overview:----

It creates interest in the subject to continue to work in the field of science in general and physics in particular. Accordingly future directions and frontiers of the subject are included in the syllabi.

B. Sc. III(Non Medical + Computer Science)
Semester -V
Paper III
Subject: Physics
PRACTICALS

Course Code: PHP-301
L-T-P
3-0-0
External Marks: 40 (25+8+7)
(Experiment+copy+ Viva Voice)

Total Credits: 3

Total Marks: 50

Internal Marks: 10(5+5)
(Attendee + Seminar)

Special notes:-
1. Do any eight experiments.
The students are required to calculate the error involved in a particular experiment

Experiments

Section-A

1.Determine the λ_{Na} by Fresnel Byprism .
2. Determine the velocity of ultrasonic in the Kerosene oil.
3. Study double slit interference by He-Ne laser.
4. Determine the diameter of a wire using (He-Ne Laser) diffraction method.
5. Determine e/m by Thomson's method.
6. Study the B H curve using oscilloscope.
7. Measurement of energy band gap of Ge/Si by four probe method.

Section –B

1.Compute the product of two matrices of different dimension using DO Loop.
2.Numerical integration by Simpson 1/3 rule.
3.Fitting of a straight line using Least-Square method..
4. Using array variable, find out the average and standard deviation.

Note:-

1.Practical examination will be held at the end of each semester
2.Pass percentage is 40% and It is necessary to pass in Practical Paper separately
3.The students are required to calculate the error involved in a
4.particular experiment Minimum ten experiments have to be done
5.The practical examination will held in 3 hours.

6.Experiment Examination : = 50

Distribution of Marks:-

External Examination = 40(Exp. +Copy+ Viva-Voce)
(25+8+ 7)

Internal Examination = 10 (Seminar Attendance)
(5+5)

Total Marks : 50

7. For giving Marks and lab record each college will maintain practical assessment record by using the following procedure given below.
8. Each student has to perform a minimum number of experiment prescribed in the syllabus.
9. After the completion of a practical the teacher concerned will check the notebook and conduct the viva-voice of each student to find out how much concepts related to the theoretical and experimental part of the experiment she has understood. According to her performance marks will be recorded on their practical notebook. These marks will constitute the lab record.
10. To compute the final marks for lab record, a separate register will be maintained. Each student will be assigned a separate page on this register. On this page the marks obtained by the student in different practicals will be entered. This record will be signed by the concerned teacher.
11. One Day scientific tour is compulsory.

Text books References:

1 Worshnop and Flint, Advanced Practical Physics
2 Nelkon M and Ogborn, Advanced Level Practical Physics, Heinemann Education Books Ltd, New Delhi
3 Srivastava S S and Gupta M K, Experiments in Electronics, Atma Ran & Sons, Delhi
4 Gupta S L and Kumar V, Practical Physics, Pragati Prakashan, Meerut.

B. Sc. III(Non -Medical + Computer Science)
Semester -VI
Paper III
Subject: Physics
PRACTICALS

Course Code: PHP-302 **Total Credits: 3**

L-T-P

3-0-0 **Total Marks: 50**

External Marks: 40 (25+8+7)

(Experiment+copy+ Viva Voice)

Internal Marks: 10(5+5)

(Attendee + Seminar)

Special notes:-

1. Do any Eight experiments.

The students are required to calculate the error involved in a particular experiment

Experiments

Section -A

1.Thickness of a paper using interference fringes in an air wedge.

2. Determine the resolving power of a prism.

3.Determine the resolving power of a transmission grating.

4.. Determine the R_H by grating and Hydrogen tube.

5. Study the C B transistor amplifier.

6. Study the C B transistor amplifier.

7.(a) Draw the plateau using G M counter.

(b) Determine the mass attenuation coefficient by G M counter.

8. Determine the R_H by grating and Hydrogen tube

9. Study the Hall effect.

Section -B Study Hartley oscillator.

1.Compute the sum of a finite series up to correct three decimal place

2. With the help of a program arrange the marks in ascending of descending Order

3.Write a program to evaluate the function $Y = 1 / | C (1 + e \cos \theta) |$

and $V = \sqrt{| C M G (e2 + e \cos \theta + 1) |}$ e = 1.1, C = 3.0(E+08),

M = 5.893(E+24), G = 6.67(E-11) for varying value of θ from 0 to π.

Note:-

1.Practical examination will be held at the end of each semester

2.Pass percentage is 40% and It is necessary to pass in Practical

Paper separately

3.The students are required to calculate the error involved in a

4.particular experiment Minimum ten experiments have to be done

5.The practical examination will held in 3 hours.

6.Experiment Examination : = 50

Distribution of Marks:-

External Examination = 40(Exp. +Copy+ Viva-Voce)
(25+8+ 7)

Internal Examination = 10 (Seminar Attendance)
(5+5)

Total Marks : 50

7. For giving Marks and lab record each college will maintain practical assessment record by using the following procedure given below.
8. Each student has to perform a minimum number of experiment prescribed in the syllabus.
9. After the completion of a practical the teacher concerned will check the notebook and conduct the viva-voice of each student to find out how much concepts related to the theoretical and experimental part of the experiment she has understood. According to her performance marks will be recorded on their practical notebook. These marks will constitute the lab record.
10. To compute the final marks for lab record, a separate register will be maintained. Each student will be assigned a separate page on this register. On this page the marks obtained by the student in different practicals will be entered. This record will be signed by the concerned teacher.
11. One Day scientific tour is compulsory.

Text books References:

1 Worshnop and Flint, Advanced Practical Physics
2 Nelkon M and Ogborn, Advanced Level Practical Physics, Heinemann Education Books Ltd, New Delhi
3 Srivastava S S and Gupta M K, Experiments in Electronics, Atma Ram & Sons, Delhi
4 Gupta S L and Kumar V, Practical Physics, Pragati Prakashan, Meerut.

(28)

Scheme of Examination of B.A./B.Sc. I in the subject of Mathematics (w.e.f. 2017-2018)

Semester 1st

Paper Code	Title of Paper	Allocation of Periods	Maximum Marks						Credits
			External Marks		Internal Marks		Total		
			B.A.	B.Sc.	B.A.	B.Sc.	B.A.	B.Sc.	
MAT 101 A	Algebra	6 periods/ 4 ½ hours per week	27	40	7	10	100	150	4 ½
MAT 101 B	Calculus	6 periods/ 4 ½ hours per week	27	40	7	10			4 ½
MAT 101 C	Solid Geometry	6 periods/ 4 ½ hours per week	26	40	6	10			4 ½

2250/D-18 393/D-19

1165/D-2010.19

B.A./B.Sc. 1st Year (1st Semester) Algebra (MAT 101A)

Max. Marks: B.A. -27
B.Sc.-40
Time: 3 Hours

Note: The question paper will consist of five sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5.5 and 8.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt one question from each section. **Section-V** will contain four short answer type questions (carrying total 5 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be compulsory.

