AKS UNIVERSITY, SATNA (M.P.)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (B.Sc.)

SEMESTER- I

SCHEME

S.N.	SUBJECT CODE	SUBJECT	Group	L	T	P	CREDIT
1	81FC101	Communication English	FC	2	1	--	3
2	81PH102	Physics-I	PH	4	1	-	5
3	81CH103	Chemistry-I	CH	4	1	-	5
4	81MS104	Mathematics-I	Math	4	2	-	6
5	81PH151	Physics-I lab	PH	-	-	4	2
6	81CH152	Chemistry-I Lab	CH	-	-	4	2

AKS UNIVERSITY, SATNA (M.P.)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (B.Sc.)

SEMESTER- II

SCHEME

S.N.	SUBJECT CODE	SUBJECT	Group	L	T	P	CREDIT
1	81FC201	Fundamental of computer	FC	2	1	-	3
2	81PH202	Physics-II	PH	4	1	-	5
3	81CH203	Chemistry-II	CH	4	1	-	5
4	81MS204	Mathematics-II	Math	4	2	-	6
5	81PH251	Physics-II lab	PH	-	-	4	2
6	81CH252	Chemistry-II Lab	CH	-	-	4	2

AKS UNIVERSITY, SATNA (M.P.)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (B.Sc.)

SEMESTER- III

SCHEME

S.N.	SUBJECT CODE	SUBJECT	Group	L	T	P	CREDIT
1	81FC301	Environmental Studies	FC	2	1	-	3
2	81PH302	Physics-III	PH	4	1	-	5
3	81CH303	Chemistry-III	CH	4	1	-	5
4	81MS304	Mathematics-III	Math	4	2	-	6
5	81PH351	Physics-III lab	PH	-	-	4	2
6	81CH352	Chemistry-III Lab	CH	-	-	4	2

AKS UNIVERSITY, SATNA (M.P.)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (B.Sc.)

SEMESTER- IV

SCHEME

S.N.	SUBJECT CODE	SUBJECT	Group	L	T	P	CREDIT
1	81FC401	Spiritual Studies	FC	2	1	-	3
2	81PH402	Physics-IV	PH	4	1	-	5
3	81CH403	Chemistry-IV	CH	4	1	-	5
4	81MS404	Mathematics-IV	Math	4	2	-	6
5	81PH451	Physics-IV lab	PH	-	-	4	2
6	81CH452	Chemistry-IV Lab	CH	-	-	4	2

AKS UNIVERSITY, SATNA (M.P.)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (B.Sc.)

SEMESTER- V

SCHEME

S.N.	SUBJECT CODE	SUBJECT	Group	L	T	P	CREDIT
1	81FC501	Development of Entrepreneurship	FC	3	-	-	3
2	81PH502	Physics-V	PH	4	1	-	5
3	81CH503	Chemistry-V	CH	4	1	-	5
4	81MS504	Mathematics-V	Math	4	2	-	6
5	81PH551	Physics-V lab	PH	-	-	4	2
6	81CH552	Chemistry-V Lab	CH	-	-	4	2

AKS UNIVERSITY, SATNA (M.P.)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (B.Sc.)

SEMESTER- VI

SCHEME

S.N.	SUBJECT CODE	SUBJECT	Group	L	T	P	CREDIT
1	81PH601	Physics-VI	PH	4	1	-	5
2	81CH602	Chemistry-VI	CH	4	1	-	5
3	81MS603	Mathematics-VI	Math	4	2	-	6
4	81PH651	Physics-VI lab	PH	-	-	4	2
5	81CH652	Chemistry-VI Lab	CH	-	-	4	2
6	81PR653	Project Work			-	-	4

AKS UNIVERSITY, SATNA (M.P.)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (B.Sc.) Computer Science

SEMESTER- I

SCHEME

S.N.	SUBJECT CODE	PAPER	Group	L	T	P	CREDIT
1	82FC101	Communication English	FC	2	1	--	3
2	82PH102	Physics-I	PH	4	1	-	5
3	82CS103	Computer Organization	CS	4	1	-	5
4	82MS104	Mathematics-I	Math	4	2	-	6
5	82PH151	Physics-I lab	PH	-	-	4	2
6	82CS152	Computer Organization Lab	CS	-	-	4	2

AKS UNIVERSITY, SATNA (M.P.)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (B.Sc.) Computer Science

SEMESTER- II

SCHEME

S.N.	SUBJECT CODE	SUBJECT	Group	L	T	P	CREDIT
1	82FC201	Fundamental of computer	FC	2	1	-	3
2	82PH202	Physics-II	PH	4	1	-	5
3	82CS203	Structure Oriented Programming in C	CS	4	1	-	5
4	82MS204	Mathematics-II	Math	4	2	-	6
5	82PH251	Physics-II lab	PH	-	-	4	2
6	82CS252	Structure Oriented Programming in C Lab	CS	-	-	4	2

AKS UNIVERSITY, SATNA (M.P.)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (B.Sc.) Computer Science

SEMESTER- III

SCHEME

S.N.	SUBJECT CODE	SUBJECT	Group	L	T	P	CREDIT
1	82FC301	Environmental Studies	FC	2	1	-	3
2	82PH302	Physics-III	PH	4	1	-	5
3	82CS303	Data Structure	CS	4	1	-	5
4	82MS304	Mathematics-III	Math	4	2	-	6
5	82PH351	Physics-III lab	PH	-	-	4	2
6	82CS352	Data Structure Lab	CS	-	-	4	2

AKS UNIVERSITY, SATNA (M.P.)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (B.Sc.) Computer Science

SEMESTER- IV

SCHEME

S.N.	SUBJECT CODE	SUBJECT	Group	L	T	P	CREDIT
1	82FC401	Spiritual Studies	FC	2	1	-	3
2	82PH402	Physics-IV	PH	4	1	-	5
3	82CS403	Object Oriented Programming in C^{++}	CS	4	1	-	5
4	82MS404	Mathematics-IV	Math	4	2	-	6
5	82PH451	Physics-IV lab	PH	-	-	4	2
6	82CS452	Object Oriented Programming in C^{++} Lab	CS	-	-	4	2

AKS UNIVERSITY, SATNA (M.P.)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (B.Sc.) Computer Science

SEMESTER- V

SCHEME

S.N.	SUBJECT CODE	SUBJECT	Group	L	T	P	CREDIT
1	82FC501	Development of Entrepreneurship	FC	3	-	-	3
2	82PH502	Physics-V	PH	4	1	-	5
3	82CS503	Database Management System	CS	4	1	-	5
4	82MS504	Mathematics-V	Math	4	2	-	6
5	82PH551	Physics-V lab	PH	-	-	4	2
6	82CS552	Database Management System Lab	CS	-	-	4	2

AKS UNIVERSITY, SATNA (M.P.)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (B.Sc.) Computer Science

SEMESTER- VI

SCHEME

S.N.	SUBJECT CODE	SUBJECT	Group	L	T	P	CREDIT
1	82PH601	Physics-VI	PH	4	1	-	5
2	82CS602	Programming in Java	CS	4	1	-	5
3	82MS603	Mathematics-VI	Math	4	2	-	6
4	82PH651	Physics-VI lab	PH	-	-	4	2
5	82CS652	Programming in Java Lab	CS	-	-	4	2
6	82PR653	Project Work					4

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM/CS)

SEMESTER- I

(Physics-I)

Credit [4+1+2=7]

[Mechanics and Properties of Matter]

Unit-I (Mathematical Physics):

Addition, subtraction and product of two vectors; Polar and axial vectors and their examples from physics; Triple and quadruple product (without geometrical applications); Scalar and vector fields; Differentiation of a vector; Repeated integral of a function of more than one variable; Unit tangent vector and unit normal vector; Gradient, Divergence and Curl; Laplacian operator; Idea of line, surface and volume integrals; Gauss', Stokes' and Green's Theorems, Jacobian Application.

Unit-II: Mechanics (Kinematics):

Displacement, Time and Average Velocity (x-t graph illustrations to be included); Instantaneous Velocity (Finding of velocity on an x-t graph), Average and Instantaneous Acceleration (Illustration with v–t and a–t graph), Motion with Constant Acceleration (Illustration with a–t and v–t graph), Freely Falling Bodies (Up and down motion in fall with y-t and vy-t graph), Velocity and Position by Integration, Position and Velocity Vectors, Acceleration Vector, Components of elocity and acceleration in different coordinate systems.

Newton's Laws of motion and its explanation with problems, various types of forces in nature (explanation), Pseudo Forces (e.g. Centrifugal Force), Coriolis force and its applications. Motion under a central force, Derivation of Kepler's laws. Gravitational law and field, Potential due to a spherical body. Gauss & Poisson's equation of Gravitational self-energy. System of particles, Centre of mass and reduced Mass. Elastic and inelastic collisions.

Unit-III: General Properties of Matter:

Elasticity: Hook's law and coefficient of elasticity; Young's modulus, Bulk modulus and Modulus of rigidity; Work done during longitudinal strain, volume strain, and shearing strain; Poisson's ratio; Relation between three elastic moduli (Y, η, K); Determination of Y of rectangular thin bar loaded at the centre; Torsional oscillations, Torsional rigidity of a wire, to determine η by torsional oscillations.

Surface Tension: Surface Tension, Angle of Contact, Capillary Rise Method; Energy required to raise a liquid in capillary tube; Factors affecting surface tension; Jeager's method for Determination of surface tension; Applications of Surface Tension.

Viscosity and Fluid Mechanics: Concept of Viscous Forces and Viscosity; Steady and Turbulent Flow, Reynolds's number; Equation of Continuity; Bernoulli's Principle; Application of Bernoulli's equation - (i) Speed of Efflux (ii) Venturimeter (iii) Aspirator Pump(iv) Change of plane of motion of a spinning ball.

Unit-IV: Oscillations:

Concept of Simple, Periodic & Harmonic Oscillation with illustrations; Differential equation of harmonic oscillator; Kinetic and potential energy of Harmonic Oscillator; Oscillations of two masses connected by a spring; Translational and Rotational motion, Moment of Inertia and their Product,Principal moments and axes, Motion of Rigid Body, Euler's equation.

Unit-V: Relativity and Developments in Physic:

Relativistic Mechanics: Michelson-Morley experiment and its outcome; Postulates of Special Theory of Relativity; Lorentz Transformations. Simultaneity and order of events; Lorentz contraction; Time dilation; Relativistic transformation of velocity, frequency and wave number; Relativistic addition of velocities; Variation of mass with velocity.

Developments in Physics up to 18th Century: Contributions of Aryabhatt, Archimedes, Nicolus Copernicus, Galileo Galilei, Huygens, Robert Hooke, Torricelli,Vernier, Pascal, Kepler, Newton, Boyle, Young, Thompson, Coulomb, Amperes, Gauss, Biot-Savarts, Cavendish, Galvani, Franklin and Bernoulli.

Text books:

1. Concepts of Physics: H.C. Varma, Bharati Bhavan Publishers
2. Unified Physics: R. P. Goyal, Shivlal Agrawal Publushers
3. Properties of Matter: D.S. Mathur, Shamlal Chritable Trust, New Delhi.

Reference Books:

1. University Physics: Sears and Zeemansky, XIth edition, Pearson Education
2. Problems in Physics: P.K. Srivastava, Wiley Eastern Ltd.
3. Applied Fluid Mechanics: Mott Robert, Pearson Benjamin Cummir, VIth Edition, Pearson Education/Prentice Hall International, New Delhi.
4. Mechanics: D.S. Mathur, S Chand and Company, New Delhi-5.

