HIGHER SECONDARY (CLASSES XI AND XII)
CHEMISTRY (PG)

Unit – 1: Physical Chemistry (1)

Physical States of Matter, Physical Properties & Molecular Structure

SECTION A: The gaseous state: The mean free path, binary collisic frequency (single gas),their dependence on temperature ar pressure. Real gases-detailed study of van der Waals' equatio Critical constants of gases, the rule of Cailletet and Mathias The reduced equation of state and the principle of correspondir states. Maxwell's law of distribution of molecular velociti (derivation not required), effect of temperature on th distribution. Expressions for various types of velocities fro Maxwell's equation. Kinetic energy distribution. Boltzmar factor and the Boltzmann euation. The barometric formula.

SECTION B: The liquid state: Surface tension: measurement, applicatio and temperature dependence.

SECTION C:
(i) Elementary ideas of crystallography – Laws of crystallograph crystal lattice, simple crystal system, ionic and covale crystals, Bragg's method of crystal analysis with illustration NaCl and KCl crystal faces, Born-Haber cycle.
(ii) Heat capacity of solids, Einstein's specific heat equation Debye's T^3 – Law (detailed deduction not required)

SECTION D: Colloidal system:
(i) Properties of colloids; optical, kinetic and electrical
(ii) Electro kinetic phenomena; charge and stability colloids, mechanism of coagulation
(iii) Determination of Avogadro's number from Perri distribution equation and Einstein's diffusion equation.
(iv) Ultracentrifuge, Determination of size of colloid particl and molecular weights of macro-molecules.
(v) Colloidal electrolytes and their properties (soaps ar detergents, Critical micellization concentration).proteins

SECTION E: Physical properties and molecular structure:
(i) Polar molecules and dipole moment (derivations equations not required)
(ii) Elementary ideas on molecular spectra, potential energ curves and Raman Spectra, with applications.

Unit – 2: Physical Chemistry (2)

Thermodynamics & Its Applications to Equilibrium processes

SECTION A: Thermodynamics:

(i) Heats of solution and dilution, heats of neutralization from bond enthalpies, Kerchief's equation.

(ii) Carnot's theorem, thermodynamic scale of temperature, refrigeration cycle.

(iii) Detailed treatment of entropy, free energy, Gibbs-Helmholtz equation, Partial molalquantities, Gibb's potential, Gibbs- potential, Gibbs-Duhem equation, Maxwell's realations. Thermodynamic equation of state. Elementary idea of entropy and probability.

(iv) Applications of thermodynamics: Clausius-Clapeyron equation. Nernst distribution law, Joule-Thomson effect, expression for $(C_P - C_V)$ for van der Waals gases.

(v) Elements of statistical thermodynamics, Boltzman distribution, partition functions and their relations with thermodynamic state functions.

SECTION B: (i) Chemical equalibria: homogeneous equalibria. Experimental determination of equilibrium constants. Thermodynamic derivation of the law of mass action. The reaction isotherim & dtemperature dependence of equilibrium constants (van't Hoff equation)

(ii) Ionic equilibria – Determination of bydrolysis constant and degree of hydrolysis, Buffer capacity. Neutralisation indicators – theory and application, (pH titration curves). Relative strengths of acids and bases.

SECTION C: Electromotive force --- Different types of electrodes, glass and quinhydrone electrodes, important reference electrodes. Thermodynamics of a reversible chemical cell, standard electrode potentials and standard emf of Chemical cell (Nernst equation); Concentration cells, liquid junction potential, salt bridge. Redox potential, Redox series, Redox indicators (Theory and applications), Decomposition potentials, polarization, overvoltage, Dry cells (Leclanche cell), accumulators (acid and alkali). Applictions of e.m.f. measurements – Thermodynamic parameters of electrochemical reactions (enthalpy, entropy and free energy), determination of solubility products, transport numbers, pH, Kw, valencies of ions and dissociation constants of weak electrolytes. Potentiometric titrations.

SECTION D: Colligative properties: Thermodynamic derivation of Raoult law for lowering of vapour pressure, elevation of boiling point and depression of freezing point, van't Hoff's osmotic pressure equation, interrelationships; between the different colligative properties, abnormal colligative properties.