Section – I

Symmetric, Skew symmetric, Hermitian and skew Hermitian matrices. Elementary Operations on matrices. Rank of a matrices. Inverse of a matrix. Linear dependence and independence of rows and columns of matrices. Row rank and column rank of a matrix. Eigenvalues, eigenvectors and the characteristic equation of a matrix. Minimal polynomial of a matrix. Cayley Hamilton theorem and its use in finding the inverse of a matrix.

01/03/2019

Section – II

Applications of matrices to a system of linear (both homogeneous and non–homogeneous) equations. Theorems on consistency of a system of linear equations. Unitary and Orthogonal Matrices.

Section – III

Relations between the roots and coefficients of general polynomial equation in one variable. Solutions of polynomial equations having conditions on roots. Common roots and multiple roots. Transformation of equations.

Section – IV

Nature of the roots of an equation Descarte's rule of signs. Solutions of cubic equations (Cardon's method). Biquadratic equations and their solutions.

Books Recommended :

1. H.S. Hall and S.R. Knight : Higher Algebra, H.M. Publications 1994.

2. Shanti Narayan : A Text Books of Matrices.

3. Chandrika Prasad: Text Book on Algebra and Theory of equations, Pothishala Private Ltd., Allahabad.

4. Khurosh: Higher Algebra (Mir Publication).

01/03/2019

394 1166/1896
D-18 D-19 D-20 D-20

B.A./B.Sc. 1st Year (1st Semester)
Calculus (MAT 101B)

Max. Marks: B.A.-27 394
B.Sc.-40 394A
Time: 3 Hours

Note: The question paper will consist of five sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5.5 and 8.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt one question from each section. Section-V will contain four short answer type questions (carrying total 5 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be compulsory.

Section – I

Definition of the limit of a function. Basic properties of limits, Continuous functions and classification of discontinuities. Differentiability. Successive differentiation. Leibnitz theorem. Maclaurin and Taylor series expansions.

Section – II

Asymptotes in Cartesian coordinates, intersection of curve and its asymptotes, asymptotes in polar coordinates. Curvature, radius of curvature for Cartesian curves, parametric curves, polar curves. Newton's method. Radius of curvature for pedal curves. Tangential Polar equations. Centre of curvature. Circle of curvature. Chord of curvature, evolutes. Tests for concavity and convexity. Points of inflexion. Multiple points. Cusps, nodes & conjugate points. Type of cusps.

Section – III

Tracing of curves in Cartesian, parametric and polar co-ordinates. Reduction formulae. Rectification, intrinsic equations of curve.

Section – IV

Quardrature (area) Sectorial area. Area bounded by closed curves. Volumes and surfaces of solids of revolution. Theorem of Pappu's and Guilden.

Books Recommended :

1. Shanti Narayan: Differential and Integral Calculus.
2. Murray R. Spiegel: Theory and Problems of Advanced Calculus. Schaum's Outline series, Schaum Publishing Co., New York.
3. N. Piskunov : Differential and integral Calculus. Peace Publishers, Moscow.
4. Gorakh Prasad : Differential Calculus. Pothishasla Pvt. Ltd., Allahabad.
5. Gorakh Prasad : Integral Calculus. Pothishala Pvt. Ltd., Allahabad.

01/03/2019

3852 C-18 395 D-19 1167 1997 D-20 D-20

B.A./B.Sc. 1st Year (1st Semester)
Solid Geometry (MAT 101C)

Max. Marks: B.A.-26 395
B.Sc.-40 3957
Time: 3 Hours

Note: The question paper will consist of five sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5 and 8.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt one question from each section. Section-V will contain four short answer type questions (carrying total 6 marks) without any internal choice covering the entire syllabus and shall be compulsory.

Section – I

General equation of second degree. Tracing of conics. Tangent at any point to the conic, chord of contact, pole of line to the conic, director circle of conic. System of conics. Confocal conics. Polar equation of a conic, tangent and normal to the conic.

Section – II

Sphere: Plane section of a sphere. Sphere through a given circle. Intersection of two spheres, Radical plane of two spheres. Co-axal system of spheres.

Section – III

Cones: Right circular cone, enveloping cone and reciprocal cone.
Cylinder: Right circular cylinder and enveloping cylinder.

Section – IV

Central Conicoids: Equation of tangent plane. Director sphere. Normal to the conicoids. Polar plane of a point. Enveloping cone of a coincoid. Enveloping cylinder of a coincoid.
Paraboloids: Circular section, Plane sections of conicoids.
Reduction of second degree.

Books Recommended:

1. R.J.T. Bill: Elementary Treatise on Coordinary Geometry of three Dimensions, MacMillan India Ltd. 1994
2. P.K. Jain and Khalil Ahmad: A Textbook of Analytical Geometry of Three Dimensions, Wiley Eastern Ltd. 1999.
3. Shanti Narayan: Solid Geometry, S. Chand and Company.

01/03

YX

Scheme of Examination of B.A./B.Sc. in the subject of Mathematics (w.e.f. 2017-2018)

Semester 2nd

Paper Code	Title of Paper	Allocation of Periods	Maximum Marks						Credits
			External Marks		Internal Marks		Total		
			B.A.	B.Sc.	B.A.	B.Sc.	B.A.	B.Sc.	
MAT 102 A	Number Theory and Trigonometry	6 periods/ 4 ½ hours per week	27	40	7	10	100	150	4 ½
MAT 102 B	Ordinary Differential Equations	6 periods/ 4 ½ hours per week	27	40	7	10			4 ½
MAT 102 C	Vector Calculus	6 periods/ 4 ½ hours per week	26	40	6	10			4 ½

01/03/2019

B.A./B.Sc. 1st Year (2nd Semester)
Number Theory and Trigonometry (MAT 102A)

(for B.A.) 4225 M-20

Max. Marks: B.A.-27
B.Sc.-40
Time: 3 Hours

Note: The question paper will consist of **five** sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5.5 and 8.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 5 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Divisibility, G.C.D.(greatest common divisors), L.C.M.(least common multiple) Primes, Fundamental Theorem of Arithemetic. Linear Congruences, Fermat's theorem. Wilson's theorem and its converse. Linear Diophanatine equations in two variables.

Section – II

Complete residue system and reduced residue system modulo m. Euler's ϕ function Euler's generalization of Fermat's theorem. Chinese Remainder Theorem. Quadratic residues. Legendre symbols. Lemma of Gauss; Gauss reciprocity law. Greatest integer function [x]. The number of divisors and the sum of divisors of a natural number n (The functions d(n) and σ (n)). Moebius function and Moebius inversion formula.

Section - III

De Moivre's Theorem and its Applications. Expansion of trigonometrical functions. Direct circular and hyperbolic functions and their properties.

Section – IV

Inverse circular and hyperbolic functions and their properties. Logarithm of a complex quantity. Gregory's series. Summation of Trigonometry series.