List of Experiments (Any Ten)

1. To determine Young's Modulus by bending of beam method.
2. To determine Surface Tension of a liquid by capillary rise method.
3. To determine acceleration due to gravity using compound pendulum.
4. To determine damping coefficient using a bar pendulum.
5. To determine Young's Modulus using Cantilever method
6. To determine Surface Tension by Jaegar's method.
7. To determine Viscosity of fluid using Poisellie's method.
8. To verify laws of parallel and perpendicular axes for moment of inertia.
9. To determine coefficient of rigidity by static method.
10. To determine coefficient of rigidity by dynamic method.
11. To plot displacement/velocity/acceleration as a function of time using M.S. Excel or C++.
12. To plot gravitational energy as a function of distance between two particles with different masses using M.S. Excel or C++.

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM/CS)

SEMESTER- I

Subject- (Mathematics-I)

Credit (4+2+0=6)

Unit-1

Rank of a matrix, Eigen values, Eigen vectors, Characteristic equation of a matrix, Cayley-Hamilton theorem and its use in finding inverse of matrix, Application of matrix to a system of linear (both homogenous and non - homogenous) equations, Theorems on consistency and inconsistency of a system of linear equations, Solving the linear equations with three unknowns.

Unit-2

Relation between the roots and coefficients of a general polynomial equation in one variable, Transformation of equations, Descarte's rule of signs, De Mover's theorem and its applications, Direct and inverse circular and hyperbolic functions, Expansion of trigonometrically function.

Unit-3

Continuity of function of one variable, Properties of continuous function, Uniform continuity, Chain Rule of differentiability, Mean value theorems and their geometrical interpretations, Darboux's Intermediate Value Theorem for derivatives.

Unit-4

Integration of irrational algebraic functions and transcendental functions, Reduction formulae, Definite Integrals.

Unit-5

Equation of cone with given base, generators of cone, condition for three mutually perpendicular generators, Right circular cone, Equation of Cylinder and its properties, Right circular cylinder, enveloping cylinder and their properties.

Texts Books :

1. Gorakh Prasad – Differential Calculus, Pothishala pvt. Ltd. Allahabad

2. Gorakh Prasad – Integral Calculus, Pothishala pvt. Ltd. Allahabad

3. D.A. Murray: Introductory Course in Differential Equations, Orient Long man, India 1967.

4. N. Saran & S.N. Nigam – Introduction to Vector Analysis, Pothishala Pvt. Ltd., Allahabad.

5. Murray R. Spiegel, Theory & problems of Advanced Calculus.Schaum's outline series, Schaum Publishing Co. NewYark.

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM)

SEMESTER- I

Subject- (Chemistry-I)

Credit [4+1+2=7]

UNIT- I

A Mathematical Concepts: Logarithmic relations, (rules and types), use of log table and antilog table in calculations, curves sketching, straight line and linear graphs, calculation of slopes, Differentiation of functions like Kx, e^x, x^n, sinx, logx; multiplication and division in differentiation, maxima and minima, partial differentiation and reciprocity relations. Integration of some useful/relevant functions; Factorials, Probability.

B. Gaseous States and Molecular Velocities: Critical phenomenon : PV isotherms of ideal gases, Andrew's experiment, continuity of states, the isotherms of van der Waals equations, relationship between critical constants and van der Waals constants, Root mean square, average and most probable velocities. Qualitative discussion of the Maxwell's distribution of molecular velocities, collision numbers, mean free path and collision diameter.

UNIT- II

A. Liquid State : Intermolecular forces, structure of Liquids (a qualitative description) Liquid crystals: Difference between liquid crystal, solid and liquid. Classification, structure of nematic and cholestric phases. Thermography and seven segment cell.

B. Solid State: Definition of space lattice, Unit cell, Laws of crystallography - (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Laws of symmetry, Symmetry elements in crystals. Ionic solid structures, radius ratio, radius ratio effect and coordination number, limitations of radius rule, lattice defects.

UNIT- III

A. Elementary Quantum Mechanics: Schrodinger wave equation, significance of ψ and ψ^2, radial and angular wave functions and probability distribution curves, effective nuclear charge.

B. Periodic Properties : Definition, application and periodicity of Atomic and ionic radii, ionization energy, electron affinity and electronegativity.

C. Chemical Bonding: Covalent bonding as applied to valence bond theory and its limitations, directional characteristic of covalent bond. Hybridization and shapes of simple molecules and ions, Valence Shell Electron Pair Repulsion (VSEPR) theory to NH_3, SF_4, ClF_3, ICl_2, H_2O.

UNIT –IV

A. s-Block Elements: Comparative study, diagonal relationship, salient features of hydrides, solvation and complexation tendencies including their, function in bio systems an introduction to alkyls and aryl complexes.

B. p-Block Elements : Comparative study (including diagonal relationship) of groups 13-17 elements, compounds like hydrides, oxides, oxyacids and halides of groups 13-16. Hydrides of boron-diborane and higher boranes. Borazine, borohydrides.

UNIT –V

A. Bond Parameters Bond lengths and bond angles, bond energy: Localized and delocalized chemical bond, Vander Waal interactions, with reference to supra molecular chemistry, resonance, hyperconjugation, inductive and field effects, hydrogen bonding.

B. Types of Reagents: Electrophiles and nucleophiles. Types of organic reactions. Energy consideration. Hemolytic and heterolytic cleavage Reactive intermediatescarbocations, carbanions, free radicals and carbenes\ benzynes.

C. Stereochemistry: Concept of Stereoisomerism, types of Stereoisomerism, elements of symmetry Chiral and achiral compounds. Fischer projection formulae; optical isomerism of lactic and tartaric acids, enantiomerism and diastereoisomerism; configuration (relative and absolute); conformations of ethane and n-butane and cyclohexane. D, L-and R, S-notations of compounds containing chiral centers; projection formulae –Fischer, Newman and Sawhorse of compounds containing two adjacent chiral centers; meso and dl-isomers, erythro and threo isomers; racemization and resolution; geometrical isomers ; E and Z notations.

Recommended Books

1. Physical Chemistry-Puri, Sharma and Pathania, Vikas Publications, New Delhi
2. Organic Chemistry, Vol. I, IL IIL S.M. Mukherji, S.P. Singh and R.P. Kapoor.
3. Organic Chemistry, Mac Murrey, Pearson Education.
4. Inorganic Chemistry – J.D. Lee, John Wiley
5. Inorganic Polymer – G.R. Chhatwal, Himalaya Pub.House.

LIST OF EXPERIMENTS

1. Calibration of thermometer
2. Determination of melting point
3. Determination of boiling point
4. Preparation of solutions of various concentration, NaOH, HCl, H2SO4
6. Determination of surface tension/percentage composition of given organic mixture using surface tension method
7. Determination of viscosity/percentage composition of given organic mixture using viscosity method. 8. Distillation
9. Crystallization
10. Decolourisation and crystallization using charcoal
11. Sublimation
12. Detection of elements and functional groups

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (CS)

SEMESTER- I

Subject- (Computer Science)

Credit [4+1+2=7]

[COMPUTER ORGANIZATION]

UNIT I

Evolution of Computers and Computer Generations, Computer Classification, Processing Speed of a Computer, Technology Trends, Measuring Computer Performance, MIPS. John Von Neumann Machine Architecture, Functional Units and Components in Computer Organization, Computers – Block Diagram, Memory Addressing Capability of a CPU, Word Length of a Computer, Basic Components of a Digital Computer: Control Unit, ALU, IO Subsystem of a Computer, Bus Structures, Uses of Program Development Tool, Editor, Compiler, Assembler, Interpreter.

UNIT II

Number Systems: Decimal Number System, Binary Number System and Hexa-decimal Number System,1's & 2's Complement, Representation of Positive and Negative Numbers Binary Fixed-Point Representation, Arithmetic Operation on Binary Numbers, Overflow & Underflow. Floating Point Representation, Codes, ASCII Logic Gates, AND, OR, NOT GATES and their Truth Tables, NOR, NAND & XOR Gates, Counters, Registers, Shift Registers.

UNIT III

Storing Data and Program in Memory, Memory Hierarchy in a Computer, Internal Organization of Semiconductor, Main Memory Chips, Semiconductor Memory RAM and ROM, Auxiliary Memory Peripheral Devices, Secondary Storage Memory, Magnetic Memories and Hard Disk Optical Disks and CD Memories.

UNIT IV

Algorithm, Flowchart, Logic Development & Problem solving. Algorithms for simple problems involving conditional manipulation of memory variables, The 8085 Programming Model, 8085 Hardware Model, Block Diagram and uses of Registers, Accumulator, Flag, Program Counter and Stack Pointer, How to write, assemble and execute a simple program: Illustrate Program – Adding two hexadecimal numbers.

UNIT V

Input Devices: Keyboard, Mouse, Output Devices: CRT Monitor, LCD Displays, Touch Screen Displays, Print Devices, Multiprocessor and Multi Core Architecture, Flynn Classification SISD, SIMD, MISD, MIMD.

TEXT BOOK:

1. Computer Fundamentals – B. Ram – New Age International Publishers.

REFERENCE BOOKS:

1. Rashid Sheikh, "Computer Organization & Architecture".
2. William Stallings, "Computer Organization & Architecture", Pearson.
3. BARTEE, "Digital Computer Fundamentals" TMH Publication.
4. MORRIS MANO, "Computer System Architecture" PHI.
5. W. Hayes, Computer Architecture, McGraw-Hill.

List of Experiments

I. WINDOWS

1. Creating folder, cut, copy, paste, managing file and folder in windows.
2. Arrange icons, set display properties
3. Adding and removing software and hardware
4. Setting date and time, screen saver and appearance.
5. Using windows accessories.
6. Settings of all control panel items

II. MS-Word

1. Creating & Editing Document
2. Formatting Document
3. Use of Auto-text, Autocorrect, Spelling and Grammar Tool,
4. Page Formatting, Page Border, Background,
5. Creation of MS-Word-Mail Merge, Macros, Tables.
6. Practice of Printing, page setup etc.

III. MS-Excel

1. Creating & Editing Worksheet, Fill Handle
2. Use Formulas and Functions
3. Preparing Charts

IV. MS-PowerPoint

1. Creating, Manipulating & Enhancing Slides,
2. Inserting Organizational Charts, Excel Charts.
3. Using Word Art

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM/CS)

SEMESTER- II

(Physics-II)

Credit [4+1+2=7]

[Thermodynamics and Statistical Physics]

Unit-I (Thermodynamics-I):

Reversible and irreversible process, Heat engines, Definition of efficiency, Carnot's ideal heat engine, Carnot's cycle, Effective way to increase efficiency, Carnot's engines and refrigerator, Coefficient of performance, Second law of thermodynamics, Various statements of Second law of thermodynamics, Carnot's theorem, Clapeyron's latent heat equation, Carnot's cycle and its applications. Steam engine, Otto engine, Petrol engine, Diesel engine.

Unit-II (Thermodynamics-II):

Concept of entropy, Change in entropy in adiabatic process, Change in entropy in reversible cycle.Principle of increase of entropy, Change in entropy in irreversible process. T-S diagram, Physical significance of Entropy, Entropy of a perfect gas, Kelvin's thermodynamic scale of temperature, The size of a degree, Zero of absolute scale, Identity of a perfect gas scale and absolute scale. Third law of thermodynamics, Zero point energy, Negative temperatures (not possible), Heat death of the universe. Relation between thermodynamic variables (Maxwell's relations).

Unit-III (Statistical Physics-I):

Description of a system: Significance of statistical approach, Particle-states, System-states, Microstates and Macro-states of a system, Equilibrium states, Fluctuations, Classical & Statistical Probability, The equi-probability postulate, Statistical ensemble, Number of states accessible to a system, Phase space. Micro Canonical Ensemble, Canonical Ensemble, Helmholtz free energy, Enthalpy, First law of thermodynamics, Gibbs free energy, Grand Canonical Ensemble.