SECTION E: Equilibrium in heterogeneous systems & phase equilibria.

(i) Derivation of phase rule; its significance. Duhem Margules equation.

(ii) One component system – carbon dioxide, water, surfur.

Unit – 3: Physical Chemistry (3)

Transport Phenomenon: Kinetics & Catalysis: Photochemistry Adsorption & Surface Phenomenon.

SECTION A: Viscosity of gases and liquids, viscosity co-efficients, and their dependence on temperature. Stoke's Law and terminal velocity, diffusion of gases and solutes in solution (Fick's law).

SECTION B: Electrochemistry:

(i) Electrolytic conductance, Transport numbers and their interpretations; hydration of ions. Determination of ionic speeds. Qualitative treatment of Onsager equation and Debye Huckel theory.

SECTION C: Chemical Kinetics:

(i) Order and molecularity of a reaction, first and second order kinetics. Determination of the order of a reaction. Zero and fractional order reactions.

(ii) Influence of temperature on the speed of a reaction. Arrhenius equation. Mechanism of uni- and and bi-molecular reactions from collision theory (detailed) and transition state theory (elementary).

(iii) Simultaneous reactions: Parallel, consecutive and opposing reactions (simple-treatment), chain reaction (Hydrogen-Bromine reaction0.

SECTION D: Adsorption and surface chemistry:

(i) The phenomenon of adsorption on liquid and solid surfaces, Freundlich and Langmuir adsorption isotherms. B. E. T. equation (without derivation), surface area of adsorbents.

(ii) Gibb's adsorption isotherm. Application of adsorption.

SECTION E: Catalysis

(i) Catalytic process: Theories of homogeneous and heterogeneous catalysis (single reactant case)
(ii) Acid-base catalysis. Kinetic salt effects.
(iii) Enzyme catalysis and its characteristics.
(iv) Application of catalysis in different fields.

SECTION F: Photochemistry:

(i) Elementary principles of spectrophotometry – Lambert-Beers' law and its applications:
(ii) Laws of photochemical reactions; H-Br reaction, H-Cl reactions, HI decomposition, photosensitized reactions, photochemical equilibrium.
(iii) Elementary ideas of fluorescences and phosphorescence.

Unit – 4: Inorganic Chemistry (1)

Atomic Structure; Radioactivity & Nuclear Chemistry; Chemical Bonding.

SECTION A:

(i) Qualitative idea on Black-body radiation, photo-electric Effect and Compton effect, Plank's quantum equation.
(ii) Atomic spectra of hydrogen. Bohr's Theory of hydrogen atom (simple mathematical treatment). Sommerfeld extension. Limitation of Bohr-Sommerfeld theory. Quantum numbers, their significance; s.p.d.f – atomic orbitals. Sequence of energy levels. Aufbau principle, Hund's rule, Pauli exclusion principle. Electronic configuration of elements, ground state terms of many electron atoms and ions.
(iii) Wave-particle duality, Heisenberg Uncertainty principle, de-Brogile relationship, Schrodinger wave equation, wave mechanical interpretation of orbital, probability distribution curves, shaps of s, p, d and f orbitals (qualitative)

SECTION B: Radioactive decay, α – ß- γ-rays; half life and average life of radioelements. Characteristics of radioactive decay series (different types) and Uranium decay series, Group displacement Law, radioactive equilibrium, Nuclear binding energy (including determining factors), stability of nuclei. Nuclear reactions. (different common types); projectiles, target nuclei, compound nuclei, spallation reaction, Nuclear energy. Elementary ideas on Nuclear fission and fusion reactions. Radio carbon dating, Age of mineral (elementary principle only), Isotope exchange. Separation and uses of isotopes.

SECTION C: Nature of chemical bond, Ionic bond, Lattice energy, Solvation energy, Born-Haber cycle (including mathematical calculation), Concepts of polarization, Fajan's rule. Ionic potential and its applications. Inert pair effect, Covalent bond and coordinate bond, σ - and π- bonds valence bond theory (simple mathematical treatment), assumptions, defects, Resonance. Molecular orbital theory (non-mathematical treatment), application to homonuclear diatomic molecules: H_2 to F_2 and hetronuclear diatomic molecules. NO, CO and HF and H_2O, BeF_2 , CO_2, Bond orders; Hybridizatin, Bent's rule, shapes of molecules, VSEPR theory. Hydrogen bond and its effects on physical properties, Intermolecular forces (elementary idea), Metallic bond, (qualitative bond theory), conductors, semiconductors, superconductors, insulators.