Books Recommended :

1. S.L. Loney : Plane Trigonometry Part – II, Macmillan and Company, London.
2. R.S. Verma and K.S. Sukla : Text Book on Trigonometry, Pothishala Pvt. Ltd. Allahabad.
3. Ivan Niven and H.S. Zuckerman. An Introduction to the Theory of Numbers.
4. G.F. Andrew : Number Theory.
5. D.M. Burton: Elementary Number Theory.

01/03/2019

04/03/2020

B.A./B.Sc. 1st Year (2nd Semester)
Ordinary Differential Equations (MAT 102B)

(for B.A) 4226

Max. Marks: B.A-27
B.Sc.-40
Time: 3 Hours

Note: The question paper will consist of five sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5.5 and 8.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 5 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Geometrical meaning of a differential equation. Exact differential equations, integrating factors. First order higher degree equations solvable for x,y,p. Lagrange's equations, Clairaut's equations. Equation reducible to Clairaut's form. Singular solutions.

Section – II

Orthogonal trajectories: in Cartesian coordinates and polar coordinates. Self orthogonal family of curves. Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations. Equations reducible to homogeneous. Linear ordinary differential equations.

Section – III

Linear differential equations of second order: Reduction to normal form. Transformation of the equation by changing the dependent variable/ the independent variable. Solution by operators of non-homogeneous linear differential equations. Reduction of order of a differential equation. Method of variations of parameters. Method of undetermined coefficients.

Section – IV

Ordinary simultaneous differential equations. Solution of simultaneous differential equations involving operators x (d/dx) or t (d/dt) etc. Simultaneous equation of the form $dx/P = dy/Q = dz/R$. Total differential equations. Condition for $Pdx + Qdy + Rdz = 0$ to be exact. General method of solving $Pdx + Qdy + Rdz = 0$ by taking one variable constant. Method of auxiliary equations.

Books Recommended :

1. D.A. Murray: Introductory Course in Differential Equations. Orient Longaman (India), 1967.
2. A. R. Forsyth : A Treatise on Differential Equations, Machmillan and Co. Ltd. London
3. E.A. Codington: Introduction to Differential Equations.
4. S.L.Ross: Differential Equations, John Wiley & Sons.
5. B.Rai & D.P. Chaudhary: Ordinary Differential Equations; Narosa Publishing House Pvt. Ltd.

04/03/2020

01/03/19

B.A./B.Sc. 1st Year (2nd Semester)
Vector Calculus (MAT 102C)

Max. Marks: B.A.-26
B.Sc.-40
Time: 3 Hours

Note: The question paper will consist of **five** sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5 and 8.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 6 marks) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Scalar and vector product of three vectors, product of four vectors. Reciprocal vectors. Vector differentiation. Scalar Valued point functions, vector valued point functions, derivative along a curve, directional derivatives.

Section – II

Gradient of a scalar point function, geometrical interpretation of grad Φ, character of gradient as a point function. Divergence and curl of vector point function, characters of Div. $\vec{f}$ and Curl $\vec{f}$ as point function, examples. Gradient, divergence and curl of sums and product and their related vector identities. Laplacian operator.

Section – III

Orthogonal curvilinear coordinates Conditions for orthogonality fundamental triad of mutually orthogonal unit vectors. Gradient, Divergence, Curl and Laplacian operators in terms of orthogonal curvilinear coordinates, Cylindrical co-ordinates and Spherical co-ordinates.

Section – IV

Vector integration; Line integral, Surface integral, Volume integral. Theorems of Gauss, Green & Stokes and problems based on these theorems.

Books Recommended:

1. Murrary R. Spiegal : Theory and Problems of Advanced Calculus, Schaum Publishing Company, New York.
2. Murrary R. Spiegal : Vector Analysis, Schaum Publisghing Company, New York.
3. N. Saran and S.N. Nigam. Introduction to Vector Analysis, Pothishala Pvt. Ltd., Allahabad.
4. Shanti Narayna : A Text Book of Vector Calculus. S. Chand & Co., New Delhi.

04/03/2020

01/03/2019

Scheme of Examination of B.A./B.Sc. in the subject of Mathematics (w.e.f. 2015-2016)

Semester 3rd

Paper Code	Title of Paper	Allocation of Periods	Maximum Marks						Credits
			External Marks		Internal Marks		Total Marks		
			B.A.	B.Sc.	B.A.	B.Sc.	B.A.	B.Sc.	
MAT 201 A	Advanced Calculus	6 periods/ 4½ hours per week	24	36	6	9	100	150	4½
MAT 201 B	Partial Differential Equations	6 periods/ 4½ hours per week	24	36	6	9			4½
MAT 201 C	Programming in C and Numerical Methods	6 periods/ 4½ hours per week	24	36	6	9			4½
MAP 201	Programming in C & Numerical Methods	2 hours per week per group	8	12	2	3			1

9/03/19

Semester 4th

Paper Code	Title of Paper	Allocation of Periods	Maximum Marks						Credits
			External Marks		Internal Marks		Total Marks		
			B.A.	B.Sc.	B.A.	B.Sc.	B.A.	B.Sc.	
MAT 202 A	Sequences and Series	6 periods/ 4½ hours per week	24	36	6	9	100	150	4½
MAT 202 B	Special Functions and Integral Transforms	6 periods/ 4½ hours per week	24	36	6	9			4½
MAT 202 C	Numerical Analysis	6 periods/ 4½ hours per week	24	36	6	9			4½
MAP 202	Methods of Numerical Analysis with C Language	2 hours per week per group	8	12	2	3			1

01/03/19

04/03/2020

Semester 5th

Paper Code	Title of Paper	Allocation of Periods	Maximum Marks						Credits
			External Marks		Internal Marks		Total Marks		
			B.A.	B.Sc.	B.A.	B.Sc.	B.A.	B.Sc.	
MAT 301 A	Real Analysis	6 periods/ 4 ½ hours per week	27	40	7	10	100	150	4 ½
MAT 301 B	Groups and Rings	6 periods/ 4 ½ hours per week	27	40	7	10			4 ½
MAT 301 C	Statics	6 periods/ 4 ½ hours per week	26	40	6	10			4 ½

Semester 6th

Paper Code	Title of Paper	Allocation of Periods	Maximum Marks						Credits
			External Marks		Internal Marks		Total Marks		
			B.A.	B.Sc.	B.A.	B.Sc.	B.A.	B.Sc.	
MAT 302 A	Real and Complex Analysis	6 periods/ 4 ½ hours per week	27	40	7	10	100	150	4 ½
MAT 302 B	Linear Algebra	6 periods/ 4 ½ hours per week	27	40	7	10			4 ½
MAT 302 C	Dynamics	6 periods/ 4 ½ hours per week	26	40	6	10			4 ½

Note:-(i) The other conditions will remain the same as per relevant ordinance and rules and regulations of the University.

(ii) Each Practical group will be of 20 students.