Unit-IV (Statistical Physics-II):

Statistical Mechanics: Phase space, The probability of a distribution, The most probable distribution and its narrowing with increase in number of particles, Maxwell-Boltzmann statistics, Molecular speeds, Distribution and mean, r.m.s. and most probable velocity, Constraints of accessible and inaccessible states.

Quantum Statistics: Partition Function, Relation between Partition Function and Entropy, Bose-Einstein statistics, Black-body radiation, The Rayleigh-Jeans formula, ThePlanck radiation formula, Fermi-Dirac statistics, Comparison of results, Concept of Phase transitions.

Unit-V (Life and Contributions of Physicists)*:*

S.N. Bose, M.N. Saha, Maxwell, Clausius, Boltzmann, Joule, Wien, Einstein, Planck, Bohr, Heisenberg, Fermi, Dirac, Max Born, Bardeen

Text and Reference Books:

1. **Heat and Thermodynamics:** Mark W. Zemansky, Richard H. Dittman, Seventh Edition, McGraw-Hill International Editions.
2. **Thermal Physics (Heat & Thermodynamics)**: A.B. Gupta, H.P. Roy, Books and Allied (P) Ltd, Calcutta.
3. **Heat and Thermodynamics:** Brijlal and N. Subrahmanyam, S. Chand & Company Ltd, New Delhi.
4. **Thermal and Statistical Physics:** K.M. Jain, South Asian Publication.
5. **Concept of Physics:** H.C. Verma, Bharati Bhavan Publishers.

List of Experiments (Any Ten)

1. To study conversion of mechanical energy into heat using Calender & Barne's method.
2. To determine heating efficiency of electrical Kettle with various voltages.
3. To determine heating temperature coefficient of resistance using platinum resistance thermometer.
4. To determine thermo electromotive force by a thermocouple method.
5. To determine heating efficiency of electrical Kettle with various voltages.
6. To determine heat conductivity of bad conductors of different geometry by Lee's method.
7. To verify Newton's Laws of cooling.
8. To determine specific heat of Coefficient of thermal conductivity by Searl's method.
9. To determine specific heat of a liquid.
10. To compare Maxwell-Boltzmann, Bose Einstein and Fermi-Dirac Distribution function vs temperature using M.S. Excel / C++.
11. To plot equation of state and Vander-wall equation with temperature using M.S. Excel / C++.

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM/CS)

SEMESTER- II

Subject- (Mathematics-II)

Credit (4+2+0=6)

Unit-1

Successive differentiation, Leibnitz theorem, Maclaurin and Taylor series expansions, Asymptotes, Curvature ,Tests for concavity and convexity, Points of inflexion, Multiple points, Tracing of curves in Cartesian co-ordinates.

Unit-2

Limit and continuity of functions of two variables, Introduction of Partial differentiation, Euler's Theorem on homogeneous function, Jacobians, Differentiability of real-valued functions of two variables, Taylor's theorem for functions of two variables, Double and triple integrals, Dirichlet's integrals.

Unit-3

Linear Differential equations and equations reducible to the linear form, Exact differential equation, First order and higher degree equations Solvable for x, y and p, Clairaut's form and singular solutions, Linear differential equations with constant coefficients.

Unit-4

Homogenous linear ordinary differential equations, linear differential equations of second order, Transformation of the equation by changing the dependent variable and the independent variable, Method of variation of parameters, Ordinary simultaneous differential equations.

Unit-5

Vector differentiation, Gradient, Divergence and Curl, Vector integration, Theorem of Gauss (without proof) and problems based on it, Theorem of Green (without proof) and problems based on it, Stoke's theorem (without proof) and problems based on it.

Text Books :

1. Gorakh Prasad – Differential Calculus, Pothishala pvt. Ltd. Allahabad
2. Gorakh Prasad – Integral Calculus, Pothishala pvt. Ltd. Allahabad
3. D.A. Murray: Introductory Course in Differential Equations, Orient Long man, India 1967.
4. N. Saran & S.N. Nigam – Introduction to Vector Analysis, Pothishala Pvt. Ltd., Allahabad.
5. Murray R. Spiegel, Theory & problems of Advanced Calculus.Schaum's outline series, Schaum Publishing Co. NewYark.

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM)

SEMESTER-II

Subject- (Chemistry-II)

Credit [4+1+2=7]

UNIT I

Chemical Kinetics: Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction - concentration, temperature, pressure, solvent, light and catalyst. Dependence of rate on concentration, mathematical characteristics of simple chemical reactions-zero order, first order, second and pseudo order, half life and mean life. Determination of the order of reaction-differential method, integration method, method of half life period and isolation method. Study of chemical kinetics by polarimetry and spectrophotometery.

Theories of Chemical Kinetics: effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy. Simple collision theory , transition state theory (equilibrium hypothesis)

UNIT II

A Thermodynamics – Definition of thermodynamic terms: System, surrounding, Types of systems, intensive and extensive properties State and path functions and their differential. Thermodynamic process. Concept of heat and work.

B. Molecular Orbital Theory: Honuclear and heteronuclear (CO and NO) diatomic molecules. Multicenter bonding in electron deficient molecules, bond strength and bond energy, Calculation of percentage ionic character from dipole moment and electronegativity difference.

C. Ionic Solids: semiconductors, lattice energy and Born-Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarizability of ions. Fajan's rule, Metallic bond, free electron, Valence bond and Band theories.

UNIT III

A. Acids and Bases- Arrhenius, Bronsted-Lowry, Solvent system Lewis Concepts.

B. Chromatographic Techniques: Definition, classifications and principle, Separation of inorganic ions, amino acids and carbohydrates (by paper chromatography and TLC methods).

UNIT IV

Alkanes: Methods of preparation (with special reference to Wurtz, Kolbe, Corey-House reactions and decarboxylation of carboxylic acids). Physical properties and chemical reactions of alkanes. Mechanism of free radical halogenation of alkanes**.**

Cycloalkanes : methods of preparations, chemical reactions. Baeyer's strain theory and its limitations. Ring strain in cyclopropane and cyclobutanes. Theory of strainless ring.

UNIT V

Dienes: Methods of formation, classification of dienes, isolated, conjugated and cumulated dines. Butadiene; methods of formation, polymerization. Chemical reactions – 1, 2 and 1, 4 addition, DielsAlder reaction.

Alkynes: Methods of formation, Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration, oxidation and polymerization.

Alkyl Halides: Nomenclature and classsification of alkyl halides, methods of formation, chemical reaction; mechanism of nucleophilic substitution reaction of alkyl halides, SN 1 and SN 2 reaction with energy profile diagrams.

Recommended Books

1. Physical Chemistry-Puri, Sharma and Pathania, Vikas Publications, New Delhi
2. Physical Chemistry -G.M. Barrow, International Student Edition, McGraw Hill
. 3. The Elements of Physical Chemistry, P.W. Atkins, Oxford Un iversit y Press
4. Physical Chemistry, R.A. Alberty, Wiley Eastern Ltd.
5. Physical Chemistry Through problems, S.K. Dogra and S. Dogra, Wiley Eastern
6. Organic Chemistry, Morrison and Boyd, Prentice Hall.
7. Organic Chemistry, L.G. Wade Jr. Prentice Hall
8. Fundamentals of Organic Chemistry Solomons, John Wiley.

LIST OF EXPERIMENTS

1- Mixture Analysis for 2 Cations and 2 Anions
2- Separation of cations by paper chromatography
3. To determine the velocity constant (specific reaction rate) of hydrolysis of methyl acetate / ethyl acetate catalyzed by hydrogen ions at room temperature.
4. To study the effect of acid strength on the hydrolysis of an ester.
5. To compare the strength of HCl and H_2SO_4 by studying the kinetics of hydrolysis of ester.
6. kinetic studies of decomposition of iodided by H_2O_2.(study of iodine clock reaction)
7. Detection of 2 elements (N, S and halogens) in same organic compound.
8. Identification of 2 functional groups in multifunctional organic compound

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (CS)

SEMESTER- II

Subject- (Computer Science)

Credit [4+1+2=7]

[Structure Oriented Programming in C]

UNIT I

Algorithm, Flowchart, Logic Development & Problem Solving, Structure of C Program, C Declarations, Keywords, Identifiers, Constants, Variables, Data Types, Type Conversion, Types of Operators and Expressions, Input and Output functions in C.

UNIT II

Decision Control Statements: if else statement, break, continue, goto, switch case and nested if statement. Loop Control Statements: for loop, while loop, do-while loop and nested loops, Strings & Standard Functions, Types of Storage Classes.

UNIT III

Pointers: Introduction, Features, Declaration & Arithmetic Operations on pointers, Pointers and Arrays, Array of pointers, Pointers to Pointers, Pointers and Strings, Void Pointers, Null Pointers.

UNIT IV

Arrays: Definition, Initialization, Characteristics, One, Two, Three and Multi-Dimensional Arrays Working with scanf(), printf(), Functions: Declaration, Prototype, Types of Functions, Call by Value and Call by Reference, Function with Operators, Function with Decision Statements, Function with Loop Statements, Function with Arrays and Pointers,

UNIT V

Structure and Union: Declaration, Initialization, Structure within Structure, Array of Structure, Enumerated Data Types, Union of Structure, Files: Streams and File Types, File Operations Write and other File Functions, Command Line Arguments, Application of Command Line Arguments.

TEXT BOOKS

1. E. Balagurusamy, “Programming In C ”, TMH Publications.
2. Yashavant Kanetkar, “Let Us C”.

REFERENCES BOOKS

1. Ashok N. Kamthane, “Programming with ANSI and Turbo C”, Pearson Education.
2. Ashok N. Kamthane et. al., Computer Programming and IT (for RTU), Pearson Education, 2011.
3. Mahapatra, “ Thinking In C ”, PHI Publications.

List of Experiments

1. Write a program for swapping two variables without using third variable.
2. Write a program to calculate simple Interest and Compound Interest.
3. Write a program to find maximum of three numbers.
4. Write a program to find student grade using if-else ladder
5. Write a program for simple calculator using switch/case loop.
6. Write a program for print Fibonacci series up to N number.
7. Write a program to find factorial of accepted number.
8. Write a program to find all prime number between two given numbers
9. Write a program to find addition, subtraction, multiplication of matrix.
10. Write a program to read and write a structure.
11. Write a program for factorial function.
12. Write a program to read a string and print its reverse.
13. Write a program to find ab using Call by reference.
14. Write a program for create, open and append a file.
15. Write a program to copy the contents of one file to another.

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM/CS)

SEMESTER- III

(Physics-III) Credit [4+1+2=7]

[Optics]

Unit-I (Geometrical Optics):

Reflection and refraction: Fermat's Principle, Refraction at a spherical surface, Aplanatic points and its applications, Lens formula, Combination of thin lenses and equivalent focal length.

Optical instruments: Dispersion and dispersive power, chromatic aberration and achromatic combination, different types of aberration (qualitative) and their remedy. Need for multiple lenses in eyepieces, Ramsden and Huygens eye-piece.

Unit-II (Interference of light):

The principle of superposition, two slit interference, coherence requirement for the sources, optical path retardations, Lateral shift of fringes, Rayleigh refractometer and other applications. Localised fringes, thin films, interference by a film with two non-parallel reflecting surfaces, Newton's rings.

Haidinger fringes (Fringes of equal inclination), Michelson interferometer, its application for precision determination of wavelength, wavelength difference and the width of spectral lines. Intensity distribution in multiple beam interference, Fabry-Perot interferometer and Etalon.

Unit-III (Diffraction of light):

Fresnel diffraction: Fresnel's theory of half period zone, diffraction at straight edge, rectilinear propagation.