Unit – 5: Inorganic Chemistry (5)

Chemical Periodicity; Acid-Base, Solvents & Redox Systems: s- & p- Block Elements & Their Compounds.

SECTION A: Periodic classification of elements on the basis of electronic configuration and periodic variation of properties; atomic radii, ionic radii, ionization energy; Slater's rule; electron affinity, electro negativity concept (Pauling & Allred-Rochow scales);

SECTION B: Modern concept of acids and bases including SHAB principle, strengths of acids and bases (qualitative idea). Non-aqueous solvents; Liquid ammonia & liquid SO_2 as solvents, Redox poetentials. Formal potentials, applications of redox potentials, variation of redox potentials, under the influence of pH, precipitation and complex formation; dismutation. Choice of indicators in redox titrations. Redox potential diagrams and their applications.

SECTION C: Noble gases; isolation properties and structure of compounds of noble gases.

SECTION D: B, Al, Ga, In, Ti- General group comparison. Boric acid, Borax, Boron nitrides, Borazine, Diborane, Borohydrides.

SECTION E: C, Si, Ge, Sn, Pb-General group comparison. Carbides, silences, silicon halides, silicic acids, silicones, silicates.

SECTION F:N, P, As, Sb, Bi-General group comparison, Elemental states of P, As, Sb, Bi; Oxides and Oxyacids of Nitrogen and Phosphorus, Hydrazine, Hydroxylamine, Hydrazoic acid, Halides of nitrogen and phosphorus, Nitrides, condensed phosphorus, Phosphonitrite compounds.

SECTION G: O, S, Se, Te – General group comparison. Hybrides, Halides, Elemental states of S, Se, Te: Oxides and Oxyacids of Sulphur, Selenium and Tellurium. Thionic acids, sodium thiosulfate, polysulphides, hydrogen peroxide, ozone, peroxyacids of sulphur.

SECTION H: F, Cl, Br, I – General group comparison. Elemental fluorine, Oxygen fluoride, Oxides and Oxyacids of Cl, Br, and I, Interhalogens and Polyhalides, Basic properties of halogens. Psedohalogens. Fluorocarbons.

Unit – 6 : Inorganic Chemistry(6)

d- Block Elements & Their Compounds: Coordination Chemistry & Organometallics

SECTION A: Terristrial abundance of the metals; elementary idea of mineral formation;
General methods of isolation of metals from their natural sources of occurance (technical details omitted) Availability in India and the chemistry of isolation of the following metals: Li, Rb, Cs, Ag, Au, Ti, V, Cr, Mn, Co, Ni, Pt, Ra, U.

SECTION B: Study of the elements of Group IA, IB, IIA and IIB with reference to their chemical reactions and properties (specially redox and coordination)

SECTION C: General characteristics of first now transition metals with reference to electronic configuration, oxidation states, redox properties, colour of the ions. Magnetic properties of first transition metal ions and their complexes. Determination of magnetic susceptibility and its application to complex compounds, Polyvanadates.

SECTION D: Introduction to coordination compounds. Werner's theory, Nomenclature of coordination compounds upto two metal atoms, Types of ligands, Chelates and inner-metallic complexes and their applications in chemical analyses. Isomerism of coordination compounds: different types; geometrical and optical isomerisms for coordinations numbers 4 and 6. Trans effect. Study of complexes in solution: detection, composition (Job's,

slope ratio and mole ration methods), stability-potentionmetric method. Metal-ligand interactions: Valence Bond and Crystal Field Theories. Application of VB and CFT approaches in explaining stereochemistry, magnetic and spectral features (d^1-d^9), systems) of coordination compounds (coor. No. upto six) Introduction of ligand field theory (qualitative treatment only). Metal legand bonding, mo concept, σ - and π- bondings in complexes.