04/03/2020

01/03/2019

-12 3299 D-18

1898 D-30

433 D-19

1168 D-20 / D-21

B.A./B.Sc. 2nd Year (3rd Semester)
Advanced Calculus (MAT 201A)

Max. Marks: B.A.-24
B.Sc.-36
Time: 3 Hours

Note: The question paper will consist of **five** sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5 and 7.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 4 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Continuity, Sequential Continuity, properties of continuous functions, Uniform continuity, chain rule of differentiability. Mean value theorems; Rolle's Theorem and Lagrange's mean value theorem and their geometrical interpretations. Taylor's Theorem with various forms of remainders, Darboux intermediate value theorem for derivatives, Indeterminate forms.

Section – II

Limit and continuity of real valued functions of two variables. Partial differentiation. Total Differentials; Composite functions & implicit functions. Change of variables. Homogenous functions & Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables.

Section – III

Differentiability of real valued functions of two variables. Schwarz and Young's theorem. Implicit function theorem. Maxima, Minima and saddle points of two variables. Lagrange's method of multipliers.

Section – IV

Curves: Tangents, Principal normals, Binormals, Serret-Frenet formulae. Curvature in two dimensions. Locus of the centre of curvature. Spherical curvature, Locus of centre of Spherical curvature, Involutes, evolutes, Bertrand Curves.

Books Recommended:

1. C.E. Weatherburn: Differential Geometry of three dimensions, Radhe Publishing House, Calcutta.
2. Gabriel Klaumber: Mathematical analysis, Mrcel Dekkar, Inc., New York, 1975.
3. R.R. Goldberg: Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970.
4. Gorakh Prasad: Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
5. S.C. Malik: Mathematical Analysis, Wiley Eastern Ltd., Allahabad.
6. Shanti Narayan: A Course in Mathemtical Analysis, S.Chand and company, New Delhi.

01/03/2019

13 - 2293
D-18

494
D-19

1169/1299
D-20/D-21

B.A./B.Sc. 2nd Year (3rd Semester)
Partial Differential Equations (MAT 201B)

Max. Marks: B.A.-24
B.Sc.-36
Time: 3 Hours

Note: The question paper will consist of five sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5 and 7.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 4 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Partial differential equations: Formation, order and degree, Linear and Non-Linear Partial differential equations of the first order: Complete solution, singular solution, General solution, Solution of Lagrange's linear equations, Charpit's general method of solution. Compatible systems of first order equations, Jacobi's method.

Section – II

Linear partial differential equations of second and higher orders, Linear and non-linear homogeneous and non-homogeneous equations with constant co-efficients, Partial differential equation with variable co-efficients reducible to equations with constant coefficients, their complimentary functions and particular Integrals, Equations reducible to linear equations with constant co-efficients.

Section – III

Classification of linear partial differential equations of second order, Hyperbolic, parabolic and elliptic types, Reduction of second order linear partial differential equations to Canonical (Normal) forms and their solutions, Solution of linear hyperbolic equations, Monge's method for partial differential equations of second order.

Section – IV

Cauchy's problem for second order partial differential equations, Characteristic equations and characteristic curves of second order partial differential equation, Method of separation of variables: Solution of Laplace's equation, Wave equation (one and two dimensions), Diffusion (Heat) equation (one and two dimension) in Cartesian Co-ordinate system.

Books Recommended:

1. D.A.Murray: Introductory Course on Differential Equations, Orient Longman, (India), 1967
2. Erwin Kreyszing : Advanced Engineering Mathematics, John Wiley & Sons, Inc., New York, 1999
3. A.R. Forsyth : A Treatise on Differential Equations, Macmillan and Co. Ltd.
4. Ian N.Sneddon : Elements of Partial Differential Equations, McGraw Hill Book Company, 1988
5. J.N. Sharma & Kehar Singh : Partial Differential Equations.

01/03/2019

-14- 2894 D-18 435 D-19 1170/1300 D-20/C-21

B.A./B.Sc. 2nd Year (3rd Semester)
Programming in C and Numerical Methods (MAT 201C)
Part-A (Theory)

Max. Marks: B.A.-24
B.Sc.-36
Time: 3 Hours

Note: The question paper will consist of five sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5 and 7.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 4 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be **compulsory**. The students are allowed to use **simple calculator**.

Section – I

Programmer's model of a computer, Algorithms, Flow charts, Data types, Operators and expressions, Input / outputs functions.

Section – II

Decisions control structure: Decision statements, Logical and conditional statements, Implementation of Loops, Switch Statement & Case control structures. Functions, Preprocessors and Arrays.

Section – III

Strings: Character Data Type, Standard String handling Functions, Arithmetic Operations on Characters. Structures: Definition, using Structures, use of Structures in Arrays and Arrays in Structures. Pointers: Pointers Data type, Pointers and Arrays, Pointers and Functions.

Solution of Algebraic and Transcendental equations: Bisection method, Regula-Falsi method, Secant method, Newton-Raphson's method. Newton's iterative method for finding pth root of a number, Order of convergence of above methods.

Section – IV

Simultaneous linear algebraic equations: Gauss-elimination method, Gauss-Jordan method, Triangularization method (LU decomposition method). Crout's method, Cholesky Decomposition Method. Iterative method, Jacobi's method, Gauss-Seidal's method, Relaxation method.

Books Recommended:

1. B.W. Kernighan and D.M. Ritchie : The C Programming Language, 2nd Edition
2. V. Rajaraman : Programming in C, Prentice Hall of India, 1994
3. Byron S. Gottfried : Theory and Problems of Programming with C, Tata McGraw-Hill Publishing Co. Ltd., 1999.
4. M.K. Jain, S.R.K.Lyengar, R.K. Jain : Numerical Method, Problems and Solutions, New Age International (P) Ltd., 1996
5. M.K. Jain, S.R.K. Lyengar, R.K. Jain : Numerical Method for Scientific and Engineering Computation, New Age International (P) Ltd., 1999
6. Computer Oriented Numerical Methods, Prentice Hall of India Pvt. Ltd.
7. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill Publishing Co. Ltd.
8. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill Publishing Co. Ltd.
9. Babu Ram: Numerical Methods, Pearson Publication.
10. R.S. Gupta, Elements of Numerical Analysis, Macmillan's India 2010.

01/02/2019

B.A./B.Sc. 2nd Year (3rd Semester)
Part-B(Practical)
Programming in C & Numerical Methods (MAP 201)

Max. Marks

	External	Internal
B.A.	8	2
B.Sc.	12	3

Time: 2 Hours

There will be a separate practical paper which will consist of simple programs in C and implementation of Numerical Methods studied in the theory paper MAT 201C (Part-A).

List of Practicals:

1. Program to convert a decimal number to its binary equivalent.
2. Program to generate first n prime numbers.
3. Program to calculate compound interest.
4. Program for pattern matching of two strings.
5. Program to solve a quadratic equation.
6. Program to generate first n Fibonacci terms using recursion.
7. Program to find the GCD of two integers and use it to find the GCD of three integers using functions.
8. Program to find transpose of a Matrix.
9. Program to find roots of an equation by Bisection Method.
10. Program to find roots of an equation by Regula-Falsi Method.
11. Program to find roots of an equation by Newton-Raphson Method.