Fraunhoffer diffraction*:* Diffraction at a slit, phasor diagram and integral calculus methods. Diffraction at a circular aperture and a circular disc, Rayleigh criterion of resolution of images. Resolving power of telescope and microscope. Outline of phase contrast microscopy.

Diffraction Grating*:* Diffraction at N-parallel slits, Intensity distribution, Plane diffraction grating, Concave grating and its mountings. Resolving power of a grating and comparison with resolving power of prism and of a Fabry Parot etalon.

Unit-IV (Polarisation of light):

Transverse nature of light waves, Polarization of electromagnetic (em) waves, Plane polarised light – production and analysis, Description of Linear, circular and elliptical polarisation.

Propagation of em waves in anisotropic media, uniaxial and biaxial crystals, symmetric nature of dielectric tensor, Double refraction, Hygen's principle, Ordinary and extraordinary refractive indices, Fresnel's formula, light propagation in uniaxial crystal, Nicol prism, Production of circularly and elliptically polarized light, Babinet compensator and applications, Optical rotation, Optical rotation in liquids and its measurement through Polarimeter.

Unit-V (Lasers and Photo Sensors):

A brief history of lasers, characteristics of laser light, Einstein prediction,

Relationship between Einstein's coefficients (qualitative discussion only), Pumping schemes, Resonators, Ruby laser, He-Ne laser, Applications of lasers, Principle of Holography.

Light Sensors: Photodiodes, Phototransistors, and Photomultipliers

Reference/Text Books:

1. Fundamentals of Optics: F.A. Jenkins and H.E. White, 1976, McGraw-Hill.
2. Principles of Optics: B.K. Mathur, 1995, Gopal Printing.
3. Fundamentals of Optics: H.R. Gulati and D.R. Khanna, 1991, S.Chand Publication.
4. University Physics: F.W. Sears, M.W. Zemansky and H.D. Young, 13/e, 1986. Addison-Wesley.
5. Optics: Ajoy Ghatak, McGraw Hill Publications.
6. Principles of Optics: Max Born and Wolf, Pregmon Press.
7. An introduction to Lasers – Theory and Applications: M. N. Avadhanalu, S. Chand and Co, Ltd.
8. Solid State Physics: P.K. Palanisamy, Scitech Publications (India) Pvt. Ltd.
9. Principles of Laser : Orazio Svelto, Plenum Press, NewYork.
10. Instrument measurement and Analysis: B.C. Narka and K.K. Chaudhary, Tata McGraw Hill Publishing Company 16th reprint Chapter-1.

LIST OF EXPERIMENTS:

1. Study of interference using biprism.
2. Study of diffraction at straight edge.
3. Use of plane diffraction grating to determine D1, D2 lines of Sodium lamp.
4. Resolving power of telescope.
5. Polarization by reflection and verification of Brewster's Law.
6. Study of optical rotation in Sugar solution.
7. Refractive index and dispersive power of prism using spectrometer.
8. Absorption spectrum of material using constant deviation spectrograph.
9. Beam divergence of He-Ne Laser.
10. Determination of wavelength of Laser by diffraction.
11. Determination of radius of curvature of plano-convex lense by Newton's rings.

FACULTY OF BASIC SCIENCE
COURSE: BACHELOR OF SCIENCE (PCM/CS)
SEMESTER- III
Subject- (Mathematics-III)

Credit (4+2+0=6)

Unit-1

Definition of a sequence, Theorems on limits of sequences, Bounded and monotonic sequences, Cauchy's convergence criterion, Series of non-negative terms, Comparison test, Cauchy's integral test, Ratio test, Raabe's test, logarithmic test, Leibnitz's theorem, Absolute and conditional convergence..

Unit-2

Series Solution of Differential Equations-Power series Method, Bessel's Equation ,Bessel's function and its properties, recurrence and generating relations, Legendre's Equation, Legendre's function and its properties, recurrence and generating relations.

Unit-3

Laplace transformations, Linearity of the Laplace transformation, Existence theorem of Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorem, Differentiation and integration of transforms, Inverse Laplace transforms, Convolution theorem, Applications of Laplace transformation in solving linear differential equations with constant coefficients.

Unit-4

Definition and basic properties of group, Order of an element of a group, Subgroups, Algebra of subgroups, Cyclic groups and their simple properties, Coset decomposition and related theorems, Lagrange's theorem and its consequences.

Unit-5

Normal sub group, Quotient groups, homomorphism and isomorphism of groups, Kernel of homomorphism of groups, fundamental theorem of homomorphism of groups, Permutation groups (even and odd permutations), Alternating groups An, Cayley's theorem.

Texts Books :

1. R.R. Goldberg, Real Analysis, I.B.H. Publishing Co. New Delhi, 1970. 2. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd. Allahabad.
3. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & sons, 1999.
4. I. N. Herstein – Topics in Algebra, Wiley Eastern Ltd. New Delhi 1977.
5. Sharma and Gupta-Integral Transform, Pragati Prakashan Meerut

Reference Books:

1. T.M. Apostol Mathematical Analysis Narosa Publishing House New Delhi 1985.
2. Murray R.Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co. New York.
3. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
4. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd. New Delhi.
5. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, Basic Abstract Algebra, Wiley Eastern, New Delhi, 1997.
6. I. S. L.uther and I.B. S. Passi, Alegebra Vol- I , II, Narosa Publishing House.

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM)

SEMESTER- III

Subject- (Chemistry-III)

Credit [4+1+2=7]

UNIT I

A. Arenes and Aromaticity: Structure of benzene, molecular formula and Kekule structure. Stability and carbon-carbon bond lengths of benzene, resonance structure. MO picture. Aromaticity, the Huckel rule. Aromatic electrophilic substitution, General pattern of the mechanismMechanism of nitration, halogenation, sulphonation, mercuration and Friedel-Crafts reaction and energy profile diagram

B. Aryl Halides: Methods of formation and reactions of aryl halides, Mechanism of nucleophilic aromatic substitution, synthesis and uses of DDT, BHC and Freon.

UNIT II

A. Alcohols: Classification and nomenclature.

B. 1. Monohydric alcohols: nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acid, and esters, acidic nature, reactions of alcohols**.**

2. Dihydric Alcohols: Nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [Pb(OAc)4, and HIO4] and pinacol-pinacolone rearrangement.

3.Trihydric alcohols - nomenclature and methods of formation, chemical reaction of glycerol.

C. Phenols: Nomenclature, structure and methods of formation, acidic character. Comparative acidic strength of alcohols and phenols, stabilization of phenoxide ion by resonance, acylation and carboxylation Mechanisms of Fries rearrangements, Gatterman synthesis, Hauben-Hoesch reaction, Lederer-Manasse reaction and Riemer-Tiemann reaction.

UNIT III

A. Chemistry of elements of I transition series: Characteristics properties of d-block elements. Properties of the elements of the first transition series, their binary compounds such as carbides, oxides and sulphides. Complexes illustrating relative stability of their oxidation states, coordination number and geometry**.**

B. Chemistry of elements of II and III transition series: General characteristics comparative study of II and III transition series with 3d-analogues respect to ionic radii, oxidation states, magnetic behavior, spectral properties and stereochemistry

UNIT IV

A. Coordination Compounds: IUPAC Nomenclature, Isomerism EAN Concept, Chelates, VBT of transition metal complexes, its limitations. Crystal field theory, Crystal Field Stabilization Energy, spectro chemical series, limitations of CFT.

B. Thermochemistry: Standard state, standard enthalpy of formation: Hess's Law of heat summation and its application. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization. Second Law of Thermodynamics: Need for the law, Different statements of the Carnot cycle and its efficiency. Carnot theorem. Thermodynamic scale. Thermodynamic scale of temperature.

UNIT V

A. Thermodynamics : Concept of entropy: entropy as a state function, entropy as a function of P & T, entropy change in physical change, Clausius inequality, entropy as criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases**.**

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

C. Buffers: Mechanism of buffer action, Henderson-Hazel equation, Hydrolysis of salts.

Recommended Books:

1. Physical Chemistry-Puri, Sharma and Pathania, Vikas Publications, New Delhi.
2. Organic Chemistry, Morrison and Boyd, Prentice Hall.
3. Organic Chemistry, L.G. Wade Jr. Prentice Hall.
4. Fundamentals of Organic Chemistry Solomons, John Wiley.
5. Basic Concepts of Analytical chemistry, S M Khopker, New Age International Publishers.
6. Analytical Chemistry, R.M. Verma, CBS Publication.
7. Analytical Chemistry, Skoog & West, Wiley International.
8. Inorganic Chemistry – J.D. Lee, John Wiley.
9. Inorganic Chemistry – Cotton and Wilkinson, John Wiley.
10. Inorganic Polymer – G.R. Chhatwal, Himalaya Pub.House

LIST OF EXEPRIMENTS

1-Calibration of the fractional weights, pipettes and burettes.

2- Preparation of standard solutions.

3-Dilution of 0.1 M to 0.001 M solutions.

5-Determination of acetic acid in commercial vinegar using NaOH.

6-Determination of alkali content- antacid tablet using HCl

7-Estimation of calcium content in chalk as calcium oxalate by permagnometry.

8-Estimation of hardness of water by EDTA Gravimetric analysis: Barium as barium sulphate

9- A-THIN LAYER CHROMATOGRAPHY;

Determination of Rf values and identification of organic compounds.

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

(b) Preparation and separation of 2,4-dinitrophenylhydrazones of acetone, 2- butanone, hexane-2 and 3-one using toluene and light petroleum (40:6).

(c) Separation of a mixture of dyes using cyclohexane and ethylacetate (8:5:1.5).

B-PAPER CHROMATOGRAPHY;

Ascending and Circular Determination of Rf values and identification of organic compounds

(a) Separation of a mixture of phenylalanine and glycine, alanine and aspartic acid, leucine and glumatic acid. Spray reagent ninhydrin.

(b) Separation of a mixture of DL-alanine, glycine and L-lucine using nbutanol: acetic acid: water (4:1:5). Spray reagent ninhydrin.

(c) Separation of monosaccharides- a mixture of D-galactose and Dfructose using n-butanol: acetone: water (4:1:5). Spray reagent-aniline hydrogen pthalate

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (CS)

SEMESTER- III

Subject- (Computer Science)

Credit [4+1+2=7]

[DATA STRUCTURE]

UNIT- I

Introduction to Data Structures: Definition of Data Structure and Abstract Data Type Classification of Data Structures: Linear, Non-Linear, Homogeneous, Non-Homogeneous, Static & Dynamic. Arrays: Definition & Types of Array, Memory Representation of One & Two Dimensional Array, Operations: *Insertion, Deletion, Traversal*, Sparse Matrix: Definition & Memory Representation.

UNIT- II

Stack: Definition, Array Implementation of Stack (Static Stack): Operations *Push, Pop, Traverse*. Applications of Stack: Infix, Prefix, Postfix Representation and Evaluation using Stack, Use of Stack in Recursive Implementation. Queue: Definition, Array Implementation of Queue (Static Queue): Operations *Insert, Delete, Traverse*. Introduction to Circular Queue: Definition & Implementation, Priority Queue, Double Ended Queue, Applications of Queue.

UNIT- III

Introduction to Linked List: Definition, Advantages, Types of Linked List: Single, Doubly, Circular, Linked List Operations: *Creation, Insertion, Deletion & Traversal* of Linked List.

UNIT- IV

Complexity of Algorithms: Time & Space Complexity, Best-Case, Worst-Case, Average-Case, Big –Oh Notation, Searching Algorithm: Linear or Sequential Search, Binary Search, and Interpolation Search using Array. Complexity of Linear Search, Sorting Algorithm: Bubble Sort, Selection Sort, Insertion Sort, Merge Sort Complexity of Sorting Algorithm.