SECTION E: Metal complexes of π acids ligans: carbonyls, nitrosyls and cyanides. Introduction of σ bonded and non-classically bonded organometallics, metal (mono) olefins-Zeise's salt; Metallocenes; Ferrocene, Metal-metal bonded complexex; inorganic rings, cages and clusters; boron cage compounds, carborances and metallocene carboranes. Catalysis by organometallic complexes; substitution, oxidative addition, reductive elimination, insertion reactions, hydrogenation, hydrofomylation and polymezation of alkenes; fluxional molecules.

Unit – 7: Organic Chemistry (1)

SECTION A: Nature of bonds in organic compounds: Atomic orbitals, Molecular orbitals: bonding, non-bonding and antibonding. Hybridisation of atomic orbitals with reference of C, N, Cl, Br, I, O; Sigma and Pi-bonds; electronegativity ; Dipole moment (bond moment, group moment, polarization and polarisability of covalent bond). Inductive and effectromeric effects. Energetics of bond cleavage and bond formation; Bond energies and bond distances; Carbocations, carbanions, Free radicls, ambident ions (definitions, examples). Conjugation, Resonance, Hyperconnugation; Tautomerism with reference to the following systems only Keto-Enol, Nitro-Acinitro, Nitroso-Oximino. Strenghth of organic acids and bases.

SECTION B: Optical activity, optical rotations: Recemisation; Elements of symmetry, asymmetric and dissymmetric moleculses, configuration and conformation, acyclic systems. D.L. and R. s. nomenclatures of acyclic systems. Erythro and Thero configurations. Fischer, sawhorse and Newman projection formula; Geometrical isomerism involving C=C and C=N bonds.

SECTION C: Investigation of reaction mechanisms:
Rate law of a reaction; Activation energy, Transition state, Reaction intermediates, energy profile diagrams involving two transition states. Idea of a reversibility of a reaction, Kinetically and Thermodynamically controlled products:

Primary kinetic isotope effects; classification of reagents and reactions; steric inhibition and steric strain in organic molecules. Pericyclic reactions, electrocyclic opening and closure.

SECTION D: Mechanism of organic reactions- What and Why ? Addition reactions: Electrophiliic, Nucleophilic and Radical . Classical and non-classical carbonium ion. Comparative study of (i) electrophilic addition at C=C; (ii) Nucleophilic addition at C=O group of aldehydes and ketons; (iii) Nucleophilic substitution at C=O group of acids and their derivatives; Substitution reaction at the saturated carbon atom (SN_1, SN_2, SNi); and the aromatic system (SE_2), Elimination reactions: beta elimination (E_1, E_2 and E_1 cB) and alpha elimination carbenes; polymerization reactions: Ionic and Free radical mechanisms.

SECTION E: Stereochemistry: Atropisomerism-Byphenyls (excluding R-S configuration). Substituted allens. Resolution of recemic modifications. Walden inversion, Mutarotation, Asymmetric synthesis, Epimerisation; Elementary idea of sterospecific and stereosclective reactions.

SECTION F:Melecular Rearrangements: Allylic, Claisen Pinacol pinacolone. Acyclic systems: Hofmann, Lossen Curtius, Schmidt, Fries and Beckmann. Cyclic systems: Demjanov and Favorskii.

SECTION G: Elementary idea of the applications of U. VIR and H-NMR spectroscopy for simple organic molecules.

Unit – 8 : Organic Chemistry (2)

SECTION A: Aliphatic Compounds:
Nomenclature and general methods of preparation, properties and reactions with mechanism in respect of the following: (i) Hydrocarbons – Alkanes, Alkenes, Alkaienes, Alkynes and their halogen derivatives.

(ii) Monohydric alcohols;
(iii) Ethers and thioethers;
(iv) Carbonyl compounds;
(v) Saturated monocarboxylic acids and their derivatives;
(vi) Alkylnitrites, Nitroalkanes, Nitriles, Isonitriles, Amines, Urea, Diazomethane, Diazoacetic ester.
(vii) Amino acids and proteins: Definition and Classification; Syntheses (by Gabriel phthalimide method, Strecker's method and Azlactone method), properties and reactions of Glycine and Alanine; Tests, peptide linkage and its geometry.

(viii) Carbanion Chemistry with reference to acetoacetic ester, malonic ester and cyanoacetic ester.