01/03/2019

7688
M-20

4131
P1-19

B.A 4228
M-20

B.A./B.Sc. 2nd Year (4th Semester)
Sequences and Series (MAT 202A)

(for B.A) 4228
M-20

Max. Marks: B.A.-24
B.Sc.-36
Time: 3 Hours

Note: The question paper will consist of **five** sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5 and 7.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 4 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Boundedness of the set of real numbers; least upper bound, greatest lower bound of a set, neighborhoods, interior points, isolated points, limit points, open sets, closed set, interior of a set, closure of a set in real numbers and their properties. Bolzano-Weierstrass theorem, Open covers, Compact sets and Heine-Borel Theorem.

Section – II

Sequence: Real Sequences and their convergence, Theorem on limits of sequence, Bounded and monotonic sequences, Cauchy's sequence, Cauchy general principle of convergence, Subsequences, Subsequential limits.

Infinite series: Convergence and divergence of Infinite Series, Comparison Tests of positive terms Infinite series, Cauchy's general principle of Convergence of series, Convergence and divergence of geometric series, Hyper Harmonic series or p-series.

Section – III

Infinite series: D-Alembert's ratio test, Raabe's test, Logarithmic test, de Morgan and Bertrand's test, Cauchy's Nth root test, Gauss Test, Cauchy's integral test, Cauchy's condensation test.

Section – IV

Alternating series, Leibnitz's test, absolute and conditional convergence, Arbitrary series: abel's lemma, Abel's test, Dirichlet's test, Insertion and removal of parenthesis, re-arrangement of terms in a series, Dirichlet's theorem, Riemann's Re-arrangement theorem. Pringsheim's theorem (statement only), Multiplication of series, Cauchy product of series (definitions and examples only). Convergence and absolute convergence of infinite products (definitions and examples only).

Books Recommended:

1. R.R. Goldberg : Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970
2. S.C. Malik : Mathematical Analysis, Wiley Eastern Ltd., Allahabad.
3. Shanti Narayan : A Course in Mathematical Analysis, S.Chand and company, New Delhi
4. Murray, R. Spiegel : Theory and Problems of Advanced Calculus, Schaum Publishing co., New York
5. T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985
6. Earl D. Rainville, Infinite Series, The Macmillan Co., New York

04/03/2019

In R.Kumar 01/03/2019

VK

B.A./B.Sc. 2nd Year (4th Semester)
Special Functions and Integral Transforms (MAT 202B)

Max. Marks: B.A.-24
B.Sc.-36
Time: 3 Hours

Note: The question paper will consist of **five** sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5 and 7.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 4 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Series solution of differential equations – Power series method, Definitions of Beta and Gamma functions. Bessel equation and its solution: Bessel functions and their properties-Convergence, recurrence, Relations and generating functions, Orthogonality of Bessel functions.

Section – II

Legendre and Hermite differentials equations and their solutions: Legendre and Hermite functions and their properties-Recurrence Relations and generating functions. Orhogonality of Legendre and Hermite polynomials. Rodrigues' Formula for Legendre & Hermite Polynomials, Laplace Integral Representation of Legendre polynomial.

Section – III

Laplace Transforms – Existence theorem for Laplace transforms, Linearity of the Laplace transforms, Shifting theorems, Laplace transforms of derivatives and integrals, Differentiation and integration of Laplace transforms, Convolution theorem, Inverse Laplace transforms, convolution theorem, Inverse Laplace transforms of derivatives and integrals, solution of ordinary differential equations using Laplace transform.

Section – IV

Fourier transforms: Linearity property, Shifting, Modulation, Convolution Theorem, Fourier Transform of Derivatives, Relations between Fourier transform and Laplace transform, Parseval's identity for Fourier transforms, solution of differential Equations using Fourier Transforms.

Books Recommended:

1. Erwin Kreyszing : Advanced Engineering Mathematics, John Wiley & Sons, Inc., New York, 1999
2. A.R. Forsyth : A Treatise on Differential Equations, Macmillan and Co. Ltd.
3. I.N. Sneddon : Special Functions on mathematics, Physics & Chemistry.
4. W.W. Bell : Special Functions for Scientists & Engineers.
5. I.N. Sneddon: the use of integral transform, McGraw Hill, 1972.
6. Murray R. Spiegel: Laplace transform, Schaum's Series.

4133
M-19

2690
M-20

B.A. 4230
M-20

B.A./B.Sc. 2nd Year (4th Semester)
Numerical Analysis (MAT 202C)
Part-A (Theory)

for B.A. (4230 / M.20)

Max. Marks: B.A.-24
B.Sc.- 36
Time: 3 Hours

Note: The question paper will consist of **five** sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5 and 7.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 4 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be **compulsory**. The students are allowed to use **simple calculator**.

Section-I

Finite Differences operators and their relations. Finding the missing terms and effect of error in a difference tabular values, Interpolation with equal intervals: Newton's forward and Newton's backward interpolation formulae. Interpolation with unequal intervals: Newton's divided difference, Lagrange's Interpolation formulae, Hermite's Formula.

Section-II

Central Differences: Gauss forward and Gauss's backward interpolation formulae, Sterling, Bessel Formula.

Probability distribution of random variables, Binomial distribution, Poisson's distribution, Normal distribution: Mean, Variance and Fitting.

Section-III

Numerical Differentiation: Derivative of a function using interpolation formulae as studied in Sections–I & II.

Eigen Value Problems: Power method, Jacobi's method, Given's method, House-Holder's method, QR method, Lanczos method.

Section-IV

Numerical Integration: Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's one-third and three-eight rule, Chebychev formula, Gauss Quadrature formula.

Numerical solution of ordinary differential equations: Single step methods-Picard's method. Taylor's series method, Euler's method, Runge-Kutta methods. Multiple step methods, Predictor-corrector method, Modified Euler's method, Milne-Simpson's method.

Books Recommended:

1. Babu Ram: Numerical Methods, Pearson Publication.
2. R.S. Gupta, Elements of Numerical Analysis, Macmillan's India 2010.
3. M.K. Jain, S.R.K.Iyengar, R.K. Jain : Numerical Method, Problems and Solutions, New Age International (P) Ltd., 1996
4. M.K. Jain, S.R.K. Iyengar, R.K. Jain : Numerical Method for Scientific and Engineering Computation, New Age International (P) Ltd., 1999
5. C.E. Froberg : Introduction to Numerical Analysis (2nd Edition).
6. Melvin J. Maaron : Numerical Analysis-A Practical Approach, Macmillan Publishing Co., Inc., New York.
7. R.Y. Rubnistein : Simulation and the Monte Carlo Methods, John Wiley, 1981.