UNIT- V

Introduction to Tree: Definition, Binary Tree: Definition, Representation, Operations: Traversal, Insertion, Deletion, Binary Search Tree (BST): Definition and Creation, Search using BST Introduction to B-Tree & B+ tree.

TEXT BOOKS:

1. YedidyahLangsam Moshe J. Augenstein, Aaron M. Tenenbaum, “Data Structures using C & C++”, PHI New Delhi, 2 nd Edition.

REFERENCE BOOKS:

1. G.S.Baluja, "Data Structures Through C",DhanpatRai& Co.,4th Edition.
2. Seymour Lipschutz,"Data Structures", Schaum's Outline Series, Tata McGraw Hill Publishing Company Ltd.
3. Adam Drodzek, "Data Structures & Algorithm in C++", 2nd Edition.

List of Experiments

1. Write a program for insertion, deletion and traversal of elements of an array.
2. Write a program for complete implementation of stack using array with push, pop and traversaloperations.
3. Write a program for conversion of an infix expression into postfix representation and evaluation of thatpostfix form.
4. Write a program for complete implementation of queue using array with insertion, deletion and traversaloperations.
5. Write a program for complete implementation of circular queue using array with insertion, deletion andtraversal operations.
6. Write a program for complete implementation of double ended queue using array with insertion,deletion and traversal operations.
7. Write a program to create singly link list (creation, insertion, deletion and traversal).
8. Write a program to create doubly link list (creation, insertion, deletion and traversal).
9. Write a program to create circular singly link list (creation, insertion, deletion and traversal).
10. Write a program to create circular doubly link list (creation, insertion, deletion and traversal).
11. Write a program for complete implementation of stack using link list with push, pop and traversaloperations.
12. Write a program for complete implementation of queue using link list with insertion, deletion andtraversal operations.
13. Write a program for implementation of binary tree (creation, insertion, deletion), with preorder, inorderand postorder traversal.
14. Write a program for linear search.
15. Write a program for binary search.
16. Write a program for bubble sort.
17. Write a program for selection sort.
18. Write a program for insertion sort.
19. Write a program for merge sort.
20. Write a program for quick sort.

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM/CS)

SEMESTER- IV

(Physics-IV)

Credit [4+1+2=7]

[Electrostatics, Magnetostatics and Electrodynamics]

Unit-I (Electrostatics):

Coulombs law in vacuum expressed in vector forms, calculations of electric field **E** for simple distributions of charge at rest, dipole and quadruple fields. Work done on a charge in an electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Relation between electric field & electric potential ($\mathbf{E} = -\nabla V$), torque on a dipole in a uniform electric field and its energy, flux of the electric field, Gauss's law and its application for finding **E** for symmetric charge distributions, Gaussian pillbox, fields at a surface of a conductor, screening of **E** field by a conductor.

Capacitors, electrostatic field energy, force per unit area of the surface of a conductor in an electric field, conducting sphere in a uniform electric field, point charge in front of a grounded infinite conductor. Dielectrics, parallel plate capacitor with a dielectric, dielectric constant, polarization and polarization vector **P**, relation between displacement vector **D**, **E** and **P**. Molecular interpretation of Claussius-Mossotti equation, boundary conditions satisfied by **E** and **D** at the interface between two homogenous dielectrics, illustration through a simple example.

Unit-II (Magnetostatics):

Force on a moving charge, Lorentz force equation and definition of **B**, force on a straight conductor carrying current in a uniform magnetic field, torque on a current loop, magnetic dipole moment, angular momentum and gyromagnetic ratio, Biot and Savart's law, calculation of **H** for simple geometrical situations such as Solenoid, Anchor ring. Ampere's Law, $\nabla \times \mathbf{B} = \mu_0 \mathbf{J}$, $\nabla . \mathbf{B} = 0$. Field due to a magnetic dipole, free and bound currents, magnetization vector (**M**), relationship between **B**, **H** and **M**. Derivation of the relation $\nabla \times \mathbf{M} = \mathbf{J}$ for non-uniform magnetization.

Unit-III (Current Electricity and Bio electricity):

Current Electricity: Steady current, current density **J**, non-steady currents and continuity equation, Kirchoff's laws and analysis of multiloop circuits, growth and decay of current in LR and CR circuits, decay constants, LCR circuits. AC circuits, complex numbers and their applications in solving AC circuits problems, complex impedance and reactance, series and parallel resonance. Q-factor, power consumed by an A.C. circuit, power factor, Y and networks and transmission of electric power.

Bioelectricity: Electricity observed in living systems, Origin of bioelectricity, Sodium and potassium transport, Resting potential and action potential, Nernst's equation, Conduction velocity, Origin of compound action potential, Neuron structure and function, An axon as cable, Membrane resistance and capacitance.

Unit-IV (Motion of Charged Particles in Electric and Magnetic Fields):

E as an accelerating field, electron gun, discharge tube, linear accelerator. **E** as deflecting field - CRO, Sensitivity of CRO. Transverse **B** field; 180° deflection, Mass spectrograph and velocity selector, Curvatures of tracks for energy determination for nuclear particles; Principle and working of Cyclotron.

Mutually perpendicular and parallel **E** & **B** fields; Positive ray parabolas, Discovery of isotopes, Elements of Mass Spectrographs, Principle of magnetic focusing **(**lenses**).**

(Note: The emphasis here should be on the mechanical aspects and not on the details of the apparatus mentioned which are indicated as applications of principles involved.)

Unit-V (**Electrodynamics):**:

Electromagnetic induction, Faraday's Laws, Electromotive force, Integral and differential forms of Faraday's laws, Self and mutual inductance, Transformers, Energy in a static magnetic field, Maxwell's displacement current, Derivations of Maxwell's equations, Electromagnetic field energy density.

Poynting vector, Electromagnetic wave equation, Plane electromagnetic waves in vacuum and dielectric media, Reflection at a plane boundary of dielectrics, Fresnel's Laws, Polarization by reflection and total internal reflection, Waves in a conducting medium, Reflection and refraction by the ionosphere.

Reference/Text Books:

(a) **Introduction to Electrodynamics:** David J. Griffiths, 4th Edition, Printice Hall.
(b) **Classical Electrodynamics:** Jhon David Jackson, Jhon Wiley & Sons.
(c) **Electrodynamics:** Emi Cossor & Bassin Lorraine, Asahi Shimbunsha Publishing Ltd.
(d) **From Neuron to Brain:** Kuffler and Nicholas, Sinauer Associates, Inc Pub. Sunderland, Masschuetts *(Reference for topics of Bioelectricity).*

List of Practical

1. Characteristics of a Ballistic galvanometer.
2. Setting up and using an electroscope or electrometer.
3. Measurement of low resistance by Carey-Foster bridge or otherwise.
4. Measurement of inductance using impedance at different frequencies.
5. Measurement of capacitance using, impedance at different frequencies.
6. Response curve for LCR circuits and response frequencies.
7. Sensitivity of a cathode- ray oscilloscope.
8. Use of a vibration magnetometer to study a field.
9. Study of Magnetic field due to current using Tangent Galvanometer.
10. Study of decay of currents in LR and RC circuits.
11. Study of Lissajous figures using CRO.

FACULTY OF BASIC SCIENCE
COURSE: BACHELOR OF SCIENCE (PCM/CS)
SEMESTER- IV
Subject- (Mathematics-IV)

Credit (4+2+0=6)

Unit-1

Group automorphisms, inner automorphism, Group of automorphisms, Conjugacy relation and centraliser, Normaliser, Counting principle and the class equation of a finite group, Cauchy's theorem for finite abelian groups and non- abelian groups.

Unit-2

Introduction to rings, subrings, integral domains and fields, simple properties and examples, ring homomorphism, ideals and quotient rings..

Unit-3

Maxima, Minima and saddle points of functions of two variables, Improper integrals and their convergence, Comparison test, Abel's and Dirichlet's tests, Beta and Gamma functions.

Unit-4

Partial Differential equations of the first order, Lagrange's solution, Some special types of equations which can be solved easily by methods other than general methods, Charpit's general method of solution, Partial differential equations of second and higher orders, Homogeneous and non- Homogeneous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients.

Unit-5

Continuity and differentiability of Complex functions, Analytical function, Cauchy Riemann equation, Harmonic function, Mobius transformations, fixed points, cross ratio.

Text Books :

1. I.N. Sneddon, Elemets of partial Differential equatiins Mc graw Hill, Co. 1988
2. Shanti Narayan, Theory of Functions of a Complex Variable, S. Chand & Co., New Delhi.
3. I.N. Herstein Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1977.
4. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Pub. Co., New York

Reference Books:

1. T.M. Apostol, Mathematical Analysis Narosa Publishing House, New Delhi 1985
2. N. Piskunov , Differential and Integral Calculus, Peace Publishers, Moscow.
3. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
4. N. Jacobson, Basis Algebra, Vols, I & II. W.H. Freeman, 1980 (also published by Hindustan Publishing Company.)
5. Shanti Narayan, A Text Book of Modern Abstract Algebra, S. Chand & Co. New Delhi
6. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, Basic Algebra, Wiley East., New Delhi, 1997.

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM)

SEMESTER-IV

Subject- (Chemistry-IV)

Credit [4+1+2=7]

UNIT I

A. **Phase equilibrium**: statement and the meaning of terms: phase, component and the degree of freedom, thermodynamic derivation of the Gibbs phase rule, one component system: water, CO2 and S system, two component system: solid-liquid equilibria, simple eutectic system: Bi-Cd; Pb-Ag system, Desilverisation of lead.

B. **B. Solid solution**: Systems in which compound formation with congruent melting point (Zn-Mg) and incongruent melting point, (NaCl-H2O) and (CuSO4-H2O) system, Freezing Mixtures: acetone-dry ice. C. Liquid- Liquid mixtures: Ideal liquid mixtures, Raoult's and Henry's law. Non-ideal system, azeotrops; HCl-H2O and ethanol water system. D. Partial miscible liquids: Phenol-water, trimethylamine - water and nicotine-water system. Lower and upper consolute temperature. Immiscible Liquids, steam distillation, Nernst distribution law: thermodynamic derivation, applications.

UNIT II

Electrochemistry

A. **Electrical transport**: conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, variation of specific conductance and equivalent conductance with dilution, Migration of ions and Kohlrausch-law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law, its uses and limitations. Debye-Huckel Onsager's equation for strong electrolytes (elementary treatment only). Transport number: Definition and determination by Hittorf method and moving boundary method..

B. **Types of reversible electrodes**: Gas metal ion, metal-meal ion, metal-insoluble salt anion and redox electrodes. Electrode reactions, Nernst equation, derivation of cell EMF and single electrode potential, standard hydrogen electrode- reference electrodes-standard electrode, standard electrode potential. EMF of a cell and its measurements, computation of cell EMF, calculation of thermodynamic quantities of cell reaction (ΔG, ΔH, K). Solubility product and activity coefficient, potentiometric and conductometric titration. Definition of pH and pK, determination of pH using hydrogen, quinhydrone and glass electrodes by potentiometric methods.

UNIT III

A. **Aldehydes and Ketones** : Nomenclature and structure of the carbonyl group. Synthesis of Aldehydes and ketones with particular reference to the synthesis of aldehydes and ketones from acid chlorides, synthesis of aldehydes and ketones using. 1,3 dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on Benzoin, Aldol Perkin and Knovenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction, Mannich reaction, use of acetals asprotecting group. Oxidation of aldehydes, Baeyer-villiger oxidation of of ketones, Cannizaro reaction. Meerwein PondroffVerley, Clemmesen, Wolf Kishner, LiAIH4 and NaBH4 reduction.