SECTION B: Alicyclic Compounds : General methods of preparation, properties and reactions with mechanism of alicyclic compounds (one ring only) with upto six carbon atoms; Bayer Strain theory; Conformational aspects boat, half-chair and chair forms; axial and equatorial bonds, Conformation, reactions of mono-and di-substituted derivatives only.

SECTION C: General methods of preparation, properties, reactions, structure and syenthetic used of Grignard reagents; preparation of uses of Li and Zn alkyls.

SECTION D: Carbohydrates: Nomenclature: Classification; Reactions and structure elucidation of Glucose and Fructose: Ascending and descending in sugar series. Aldopentoses. Aldohexoses; Ketopentoses and Ketohexoses; Interoconversion of aldohexose to ketohexose and vice versa; Configuration of Arabinose, Glucose, Fructose; Conformation of Glucose; Inversion of Sucrose; Ring-chain tautomerism.

Unit – 9 : Organic Chemistry (3)

SECTION A: Aromatic Compounds:

(i) Idea of aromatic compounds upto-pi-electron system; Aromaticity and Aromatic character;

(ii) Benzene: Modern idea of structure, Electrophilic substitution; preparation properties and important reactions with mechanism of homologues of benzene, halogen derivatives; Nucleopilic and cine substitution: Benzyne intermediates; Orientation and reactivity---mechanistic approach.

(iii) Aromatic nitro compounds: General methods of preparation, properties, reactions with mechanism.

(iv) General methods of preparation, properties and reactions with mechanism of the following classes of compounds: Phenols, Aromatic alcohols, Aromatic aldehydes, Aromatic Ketones, Aromatic carboxylic acids and their derivatives, Phenolic aldehydes and ketones, Phenolic acids, Nitro phenols, Benzoquinones and aromatic sulphonic acids.

(v) Aromatic diazo compounds: preparation, properties and reactions with mechanism.

(vi) General methods of preparation, properties and reactions with mechanism of the following classes of compounds: Phenols, Aromatic alcohols, Aromatic aldehydes, Aromatic Ketones, Aromatic carboxylic acids and their derivatives, Phenolic aldehydes and ketones, Phenolic acids, Nitro phenols, Benzoquinones and aromatic sulphonic acids.

(vii) General methods of preparation properties, reactions with mechanism of the following bi-functional compounds: Diols, Hydroxy ketons, Hydroxy aldehydes, Dicarbonyl compounds (alpha, beta and gamma) keto acids, unsaturated aldehydes. Unsaturated ketones, Unsaturated acids, Lactons.

SECTION B: Polynuclear hydrocarbons: Synthesis, reactions and structures of Naphthalene and Anthracene; Synthesis (only) of Phenanthrene.

SECTION C: Heterocyclic Compounds: General methods of synthesis, properties and important reactions of the following compounds. Pyrrole, Furan, Thiophene, Pyridine, Quinoline and Indole and derivatives of Pyrrole and Pyridine.

SECTION D: Dyes: Classification, Elementary idea of colour and constitution; Preparation and uses of Phenolphthalein, Methyl orange, Congo red, Malachite green, Alizarin and Indigo.

SECTION E: Problems incorporating reactions including in the syllabus.

Unit – 10 : Advanced Level Chemistry & Application Oriented Chemistry

SECTION A: Bioinorganic Chemistry

Essential and trace elements of life, role of metal ions (Na^+, K^+, MG^{2+}, CA^{2+}, $Fe^{3+/2+}$, $Cu^{2+/1+}$, Zn^{2+}) in biology. Basic reactions in the biological systems. Transport of ion across biological membrane, Na^+ ion pump. Transport and storage of metabolic energy, ATP-ADP imterconversion. O_2 - uptake proteins: hemoglobin and myoglobin; electron transport proteins: cytochromes and ferredoxins; redox metalloenzymes: catalase, peroxidase, super oxide dismutase, ascorbate oxidase. Bioinorganic chemistry of nitrogen fixation, respiratory electron transport chair, photosynthesis. Toxic effects of metal ions , Chelation therapy, metal dependent diseases, metal complexes as drugs.