04/03/2020

R Kumar 01/03/2019

B.A./B.Sc. 2nd Year (4th Semester)
Part-B(Practical)
Methods of Numerical Analysis with C Language (MAP 202)

Max. Marks

	External	Internal
B.A.	8	2
B.Sc.	12	3

Time: 2 Hours

There will be a separate practical paper which will consist of implementation of numerical methods, studied in the theory paper MAT 202C (Part-A), in 'C' Programming Language.

List of Practicals:

1. Program for interpolation by Newton-Forward method.
2. Program for interpolation by Newton-Backward method.
3. Program for interpolation by Lagrange's method.
4. Program for Numerical integration by Trapezoidal Rule.
5. Program for Numerical integration by Simpson's 1/3 Rule.
6. Program for Numerical integration by Simpson's 3/8 Rule.
7. Program to execute Euler's method.
8. Program to execute Euler's modified method.
9. Program to execute Runge-Kutta method of fourth order.
10. Program to execute Milne Simpson method.

04/03/2020

01/03/2019

474/D19 1175/1301/D20(D-3)

B.A/B.Sc. 3rd Year (5th Semester)
Real Analysis (MAT 301A)

Max. Marks: B.A.-27
B.Sc.-40
Time: 3 Hours

Note: The question paper will consist of **five** sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5.5 and 8.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 5 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Riemann integral, Integrabililty of continuous and monotonic functions, The Fundamental theorem of integral calculus. Mean value theorems of integral calculus.

Section – II

Improper integrals and their convergence, Comparison tests, Abel's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter. Continuity, Differentiability and integrability of an integral of a function of a parameter.

Section – III

Definition and examples of metric spaces, neighborhoods, limit points, interior points, open and closed sets, closure and interior, boundary points, subspace of a metric space, equivalent metrics, Cauchy sequences, completeness, Cantor's intersection theorem, Baire's category theorem, contraction Principle.

Section – IV

Continuous functions, uniform continuity, compactness for metric spaces, sequential compactness, Bolzano-Weierstrass property, total boundedness, finite intersection property, continuity in relation with compactness, connectedness , components, continuity in relation with connectedness.

Book s Recommended:

1. P.K. Jain and Khalil Ahmad: Metric Spaces, 2nd Ed., Narosa, 2004
2. T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985
3. R.R. Goldberg : Real analysis, Oxford & IBH publishing Co., New Delhi, 1970
4. D. Somasundaram and B. Choudhary : A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997
5. Shanti Narayan : A Course of Mathematical Analysis, S. Chand & Co., New Delhi
6. E.T. Copson, Metric Spaces, Cambridge University Press, 1968.
7. G.F. Simmons : Introduction to Topology and Modern Analysis, McGraw Hill, 1963.

R Kumar 01/03/2019

B.A./B.Sc. 3rd Year (5th Semester)
Groups and Rings (MAT 301B)

Max. Marks: B.A.-27
B.Sc.-40
Time: 3 Hours

Note: The question paper will consist of **five** sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5.5 and 8.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 5 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Definition of a group with example and simple properties of groups, Subgroups and Subgroup criteria, Generation of groups, cyclic groups, Cosets, Left and right cosets, Index of a sub-group Coset decomposition, Lagrange's theorem and its consequences, Normal subgroups, Quotient groups.

Section – II

Homomorphisms, isomophisms, automorphisms and inner automorphisms of a group. Automorphisms of cyclic groups, Permutations groups. Even and odd permutations. Alternating groups, Cayley's theorem, Center of a group and derived group of a group.

Section – III

Introduction to rings, subrings, integral domains and fields, Characteristics of a ring. Ring homomorphisms, ideals (principle, prime and Maximal) and Quotient rings, Field of quotients of an integral domain.

Section – IV

Euclidean rings. Principal ideal domains. Polynomial rings, Polynomials over the rational field, The Eisenstein's criterion of irreducibility.

Books Recommended:

1. I.N. Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975
2. P.B. Bhattacharya, S.K. Jain and S.R. Nagpal: Basic Abstract Algebra (2nd edition).
3. Vivek Sahai and Vikas Bist : Algebra, NKarosa Publishing House.
4. I.S. Luther and I.B.S. Passi : Algebra, Vol.-II, Norsa Publishing House.
5. J.B. Gallian: Abstract Algebra, Narosa Publishing House.

01/03/2019

476
D-19

1177/1303
D-2019

B.A./B.Sc. 3rd Year (5th Semester)
Statics (MAT 302C)

Max. Marks: B.A.-26
B.Sc.-40
Time: 3 Hours

Note: The question paper will consist of **five** sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5 and 8.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 6 marks) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Composition and resolution of forces. Parallel forces. Moments and Couples.

Section – II

Analytical conditions of equilibrium of coplanar forces. Friction. Centre of Gravity.

Section – III

Virtual work. Forces in three dimensions. Poinsots central axis.

Section – IV

Wrenches. Null lines and planes. Stable and unstable equilibrium.

Books Recommended:

1. S.L. Loney: Statics, Macmillan Company, London.
2. R.S. Verma: A Text Book on Statics, Pothishala Pvt. Ltd., Allahabad.

01/03/2019

2895
M.20

B.A./B.Sc. 3rd Year (6th Semester)
Real and Complex Analysis (MAT 302A)

2895
M.20

Max. Marks: B.A.-27
B.Sc.-40
Time: 3 Hours

Note: The question paper will consist of **five** sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5.5 and 8.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 5 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Jacobians, Beta and Gama functions, Double and Triple integrals, Dirichlets integrals, change of order of integration in double integrals.

Section – II

Fourier's series: Fourier expansion of piecewise monotonic functions, Properties of Fourier Co-efficients, Dirichlet's conditions, Parseval's identity for Fourier series, Fourier series for even and odd functions, Half range series, Change of Intervals.

Section – III

Extended Complex Plane, Stereographic projection of complex numbers, continuity and differentiability of complex functions, Analytic functions, Cauchy-Riemann equations. Harmonic functions.

Section – IV

Mappings by elementary functions: Translation, rotation, Magnification and Inversion. Conformal Mappings, Mobius transformations. Fixed points, Cross Ratio, Inverse Points.

Books Recommended:

1. T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
2. R.R. Goldberg : Real analysis, Oxford & IBH publishing Co., New Delhi, 1970.
3. D. Somasundaram and B. Choudhary : A First Course in Mathematical, Analysis, Narosa Publishing House, New Delhi, 1997.
4. Shanti Narayan : A Course of Mathematical Analysis, S. Chand & Co., New Delhi.
5. R.V. Churchill & J.W. Brown: Complex Variables and Applications, 5th Edition, McGraw-Hill, New York, 1990
6. Shanti Narayan : Theory of Functions of a Complex Variable, S. Chand & Co., New Delhi.