B. **Carboxylic acids**: Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic, reaction of carboxylic acids. Hell Volhard Zelinsky reaction. Synthesis of acid chlorides ester and amides reduction of carboxylic acids, mechanism of decarboxylation.

UNIT IV

A. Carboxylic acids derivatives: structure and nomenclature of acid chlorides, esters amides and acid anhydrides. Physical properties, interconversion of acid derivative by nucleophilic acyl substitution, preparation of carboxylic acid derivatives, chemical reactions. Mechanism of esterification and hydrolysis (acidic and basic).

B. Coordination Chemistry: MOT (molecular orbital theory) diagram for tetrahedral, square planar and octahedral complexes.

C. Green Chemistry: Principles, 12 tenets, their description with examples.

UNIT V

A. Chemistry of Lanthanides: Electronic structure, oxidation states, ionic radii and lanthanide contraction, complex formation, occurrence and isolation of lanthanide compounds. B. Chemistry of Actinides: General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from U, Similarities between the later actindies and later lanthanides.

Recommended Books:

1. Physical Chemistry-Puri, Sharma and Pathania, Vikas Publications, New Delhi.
2. Physical Chemistry -G.M. Barrow, International Student Edition, McGraw Hill.
3. Organic Chemistry, Vol. I, IL IIL S.M. Mukherji, S.P. Singh and R.P. Kapoor.
4. Organic Chemistry, F.A. Carey, McGraw-Hill Inc.
5. Vogel's Qualitative & quantitative Analysis Vol- 1, 2, 3, ELBS.
6. Basic Concepts of Analytical chemistry, S M Khopker, New Age International Publishers.
7. Essentials of Physical Chemistry, B.S. Bahl, Arun Bahl & G.D. Tuli, S. Chand & Company Ltd.
8. Atomic structure and Molecular spectroscopy, Manas Chanda, New Age International Publishers.
9. Inorganic Chemistry – Cotton and Wilkinson, John Wiley.

LIST OF EXEPRIMENTS

1. Identification of an organic compound through the functional group analysis.
2. Determination of melting point and preparation of suitable derivatives.
3. Determination of transition temperature of given substance by theromometric, dialometric method (e.g.) ($MnCl_2$, $4H_2O/SrBr_2$, $2H_2O$)

   Phase equilibrium
4. To study the effect of solute (e.g. NaCl, succinic acid) on the critical solution temperature of two partially miscible liquid (e.g., phenol water system).
5. To construct the phase diagram of two component (e.g., diphenylamine benzopheone) by cooling curve method.

   Thermochemistry
6. To determine the enthalpy of neutralization of weak acid/weak base versus strong acid/strong base and determine the enthalpy of ionization of the weak acid/base.
7. Estimation of ferrous and ferric by dichromate method.
8. Estimation of copper using thiosulphate.

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (CS)

SEMESTER-IV

Subject- (Computer Science)

Credit [4+1+2=7]

[Object Oriented Programming in C^{++}]

UNIT I

Introduction, OOPS Languages, Characteristics of OOP's Languages, Application of OOP's, OOP's Paradigm, Concepts: Object, Class, Data Abstraction, Data Encapsulation, Inheritance, and Polymorphism. Static and Dynamic Binding, Message Passing, benefits of OOP's, disadvantage of OOP's, Application of OOP's.

UNIT II

C++ Programming Basics, Basic Program Structure, Preprocessor Directive, Data Types, Operators, Manipulator, Type Conversions, C++ Stream Class. Control Statement: for, do, while, do-while, Decision Statement if, if-else, switch-case. Jump Statement: break, continue, go to, exit.

UNIT III

Function and Arrays. Classes and Instances, Defining Classes in Object Oriented Language, Building and Destroying Instances (Constructors and Destructors), Modifiers, Friend and Inline Functions, String Handling Function.

UNIT IV

Data Encapsulation, Polymorphism, Operator Overloading, Function Overloading, Virtual Functions.

UNIT V

Inheritance, Reusability of code through Inheritance, Type of Inheritance, Data Abstraction, Abstract Classes.Templates and Exception Handling.

TEXT BOOK:

1. Object oriented programming with C++ by E. Balagurusamy, TMH Publishing.

REFERENCE BOOKS:

1. C++, The Complete Reference, 4th Edition, Herbert Schildt, TMH.
2. C++ Primer, 3rd Edition, S. B. Lippman and J. Lajoie, Pearson Education.
3. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.
4. OOP in C++, 3rd Edition, T.Gaddis, J.Walters and G. Muganda, Wiley Dream Tech Press.

5. Object Oriented Programming in C++, 3rd Edition, R.Lafore, Galgotia Publications Pvt. Ltd.
6. Computer Science, A Structured Programming Approach Using C++, B. A .Forouzan and R. F. Gilberg, Thomson.

List of Experiments:

1. Write a program to find the maximum of three using conditional operator.
2. Write a program to generate Armstrong series.
3. Write a program to check whether the given number is palindrome or not.
4. Write a program to find the GCD and LCM of two no's.
5. Write a program to print the diagonal elements of matrix.
6. Write a Program to demonstrate use of array of objects.
7. Program to demonstrate use of function overloading.
8. Write a Program to demonstrate the virtual base class.
9. Write a Program to demonstrate use of polymorphism (virtual function).
10. Write a program to overload ++ operator to increment age of person by one month.
11. Write a program to illustrate the use of scope resolution operator.
12. Write a program to find the square root using inline function.
13. Write a program to illustrate the use of friend function.
14. Create two employee objects and display each object's yearly salary.
15. Write C++ program to create five object of book, get information of book using

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM/CS)

SEMESTER- V

(Physics-V)

Credit [4+1+2=7]

[Quantum Mechanics and Spectroscopy]

Unit-I (QUANTUM MECHANICS-I):

Particles and Waves: Photoelectric effect. Black body radiation. Compton effect. De Broglie hypothesis. Wave particle duality. Davisson-Germer experiment. Wave packets. Concept of phase and group velocity. Two slit experiment with electrons. Probability. Wave amplitude and wave functions. Heisenberg's uncertainty principle with illustrations. Basic postulates and formalism of Schrodinger's equation. Eigenvalues. Probabilistic interpretation of wave function. Equation of continuity. Probability current density. Boundary conditions on the wave function. Normalization of wave function.

Unit-II (QUANTUM MECHANICS-II):

Time independent Schrodinger equation: One dimensional potential well and barrier. Boundary conditions. Bound and unbound states. Reflection and transmission coefficients for a rectangular barrier in one dimension. Explanation of alpha decay. Quantum phenomenon of tunneling. Free particle in one-dimensional box, eigen functions and eigen values of a free particle. One-dimensional simple harmonic oscillator, energy eigenvalues from Hermite differential equation, wave function for ground state. Particle in a spherically symmetric potential. Rigid rotator. Orbital angular momentum, azimuthal quantum numbers and space quantization. Radial solutions and principle quantum number. Hydrogen atom.

Unit-III (ATOMIC SPECTROSCOPY):

Atoms in electric and magnetic fields: Quantum numbers, Bohr model and selection rules. Stern-Gerlach experiment. Spin as an intrinsic quantum number. Incompatibility of spin with classical ideas. Orbital angular momentum. Fine structure. Total angular momentum. Pauli exclusion principle. Many particles in one dimensional box. Symmetric and anti-symmetric wave functions. Atomic shell model. Spectral notations for atomic states. Spin-orbit coupling, Vector model L-S and J-J coupling. Doublet structure of alkali spectra. Zeeman effect. Continuous and characteristic X-rays. Mossley's law.

Unit-IV (MOLECULAR SPECTROSCOPY):

Spectra: Various types of spectra. Rotational spectra. Intensity of spectral lines and determination of bond distance of diatomic molecules. Isotope effect. Vibrational energies of diatomic molecules. Zero point energy. Anharmonicity. Morse potential. Raman effect, Rotational Raman spectra and Vibrational Raman spectra. Stokes and anti-Stokes lines and their intensity difference. Electronic spectra. Born-Oppenheimer approximation. Frank-Condon principle, singlet and triplet states. Fluorescence and phosphorescence.

Unit-V (NUCLEAR PHYSICS):

Interaction of charged particles and neutrons with matter, working of nuclear detectors, G-M counter, proportional counter, Scintillation counter, Cloud chamber.

Basic properties of nucleus: Shape, Size, Mass and Charge of the nucleus. Stability of the nucleus and Binding energy. Alpha particle spectra – velocity and energy of alpha particles. Geiger-Nuttal law. Nature of beta ray spectra. The neutrino. Energy levels and decay schemes. Positron emission and electron capture. Selection rules. Beta absorption and range of beta particles. Kurie plot. Nuclear reactions, pair production. Q-values and threshold of nuclear reactions. Nuclear reaction cross-sections. Examples of different types of reactions and their characteristics. Compound nucleus, Bohr's postulate of compound nuclear reaction, Semi empirical mass formula, Shell model, Liquid drop model, Nuclear fission and fusion (concepts).

Reference/Text Books:

1. Quantum Mechanics: V. Devanathan, Narosa Publishing House, New Delhi, 2005.
2. Quantum Mechanics: B. H. Bransden, Pearson Education, Singapore, 2005.
3. Quantum Mechanics: Concepts and Applications, Nouredine Zettili, Jacksonville State University, Jacksonville, USA, John Wiley and Sons, Ltd, 2009.
4. Introductory Quantum Mechanics & Spectroscopy: K.M. Jain, South Asian Publications.
5. Physics of Atoms & molecules: B.H. Bransden & C.J. Joachaim, Pearson Education, Singapore, 2003.
6. Fundamentals of Molecular Spectroscopy: C.M. Banwell & M. McCash, McGraw Hill (U.K. edition)

List of Experiments:

1. Determination of Planck's constant.
2. Determination of **e**/m using Thomson's method.
3. Determination of **e** by Millikan's method.
4. Study of spectra of hydrogen and deuterium (Rydberg constant and ratio of masses of electron to proton).
5. Absorption spectrum of iodine vapour.
6. Study of alkali or alkaline earth spectra using concave grating.
7. Study of Zeeman effect for determination of Lande g-factor.
8. Study of Raman spectrum using laser as an excitation source.
9. Calculation of energy states of Hydrogen and Deuterium.
10. To draw B-H curve of ferro-magnetic material with the help of CRO.
11. Study of half wave and full wave rectification.

FACULTY OF BASIC SCIENCE
COURSE: BACHELOR OF SCIENCE (PCM/CS)
SEMESTER- V
Subject- (Mathematics-V)

Credit (4+2+0=6)

Unit-1

Definition and examples of vector spaces, subspaces, Sum and direct sum of subspaces, Linear span, Linear dependence, independence and their basic properties, Basis, Finite dimensional vector spaces, Existence theorem for basis, Invariance of the number of elements of a basis set, Dimension, Dimension of sums of vector subspaces.

Unit-2

Linear transformations and their representation as matrices, The algebra of linear transformations, The rank- nullity theorem, Eigen values and eigen vectors of a linear transformation, Diagonalisation, Quotient space and its dimension.

Unit-3

Approximations, Errors and its types, Solution of Equations: Bisection, Secant, Regula Falsi, Newton- Raphson Method and their order of convergence, Roots of second degree Polynomials, Interpolation: Lagrange interpolation, Divided Differences, Interpolation formulae using Differences and derivations of Interpolation formula

Unit-4

Linear Equations: Direct Methods for Solving Systems of Linear Equations, Gauss elimination, Gauss Jordan Method, LU Decomposition, Cholesky Decomposition, Iterative Methods: Jacobi Method , Gauss - Seidel Method, Relaxation Method, Methods Based on Numerical Differentiation.