SECTION B: Chemical Analysis: Principles & Applications:
Gravimetric and titrimetric (acid-base, redox, complexometric EDTA) estimations of common cations and anions (single & in mixtures). Chemical separation techniques: chromatography, ion exchange, solvent extraction: Instrumental methods of analysis: conductometry, potentionmety, polarography, amperometry, UV-VIS spectrophotometry, flame photometry, AAS and AES spectrometry, neutron activation analysis. IR, NMR and ESR spectroscopy applications to simple inorganic and organic systems. Analysis of complex materials; ores, alloys, drugs, pharmaceuticals, air and water samples. Error analysis.

SECTION C: Chemistry on Materials:
Production and uses of stainless steels and alloy steels, glass and ceramic materials, Port-land cement (composition and setting). Chemical and biofertilizers, natural and synthetic rubbers, synthetic fibres, biopolymers and biodegradable polymes; common drugs and pharmaceuticals, common pesticides (applications and residual toxicity). Solid, liquid and gasesous fuels, coal based chemicals and petrochemicals (C_1 to C_3 compounds); oils, soaps and detergents, hydrogenation of oils, production of vanaspati and margarine. Constituents and formulations of paints and varnishes, common cosmetics and perfumes, food additives and preservatives.

SECTION D: Environmental chemistry
Environmental segments: atmosphere, hydrosphere, lithosphere and biosphere. Environmental cycles: hydrologic cycle, oxygen-, nitrogen-carbon, phosphorus- and sulfur cycles, composition and structure of the atmosphere. Chemical and photochemical reactions in the atmosphere, ozone layer and its importance. Major air pollutants and their sources, green house effect, acid rain, photochemical smog; air pollution control measures, Environmental role of water, major water pollutants, water quality parameters, water treatment: (domestic, industrial and waster water).

Syllabus for Commerce (PG)

I. Accounting - (A) Financial Accounting and (B) Cost & Management Accounting-

(A) Financial Accounting:

Principles of Accounting; Accounting Concepts- Entity, Fund, Going Concern, Dual Aspects, Money Measurement, Periodicity, Accounting Equation; Accounting Conventions- Conservatism, Disclosure, Consistency, Materiality; Accounting Cycle; Basis of Accounting- Cash and Accrual; Measurement of Periodic Income- Revenue Recognition and Matching Process; Process of Accounting- Preparation of Journal, Ledger, Trial Balance, Adjusting Entries and Rectification of Errors; Depreciation, Provisions and Reserves- Concepts and Different Types; Preparation of Final Accounts of Non-corporate Entities- Trading Account, P & L Account and Balance Sheet; Hire Purchase and Installment Payment System; Partnership Accounts- Appropriation of Profits, Admission, Retirement, Dissolution; Accounting Standards- Concept, Needs and Process of Setting Standards in India

(B) Cost & Management Accounting:

Cost concepts and classification; Elements of Cost- Materials, Labour and Overhead; Cost Sheet; Process Costing (excluding valuation of equivalent products); Budget and Budgetary Control- Cash, Sales, Flexible Budget; Standard Costing (Only Material and Labour Variances); CVP Analysis; Fund Flow and Cash Flow Analysis; Ratio Analysis and Interpretation of Financial Statements.

II. Auditing:

Definition; Principles and Procedures; Types of Audits; Internal Control and Check, Internal Audit; Vouching; Verification and Valuation of Assets and Liabilities; Auditor's Report and Certificate; Investigation; Areas of Auditing- Cost Audit, Management Audit, Tax Audit.

III. Taxation:

Direct and Indirect Taxes; Tax Structure in India; Income Tax - Definition of Assessee, Person, Previous Year, Assessment Year, Income, Gross Total Income, Net Income; Goods and Services Tax: Features and Scope, Taxable Event, Types of GST.

IV. Business Mathematics & Statistics:

Business Mathematics- Simple and Compound Interest; Annuity; AP and GP Series; Business Statistics- Meaning, Uses, Classification of Data; Measures of Central Tendency; Measures of Dispersion; Index Number; Correlation (Simple and Rank).

V. Business Organisation and Management:

Nature, Scope and Objectives of Business- Business, Economy and Society- Social Responsibility of Business.

Business Environment- Elements of Environment, Needs for Identifying environmental facilities and constraints- Features of Business Environment in India.

Functional Classification of Business- Industry, Trade and Commerce; Features of Different Forms of Business Organisations; Public Sector, Private Sector and Public Private Partnership (PPP).