04/03/2020

01/03/2019

2694
M.20

2896
M.20

B.A./B.Sc. 3rd Year (6th Semester)
Linear Algebra (MAT 302B)

Max. Marks: 27
B.Sc.-40
Time: 3 Hours

Note: The question paper will consist of **five** sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5.5 and 8.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 5 and 6 marks for B.A. and B.Sc. respectively) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Vector spaces, subspaces, Sum and Direct sum of subspaces, Linear span, Linearly Independent and dependent subsets of a vector space. Finitely generated vector space, Existence theorem for basis of a finitely generated vactor space, Finite dimensional vector spaces, Invariance of the number of elements of bases sets, Dimensions, Quotient space and its dimension.

Section – II

Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vector spaces, Vector space of all the linear transformations Dual Spaces, Bidual spaces, annihilator of subspaces of finite dimensional vector spaces, Null Space, Range space of a linear transformation, Rank and Nullity Theorem.

Section – III

Algebra of Linear Transformation, Minimal Polynomial of a linear transformation, Singular and non-singular linear transformations, Matrix of a linear Transformation, Change of basis, Eigen values and Eigen vectors of linear transformations.

Section – IV

Inner product spaces, Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements, Orthogonal sets and Basis, Bessel's inequality for finite dimensional vector spaces, Gram-Schmidt Orthogonalization process, Adjoint of a linear transformation and its properties, Unitary linear transformations.

Books Recommended:

1. I.N. Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975
2. P.B. Bhattacharya, S.K. Jain and S.R. Nagpal: Basic Abstract Algebra (2nd edition).
3. Vivek Sahai and Vikas Bist : Linear Algebra, Narosa Publishing House.
4. I.S. Luther and I.B.S. Passi : Algebra, Vol.-II, Narosa Publishing House.
5. Gilbert: Linear Algebra.

04/03/2020

01/03/2019

2695

2897

B.A./B.Sc. 3rd Year (6th Semester)
Dynamics (MAT 302C)

Max. Marks: B.A.-26
B.Sc.-40
Time: 3 Hours

Note: The question paper will consist of **five** sections. Each of the first four sections (*I-IV*) will contain two questions (each carrying 5 and 8.5 marks for B.A. and B.Sc. respectively) and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **four** short answer type questions (carrying total 6 marks) without any internal choice covering the entire syllabus and shall be **compulsory**.

Section – I

Velocity and acceleration along radial, transverse, tangential and normal directions. Relative velocity and acceleration. Simple harmonic motion. Elastic strings.

Section – II

Mass, Momentum and Force. Newton's laws of motion. Work, Power and Energy. Definitions of Conservative forces and Impulsive forces.

Section – III

Motion on smooth and rough plane curves. Projectile motion of a particle in a plane. Vector angular velocity.

Section – IV

General motion of a rigid body. Central Orbits, Kepler laws of motion. Motion of a particle in three dimensions. Acceleration in terms of different co-ordinate systems.

Books Recommended:

1. S.L.Loney : An Elementary Treatise on the Dynamics of a Particle and a Rigid Bodies, Cambridge University Press, 1956
2. F. Chorlton : Dynamics, CBS Publishers, New Delhi
3. A.S. Ramsey: Dynamics Part-1&2, CBS Publisher & Distributors.

04/03/2020

01/03/2019

2015

Syllabus FOR B.Sc. : Ist –Medical
w.e.f. July 2015
ZOOLOGY
FIRST SEMESTER
Paper 1- Animal diversity
Protozoa to Annelida

External marks ; 40
Internal marks ; 10

Total credits ; 03
Total marks ; 50

Unit- 1

Protozoa - General Characters and Classifications up to Orders with examples. 2 economic imp of Protozoa

Type study - *Plasmodium Vivax*
Systematic position, Natural history, Life history, Schizogony, Gamogony, Sporogony Alternation of generation, Alternation of Hosts, Adaptations, Evolution..

Unit- 2

Parazoa - General characters and classification up to orders with examples.

Type study - *Sycon*
Systematic position, Natural history, Morphology, Histology, Physiology of digestion, respiration, excretion, reproduction, Regeneraton, adaptation

Coelenterata – General characters and classification upto orders with examples.

Type study -- *Obelia.*
Systematic position, Natural history, Morphology of colony, Histology, Physiology of colony, Medusa- Morphology , Histology, Nervous system, Origin, Physiology, Life history, Polymorphism, Alternation of generation, Adaptation.

Unit-3

Platyhelmintlies - General characters and classification up to orders with examples.

Type study - *Fasciola hepetica*
Systematic position, Natural history, External Characters, Digestive system, Respiration, Nervous system, Excretory system, Reproductive system, Life history, Effect on the host, Control measures and Adaptations

Verified 15/9/15

15/9/2015

Aschelminthes - General characters and classification upto orders with examples.

Type study - *Ascaris*

Systematic position, Natural history, External characters, Body wall, Locomotion, Digestive system, Respiration, Nervous system, Reproductive system, Life history, Effects on the Host, Control measures and adaptations.

Unit -4

Annelida - General characters and classification up to orders with examples.

Type study - Leech

Systematic position, Natural history, External characters, Locomotion, Digestive system, Coelom, Haemocoelomic system, Respiratory system, Excretory system, Nervous system, Reproductive system, Adaptations.

Note for examiner –
1.The candidate shall attempt five questions in all, including the compulsory question. The examiner will set nine questions, including one objective type questions covering the entire syllabus, remaining Eight questions, Two from each unit.
2. All questions carry equal marks.
3. Max. marks ; 40
4.Time ; 3 hours.

Suggested Books :

A Textbook of Zoology : Nonchordates

1. Dhami, P.S. & Dhami, J.K. , Invertebrates, R. Chand & Co., New Delhi, 2001
2. Barnes, R.D. Invertebrates Zoology , W.B. Saunders, Philadelphia, 1999.
3. Kotpal, R.L., Invertebrates, Rastogi Pub., Meerut.

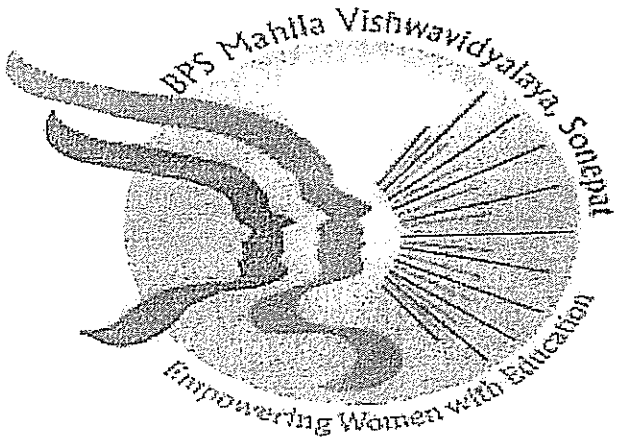
Verified 10/9/15

10/9/2015

Computer Science

B.P.S.MAHILA VISHWAVIDALAYA

KHANPUR KALAN (SONEPAT)



Scheme of Examination and Curriculum for

B.Sc. (Computer Science) Programme

(w.e.f. academic year 2017-18)

Approved by 19th Academic Council held in 14-09-2017 for implementation from the Academic session 2017-18.