Unit-5

Ordinary Differential Equations: Euler Method, Eulers Modified Method, Single-step Methods, Runge-Kutta's Method, Multi-step Methods, Milne Method, Numerical Quadrature, Newton-Cote's Formulae, Gauss Quadrature Formulae, Methods Based on Numerical Integration with their derivation.

Text Books :

1. K. Hoffman and R. Kunze, Linear Algebra, 2nd Edition. Prentice Hall Englewood Cliffs, New Jersey.1971.
2. C E Frooerg. Introduction to Numerical Analysis, (Second Edition L Addison-Wesley - 1979,
3. M K Jain, S.R.K. Iyengar, R. K. Jain. Numerical Methods Problems and Solutions, New Age International (P)Ltd. 1996. Page 21

Reference Book:-

1. E. Balaguruswamy- Numerical Method Tata Mc Graw_ Hill Pub.Com. New Yark
2. K.B. Datta. Matrix and Linear Algebra, Prentice hall of India Pvt Ltd., New Delhi, 2000.
3. S.K. Jain, A. Gunawardena & P.B. Bhattacharya. Basic Linear Algebra with MATLAB Key college Publishing (Springer-Verlag) 2001
4. S. Kumarsaran, Linear Algebra, A Geometric Approach Prentice – Hall of India, 2000 5. Murray R. Spiegel, Theory & problems of Advanced Calculus.Schaum's outline series, Schaum Publishing Co. NewYark.

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM)

SEMESTER-V

Subject- (Chemistry-V)

Credit [4+1+2=7]

UNIT I

Organic Compounds of Nitrogen: preparation, properties and chemical reactions of nitroalkanes and nitroarenes. Mechanism of nucleophilic substitution in nitroarenes and their reduction in acidic neutral and alkaline media, picric acids. Halonitroarenes; structure and nomenclature, and their activity. Amines structure, and nomenclature, physical properties and stereochemistry, separation of mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Amine salts as phase transfer catalysts. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles), reductive amination of aldehydic and ketonic compounds, Gabriel – phthalamide reaction, Hoffmann bromamide reaction, Reaction of amines, electrophilic aromatic substitution in aryl amines, reaction of amines with nitrous acid synthetic transformation of aryl diazonium salts, azo coupling.

UNIT II

Carbohydrates-I Classification and nomenclature, monosaccharide, mechanism of osazone formation, chain lengthening and chain shortening of aldoses, epimerization, configuration of monosaccharide, erythro, threo diasterioisomers. Formation of glycosides, ethers and esters, determination of ring size of monosaccharide, cyclic structure of D(+) glucose, mechanism of mutarotation. Structure of ribose and deoxyribose. Carbohydrates-II An introduction to glycosidic linkages in di and polysaccharides. Reducing and non-reducing sugars.

UNIT III

a) **Photochemistry**: Electromagnetic radiation, range of different regions of the spectrum, different expression units for energy, wavelength and frequency Interaction of radiation with matter, difference between thermal and photochemical process. Laws of photochemistry – Grotthus-Draper law, Stark-Einstein law, Beer-Lambert law. Electronic transitions, Jablonski diagram depicting various quantum yield.

b) **UV Spectroscopy**: Electronic excitation, elementary idea of instrument used, Application to organic molecules. Woodward-Fieser rule for determining λmax of enes, polyenes and α, -unsaturated carbonyl compounds.

UNIT IV

Bioinorganic I 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 $Ca2^{+}$.

Bioinorganic Chemistry - II Role of metal ions in biological process, nitrogen fixation, oxygen-uptake proteins, cytochromes and ferredoxins.

UNIT V

Hard and Soft Acids and Bases (HSAB) Classification of acids and bases as hard and soft, Pearson's HSAB concept, symbiosis. Analytical Chemistry: Errors, their classification, minimization of errors, precision and accuracy, gravimetric estimation - concept, method and precautions, gravimetric estimation of barium and copper. Inorganic Polymers: Introduction and

scope of inorganic polymers, special characteristics, classification and their applications. Structure and nature of bonding in Silicones and triphosphonitrilic chloride

Recommended Books:

1. The Elements of Physical Chemistry, P.W. Atkins, Oxford Un iversit y Press.
2. Physical Chemistry, R.A. Alberty, Wiley Eastern Ltd.
3. Physical Chemistry Through problems, S.K. Dogra and S. Dogra, Wiley Eastern.
4. Organic Chemistry, Morrison and Boyd, Prentice Hall.
5. Fundamentals of Organic Chemistry Solomons, John Wiley.
6. Organic Chemistry, Vol. I, IL IIL S.M. Mukherji, S.P. Singh and R.P. Kapoor.
7. Organic Chemistry, F.A. Carey, McGraw-Hill Inc.
8. Advanced Organic chemistry, I. L. Finar, ELBS.
9. Basic Concepts of Analytical chemistry, S M Khopker, New Age International Publishers.
10. Molecular Spectroscopy, Sukumar, MJP Publishers.
11. Inorganic Chemistry – J.D. Lee, John Wiley.
12. Inorganic Chemistry – Cotton and Wilkinson, John Wiley.
13. Inorganic Polymer – G.R. Chhatwal, Himalaya Pub.House.

LIST OF EXEPRIMENTS

1-Analysis of inorganic mixture containing five radicals with at least one interfering radical or typical combination

2-Gravimetric analysis : Barium as barium sulphate.

Preparation: (3). Acetylation

(4). Benzoylation

(5). meta-Dinitrobenezene

(6). Picric acid

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (CS)

SEMESTER-V

Subject- (Computer Science)

Credit [4+1+2=7]

[DATA BASE MANAGEMENT SYSTEM]

UNIT I

Fundamentals of DBMS: Data, Information, Database & Computers, DBMS Definition, DBMS versus File Processing System, Components of DBMS Environment, Instances & Schemas, Three Levels Architecture, Data Independence, Data Dictionary, Database Users, Data Administrators.

UNIT II

Modeling the Real World, Various Data Models & their Comparison, Entity Relationship Models. RDBMS: Concept, Components, Data Integrity, Keys, Relational data Manipulations and Relational Algebra, Tuple Calculus.

UNIT III

Normalization: Definition, Decomposition, Basic Concepts like FD, Objectives of Normalization. Normal Forms- First, Second, Third Normal Form, BCNF, Concept of Multi Valued Dependencies & Higher Normal Forms.

UNIT IV

Introduction to SQL, DDL, DML, and DCL statements, Creating Tables, Adding Constraints, Altering Tables, Update, Insert, Delete & various Form of SELECT- Simple, Using Special Operators for Data Access. Nested Queries & Exposure to Joins, Aggregate Functions.

UNIT V

Transaction: Concept of Transaction, Concurrency Control-Problem & its Basis, Concurrency Control -Locks & Deadlocks. Recovery-Kind of Failures, Recovery Techniques, Security-Authentication, Authorization, Access Control.

Text Book:

1. H. F. Korth& A. Silverschatz, Database concepts, Tata McGraw Hill, New Delhi.

Reference Books:

1. Elmasri&Navathe, Fundamentals of Database systems, Addison &Weisely, New Delhi.
2. C. J. Date, Database Systems, Prentice Hall of India, New Delhi.
3. Hoffer, Prescott & McFadden, Modern Database Management, 8/e
4. Ivan Bayross, SQL, PL/SQL, BPB Publications , New Delhi.

List of Experiments

1. Write a command to create following table structure, item-master.
   Column name datatype
   Itemcodechar(4)
   Itemdescvarchar(25)
   No_of_item_availableint
   Price int.
   Condition are:-
   1. Itemcode is primary key
   2. Itemdesc is not NULL
   3. No_of_item_available is non zero .
   4. Price value should be 200 Rs.
2. The employee tables contain the employee name, address, age, salary of each employ. Write SQLcommand for-
   Display all the detail of the employee
   1. Whose age less than 40 year.
   2. Salary is greater than 15000.
3. Consider title table with column name, title, title type pub ID of char type, while price advance, royalty,ytd-sales is off int type.
   1. Display the highest advance paid.
   2. Display the lower advance paid.
   3. Display the total no. of book.
   4. Display total sales of book.
4. Consider the following table
   Cust_mstr (custno, fname, mname, lname)
   Addr_dtls (code_no,addr1,addr2,city,state,pincode)
   List the customer along with their multiple address details.
5. Consider table
   Book (Bookid, title, author, Publisher, year, price)
   Order_details (Orderno, bookid, quantity)
   Publisher (pubid, name, city, country)
   Catalog (Bookid, title, authorid, pubid, category_id, year, price)
   Author (authorid, name, city, country)
   1. Get the title and price of all the books whose price is less than the average price of the books.
   2. Get the name of all authors who have more than two books in the catalog.
   3. Get the name of all the books for which an order has been placed.
6. Consider table
   Client_master (Client_no, name, city, pincode, state, bal_due).

Product_master (Product_no, description, profit_percent, unit_measure, qty_on_hand, reorder, sellprice, cost_price).

Salesman_master (Salesmanno, salesmanname, address1, address2, city, pincode , state , sal_amt,tgt_to_get, Ytd_sales, remark)

1. Change the city of client_no 'C00005' to 'Bombay'.
2. Change the bal_due of client_no 'C00001' to Rs. 1000.
3. Change the cost price of '1.22 Floppies' to Rs. 950.00.
4. Change the city of the salesman to Mumbai.

7. Consider employee table

   Employee (empno, name, depid, basic, hra, deduction, tax)

   1. Get the number of rows in a table
   2. Find the department wise average pay of the employees.
   3. Find the name of the employees whose basic pay is greater than the average basic pay.
   4. Find the name of the employee who gets the basic pay.

8. The employee table stores the details of employees such as employee code, employee name, departmentcode, date of joining, years of experience and the employee grade. Display only those grades in whichthe number of employees is more than 100.

   The table structure of the employee table is shown below:

   Employee(emp_code, emp_name, Dept_code, Doj, Yrs_exp, Emp_grade)

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM/CS)

SEMESTER- VI

(Physics-VI)

Credit [4+1+2=7]

[SOLID STATE PHYSICS AND DEVICES]

Unit-I (SOLID STATE PHYSICS-I):

Crystal Structure and bonding: Crystalline and amorphous solids. Translational symmetry. Lattice and basis. Unit cell. Reciprocal lattice. Fundamental types of lattices (Bravias Lattice). Miller indices Lattice planes. Simple cubic. Face centered cubic. Body centered cubic lattices. Laue and Bragg's equations. Determination of crystal structure with X-rays, X-ray spectrometer. Ionic, covalent, metallic, van der Waals and hydrogen bonding. Band theory of solids. Periodic potential and Bloch theorem. Kronig-Penny model (Qualitative).

Unit-II (SOLID STATE PHYSICS-II):

Lattice structure and properties: Dulong Petit, Einstein and Debye theories of specific heats of solids. Elastic and atomic force constants. Dynamics of a chain of similar atoms and chain of two types of atoms. Optical and acoustic modes. Electrical resistivity. Specific heat of electron. Wiedemann-Franz law. Hall effect. Response of substances in magnetic field, dia-, para- and ferromagnetic materials. Classical Langevin theory of dia and paramagnetic domains. Curie's law. Weiss' theory of ferromagnetism and ferromagnetic domains. Discussion of BH hysteresis.

Unit-III (SEMICONDUCTOR DEVICES-I):

Electronic devices: Types of Semiconductors (p and n). Formation of Energy Bands, Energy level diagram. Conductivity and mobility. Junction formation, Barrier formation in p-n junction diode. Current flow mechanism in forward and reverse biased diode (recombination), drift and saturation of drift velocity. Derivation of mathematical equations for barrier potential, barrier width. Single p-n junction device (physical explanation, current voltage characteristics and one or two applications). Two terminal devices. Rectification. Zener diode. Photo diode. Light emitting diode. Solar cell. Three terminal devices. Junction field effect transistor (JFET). Two junction devices. Transistors as p-n-p and n-p-n. Physical mechanism of current flow. Characteristics of transistor.