B. P. S. Mahila Vishwavidyalaya, Khanpur Kalan (Sonepat)

(State University Established Under the Legislative Act No 31/2006)

Course Curriculum & Scheme of Examination

For

B.Sc. Computer Science

(w.e.f. 2017-18)

e Bachelor of Science in Computer Science is a three year full time programme. The course structure of the ogramme is given under:-

Semester – 1

Code	Course Title	Hours /Week			Total Credits	Max Marks		
		L	T	P		Interna Marks	External Marks	Tota Marl s
ory								
CSC - 101A	Computer Fundamentals	3	-	-	3	10	40	50
CSC - 101B	Logical Organization of Computer	3	-	-	3	10	40	50
CSP - 101	Computer Fundamentals Lab.	-	-	4	2	10	40	50
al		6	-	4	8	30	120	150

Total Contact Hours=10 Total Credits=8

lote: Minimum passing marks for any subject (paper) shall be 40% in the external examination and 40% in he aggregate of internal and external examinations of the subject.

11/8/2017 11/8/17 11/8/2017 11/08/2017 11/8/17 11/8/17

1st Semester

per Code: CSC – 101A Computer Fundamentals

- T – P
-- --

Total Credits: 03
External Marks: 40
Internal Marks: 10

me-3Hrs

te: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 4 parts ort-answer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory estion there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the llabus and each question will carry 8 marks. Student will be required to attempt Five questions in all. Question mber 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions lecting one question from each Unit.

nit -1

troduction to computer - Evolution of computers, classification of computers, model of a digital computer. nctioning of a digital computer, usefulness of computers, Human being Vs computers, applications of computers esktop publishing, sports ,design and manufacturing research, military robotics, planning & management. arketing. medicine & health care, arts, communication etc.).

Init 2

nput/out devices: Punch cards. card-readers. Keypunching machines, keyboards, mouse, joysticks, trackball. igitizer. Voice-recognition devices, Scanner and terminal.

lard copy devices - Types of printer: Impact printer (DMP, Daisy wheel, line, drum printer, chain printer). Non mpact printer (laser. inkjet. thermal), plotters, soft copy devices, monitor, video standards.

Memory & Mass Storage devices: Characteristics of memory system, types of memory : RAM, ROM, Magnetic lisks. floppy disk .hard disk. optical disk, optical disk CD, CD-ROM, magnetic tapes, concept of virtual & cache nemory.

Unit 3

Software Concepts: Introduction, types of software - System & Application software; Language translators- Compiler. Interpreter. Assembler; System utilities - Editor, Loader, Linker.

rview of operating system: Definition, functions of operating system, concept of multiprogramming, ltitasking, multithreading, multiprocessing, time-sharing, real time, single-user & multi-user operating system.

14

tures of Microsoft Windows: 98, XP, Windows-2003, Windows -7, Windows - 10.

-WORD: Text manipulation (change the font size and type, aligning and justification of text, Underlining the , indenting the text, Usages of numbering, bullets, footer and headers. Usages of spell check and find and lace. difference between .doc and .docx .

bles and manipulation: Creation, insertion, deletion (columns & rows) and usage of auto format, creation of :uments using templates, Mail merge concept, macros.

uggested Readings:

1. Gill. Nasib S.: Essentials of Computer and Network Technology, Khanna Book Publishing Co.,New Delhi.
2. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
3. Chhillar, Rajender S.: Application of IT in Business, Ramesh Publishers, Jaipur.
4. Donald Sanders: Computers Today, McGraw-Hill Publishers.
5. Davis: Introduction to Computers, McGraw-Hill Publishers.
6. V. Rajaraman : Fundamental of Computers, Prentice-Hall India Ltd., New Delhi.
7. Learning MS-Office2000 by R Bangia (Khanna Book Pub)
8. Teach yourself MS-Office by Sandlers (BPB Pub).
9. Using MS-Office by Bott(PHI).

Note: Latest and additional good books may be suggested and added from time to time, covering the syllabus.

11/08/2017 11/8/17 11/08/17 11/8/17

11/8/2017 11/8/17

2263 406-I 1202
D-18 D-19 D-20 & 21

r Code: CSC – 101B **Logical Organization of Computer**

T – P
- - -

Total Credits: 03
External Marks: 40
Internal Marks: 10

e-3Hrs

: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 4 parts rt-answer type questions) covering the entire syllabus and will carry 8 marks. In addition to the compulsory stion there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the abus and each question will carry 8 marks. Student will be required to attempt FIVE questions in all. Question nber 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions cting one question from each Unit.

IT I

ormation Representation: Number Systems, Binary Arithmetic, Fixed-point and Floating-point representation numbers. BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, icode.

NIT II

nary Logic: Boolean algebra. Boolean Theorems, Boolean Functions and Truth Tables, ; De Morgan's theorem, mplifying logic circuits—sum of product and product of sum form, algebraic simplification, Karnaugh mplification.

INIT III

igital Logic: Basic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates –XOR, XNOR etc. NAND, NOR, AND-OR-INVERT and OR-AND-INVERT .

equential Logic: Characteristics, Flip-Flops, Clocked RS, D type, JK, T type, Race Around condition and Master-Slave flip flops.

JNIT IV

Combinational Circuits: Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor, Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters, BCD to Seven-Segment, Decoder.

Suggested Readings:

1. M. Mano: Computer System Architecture, Prentice-Hall of India Ltd., New Delhi.

5

11/08/2017

Gill N.S. and Dixit J.B.: Digital Design and Computer Organization, University Science Press (An Imprint of Laxmi Publications), N. Delhi)

William Stallings: Computer Architecture and Organization, Maxell Publication.

Mano, M.M.: Digital Design, 2nd ed., Prentice-Hall of India.

Salivahanan and Arivazhagan: Digital Circuits and Design, Vikas Publ. House Pvt. Ltd.,

J.P. Hayes: Computer Architecture and Organization by J.P. Hayes, Tata McGraw-Hill, New Delhi.

Gear C.W.: Computer Organization and Architecture, Prentice Hall of India Ltd., New Delhi.

ote: Latest and additional good books may be suggested and added from time to time, covering the syllabus.

11/08/2017 11/8/17 11/08/2017 11/08/2017 11/8/17

ır Code: CSP – 101 Computer Fundamentals Lab.

ſ – P Total Credits: 02
- 4
e-3Hrs
ırnal Marks: 40
rnal Marks: 10

ctical Based on CSC-101 (Windows, Ms-Office)

ırnal Assessment Marks (For Theory Papers)

No.	Criteria	Marks
	One mid term exam	5
	Seminar/Assignment	2.5
	Attendance	2.5
	Total	10

ternal Assessment Marks (For Practical)

.No.	Criteria	Marks
	Practical Sheet/Program Execution	5
	Practical File/Viva-Voce	2.5
	Lab Attendance	2.5
Total		10

11/8/17 11/08/2017 11/08/2017 11/10/2017 11/8/17 11/08/2017