Unit-IV (SEMICONDUCTOR DEVICES-II):

Amplifiers (only bipolar junction transistor). CB, CE and CC configurations. Single stage CE amplifier (biasing and stabilization circuits), Q-point, equivalent circuit, input impedance, output impedance, voltage and current gain. Class A, B, C amplifiers (definitions). RC coupled amplifiers (frequency response). Class B push-pull amplifier. Feedback amplifiers. Voltage feedback and current feedback. Effect of negative voltage series feedback on input impedance. Output impedance and gain. Stability, distortion and noise. Principle of an Oscillator, Barkhausen criterion, Colpitts, RC phase shift oscillators. Basic concepts of amplitude, frequency and phase modulations and demodulation.

Unit-V (NANO MATERIALS):

Nanostructures: Introduction to nanotechnology, structure and size dependent properties. 3D, 2D, 1D, 0D nanostructure materials and their density of states, Surface and Interface effects. Modelling of quantum size effect. Synthesis of nanoparticles - Bottom Up and Top Down approach, Wet Chemical Method. Nanolithography. Metal and Semiconducting nanomaterials. Essential differences in structural and properties of bulk and nano materials (qualitative description). Naturally occurring nano crystals. Applications of nanomaterials.

Reference/Text Books:

1. Introduction to Solid State Physics, C. Kittel, VIIIth Edition, John Wiley and Sons, New York, 2005.
2. Intermediate Quantum theory of Crystalline Solids, A. O. E. Animalu, Prentice–Hall of India private Limited, New Delhi 1977.
3. Solid State Physics, N. W. Ashcroft, and N. D. Mermin, Harcourt Asia (P) Ltd. 2001.
4. The Physics and Chemistry of Nanosolids: Frank J. Owens, and Charles P. Poole Jr., Wiley Inter Science, 2008.
5. Physics of Low Dimensional Semiconductors: An introduction; J.H. Davies, Cambridge University Press, U.K., 1998

List of Experiments:

1. Characteristic of a transistor.
2. Characteristic of a tunnel diode.
3. Hysteresis curve a transformer core.
4. Hall probe method for measurement of resistivity.
5. Specific resistance and energy gap of a semiconductor.
6. Study of regulated power supply.
7. Study of RC coupled amplifiers.
8. Analysis of a given band spectrum.
9. Study of crystal faces.
10. Characteristics of Zener diode.
11. Charging and discharging of capacitor.

FACULTY OF BASIC SCIENCE
COURSE: BACHELOR OF SCIENCE (PCM/CS)
SEMESTER- VI
Subject- (Mathematics-VI)

Credit (4+2+0=6)

Unit-1

Riemann integral, Algebra of Riemann integrable functions, Inerrability of continuous and monotonic functions, The fundamental theorem of integral calculus, Mean value theorems of integral calculus

Unit-2

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, Cauchy sequences, Completeness, Cantor's intersection theorem, Contraction principle, Real numbers as a complete ordered field, Definition of Continuous functions and its illustrations.

Unit-3

Algebra of Logic, Tautologies and Contradictions, logical equivalence, Algebra of propositions, Quantifiers: Universal and Existential Quantifiers, Boolean Algebra and its properties, Demorgan's law, Algebra of Electric circuits and its applications.

Unit-4

Boolean Function, Disjunction and Conjunction Normal Forms, Bools Expansion Theorem. Binary Relations, Equivalence Relations, Partitions and Partial Order Relation.

Unit-5

Graph Theory: Graphs, Multigraphs, Weighted Graphs, Paths and Circuits, Shortest Paths: Dijkstra's Algorithm, Matrix Representation of Graph: Incidence and Adjacency Matrix, Trees and its simple properties.

OR

Elementary Statistics :

Probability, Continuous probability, probability density function and its applications (for finding the mean, mode, median and standard deviation of various continuous probability distributions) Mathematical expectation, expectation of sum and product of random variables, Moment generating functions, Theoretical distribution: Binomial, Poisson distributions and their properties and uses.

Text Books :

1. R.R Goldberg, Real Analysis, Oxford & IBH Publishing Co., New Delhi, 1970.
2. G.F. Simmons. Introduction to Topology and Modem Analysis. McGraw-Hill, 1963. Page 26
3. T.M Apostol, Mathematical Analysis. Norosa Publishing House. New Delhi, 1
4. C.L. Liu,Elements of Discrete Mathematics, (Second Edition), McGraw Hill, International Edition, Computer Science scries 1986.

Reference Books:

1. T.M Apostol, Mathematical Analysis. Norosa Publishing House. New Delhi, 1985.
2. S. Lang. Undergraduate Analysis, Springer-Veriag, New York, 1983.
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. Delhi.
5. RK. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi 2000.

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (PCM)

SEMESTER-VI

Subject- (Chemistry-VI)

Credit [4+1+2=7]

UNIT I

Thermodynamics-1 Definition of thermodynamic terms: System, surrounding, Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work. 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 and inversion temperature. Calculation of w, q, dU and dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process. Thermochemistry: Standard state, standard enthalpy of formation: Hess's Law of heat summation and its application. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization. Bond dissociation energy and its calculation from thermochemical data, temperature dependence of enthalpy, Kirchoff's equation. Second Law of Thermodynamics- Need for the law, different statements of the law, Carnot cycle and its efficiency. Carnot theorem. Thermodynamic scale of temperature

UNIT II

Thermodynamics-II (a) Concept of entropy: Entropy as a state function, entropy as a function of P&T, entropy change in physical change, Clausius inequality, entropy as criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases. Third Law of Thermodynamics: Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data, Gibbs and Helmholtz functions, Gibbs function (G) and Helmholtz function(A) as a thermodynamic quantities, A and G as a criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V and T. (b) Chemical equilibrium Equilibrium constant and free energy. Thermodynamic derivation of law of mass action. Le Chateliers's principle. Reaction isotherm and reaction isochore: Clapeyron equation and Clausius- Clapeyron equation, applications. (c) Buffers: Mechanism of buffer action, Henderson-Hazel equation, Hydrolysis of salts. (d) Corrosion: **types, theories and methods of combating it**

UNIT III

Chemistry of elements of I transition series: Characteristic properties of d-block elements. Properties of the elements of the first transition series, their binary compounds such as carbides, oxides and sulphides. Complexes illustrating relative stability of their oxidation states, coordination number and geometry Chemistry of elements of II and III transition series: General characteristics, comparative treatment with their 3d-analogues in respect of ionic radii, oxidation states, magnetic behaviour, spectral properties and stereochemistry

UNIT-IV

(a) Coordination Compounds: Werner's coordination theory and its experimental verification, EAN Concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds,VBT of transition metal complexes.

(b) Oxidation and Reduction: Use of redox potential data, analysis of redox cycle, redox stability in H2O: Frost, Latimer and Pourbaix diagram. Principles involved in the extraction of elements. Group III: Organic Chemistry dkcZfud jlk;u

UNIT-V

(a) Electromagnetic Spectrum: Absorption Spectra; 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. IR absorption spectroscopy; molecular vibrations, Hook'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

(b) Alcohols: Classification and nomenclature. 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 HIO4] and pinacole-pinacolone rearrangement. Trihydric alcohols-nomenclature and methods of formation, chemical reactions of glycerol

(c) Phenols: Nomenclature, structure and bonding. Prepration of phenols, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols: resonance stabilization of phenoxide ion. Reactions of phenols: electrophillic aromatic substitution, acylation and carboxylation. Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben-Hoesch reaction, Lederer-Manasse reaction and RiemerTiemann reaction (d) Ethers and Epoxides Nomenclature of ethers and methods of their formation, physical properties. Chemical reactions: cleavage and auto oxidation. Ziesel's method. Synthesis of epoxides. Acid and base-catalysed ring opening of epoxides, orientation of epoxide ring opening, reaction of Grignard and organolithium reagents with epoxides.

Recommended Books

1. Physical Chemistry-Puri, Sharma and Pathania, Vikas Publications, New Delhi.
2. Physical Chemistry Through problems, S.K. Dogra and S. Dogra, Wiley Eastern.
3. Organic Chemistry, Morrison and Boyd, Prentice Hall.
4. Organic Chemistry, L.G. Wade Jr. Prentice Hall.
5. Introduction to Organic Chemistry, Streitwiesser, Heathcock and Kosover, Macmillan.
6. Vogel's Qualitative & quantitative Analysis Vol- 1, 2, 3, ELBS.
7. Advanced Organic chemistry, I. L. Finar, ELBS.
8. Atomic structure and Molecular spectroscopy, Manas Chanda, New Age International Publishers.
9. Molecular Spectroscopy, Sukumar, MJP Publishers.
10. Inorganic Chemistry – J.D. Lee, John Wiley.
11. Inorganic Chemistry – Cotton and Wilkinson, John Wiley

LIST OF EXEPRIMENTS:

1-Binary mixture analysis containing two solids: Separation,
2-identification and preparation of derivatives.
Job's Method (ii) Mole-ratio method
3-Effluent Analysis Identification of cations and anions in different water samples.
4. Water analysis To determine the amount of dissolved oxygen in water samples in ppm units.
5- Determination of Hardness of Water.

FACULTY OF BASIC SCIENCE

COURSE: BACHELOR OF SCIENCE (CS)

SEMESTER-VI

Subject- (Computer Science)

Credit [4+1+2=7]

[Java Programming]

UNIT I

Java Programming: Introduction, Data Types, Access Specifiers, Operators, Control Statements, Arrays. Classes: Fundamentals, Objects, Methods, Constructors. Inheritance: Super Class, Sub Class, this and super Operator, Method Overriding, use of final, packages, Abstract Class, Interface. Polymorphism: Method Overloading, Constructor Overloading.

UNIT II

Exception Handling: Exception Class, Built in Checked and Unchecked Exceptions, User Defined Exceptions, use of try, catch, throw, throws, finally. Multi-threaded Programming: Overview, Comparison with Multiprocessing, Thread Class and Runnable Interface, Life Cycle, Creation of single and multiple Threads, Thread Priorities, Overview of Synchronization.

UNIT III

Java Library: String handling (only main functions), String Buffer Class. Elementary concepts of Input/Output: byte and character streams, System.in and Sysem.out, print and println, reading from a file and writing in a file.

UNIT IV

Software Development using Java: Applets :Introduction, Life Cycle, Creation and Implementation, AWT Controls: Button, Label,Text-Field, Text-Area, Choice Lists, List, Scrollbars, Check Boxes, Layout Managers, Elementary Concepts of Event Handling: Delegation Event Model, Event Classes and Listeners, Adapter Classes, Inner Classes. Swings: Introduction and Comparison with AWT Controls.

UNIT V

Networking Basics: Socket (datagram and TCP/IP based client and server socket), Factory Methods, InetAddress JDBC: JDBC Architecture, JDBC Drivers, Connecting to the Database Introduction to Java Servlets: Life Cycle, Interfaces and Classes in javax.servletpackage(only description) Creating a simple Servlet.

TEXT BOOKS:

1. Patrick Naughton and Herbert Schildt, “Java-2 The Complete Reference”, TMH. [T2] Y. Daniel Liang, “Introduction to Java Programming, Comprehensive Version, 7/e” Pearson.

REFERENCE BOOKS: -

1. Krishnamoorthy R, PrabhuS ,”Internet and Java Programming”, New Age Intl.
2. David Flanagan, Jim Farley, William Crawford and Kris Magnusson, “Java Enterprise in a Nutshell”, O’Reilly.

List of Experiments

1. Real-Life Minor Project (Based on Java Language).