Principles of Management- Meaning, Significance and Functions of Business Management; Evolution of Management Thoughts, Different Approaches of Study to Management.

Human Resource Management- Concept, Functions, Manpower Planning, Industrial Relations, Industrial Disciplines, Workers' Participation in Management, Trade Unions and their Functions.

Marketing Management- Concept, Functions, Modern Concept of Marketing, Marketing Mix, Product Life Cycle, Pricing Policies and Strategies, Sales Organisation and Promotion.

Financial Management- Concept, Objectives, Functions; Sources of Finance; Cost of Capital; Capital Structure; Working Capital Management.

VI. Business Economics:

Demand and Supply Function- Concept of Equilibrium Price; Price Elasticity of Demand; Basic Theory of Consumer Behaviour; Cardinal and Ordinal Utility; Indifference Curve and its Properties.

Producer's Behaviour- Short-run and Long-run Production Function, Returns to Scale, Economies of Scale; Basic Concepts of Total Cost, Average Cost, Marginal Cost, Total Revenue, Average Revenue, Marginal Revenue and Profit.

Markets and Price Determination under Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly.

National Income- Concepts, GDP, GNP, Balance of Payment, Real vs. Nominal Income; Inflation- Concept and Types; Functions of Central Bank.

Notion of Consumption Function, Investment Function, Concepts of IS and LM Curves, Investment Multiplier.

HIGHER SECONDARY (CLASSES XI AND XII)
COMPUTER SCIENCE (PG)

1. **Introduction and Background:**

Generation of computers, Basic building blocks of Computer and their descriptions. Number system – Binary, Octal, and Hexadecimal, Fixed and floating point number representations, Different codes – BCD, Excess – 3, Gray, ASCII, and EBCDIC, Binary arithmetic, Complement representations.

2. **Digital logic:**

Logic gates, Truth table, Minimization of Boolean expressions, Adder, Subtractor, Multiplexer, Encoder, Decoder, Flip Flops, Register, Counters.

3. **Computer Organization:**

CPU Organization with registers, Different addressing modes, Instruction formats, Hardwared and Micro programmed control units, Arithmetic algorithms related to arithmetic operations. Primary memory, Secondary memory Cache memory and Virtual memory, different I/O devices such as keyboard, Mouse, Dot matrix printer, Visual display unit.

4. **Overview of programming:**

Introduction to computer based problem solving, Algorithms – time and space complexity analysis, Flow Chart, Pseudo code, Decision table, structured programming concepts, Programming languages classifications-machine, Assembling and high-level, Translators, Editors, Operating Systems – Multi programming , Multi tasking, Time sharing, Multi processing, Fundamental data Structure concepts – Array Stack, Queue and Linked lists.

5. **Programming Languages:**

BASIC, C, C++, Program design, Implementation of the primitive date structures, Object oriented concepts.

6. **Overview of Software and Packages:**

Utility commands in DOS, Windows and LINUX operating systems, Shell programming and application of batch files, File managements – use of folders, and directory systems, Database programming for commercial applications using packages in star office and use of spreadsheet packages, Elements of word processing.

7. **Computer Network:**

Concept of networking, Client server concepts, E-mail, chat, internet, www, use of scripting language, html, Web page design etc.

HIGHER SECONDARY (CLASSES XI AND XII)
ECONOMICS (PG)

Group –A

1. **DEFINITION AND SCOPE OF ECONOMICS**
Basic problems in every economic society and their solution in different economic systems. A general view of the price system. The elementary theory of demand, supply and market price. The elasticities of demand and supply, Applications of the demand-supply apparatus in price control and rationing, taxation and in the determination of the prices of agricultural and manufactured goods.

2. **THEORY OF CONSUMER BEHAVIOUR**
Concepts of cardinal and ordinal utility – the limitation of cardinal utility analysis. The Indifference Curve approach. Consumer's equilibrium. Income effect, substitution effect and price effect. The Revealed Preference approach.

3. **THE THEORY OF PRODUCTION**
The concept of production function. Production with a single variable input. Production with two variable inputs. Optimal input combination. Cobb-Douglas production function.

4. **THE THEORY OF COST.**
Different concepts of cost. Short-run and long-run cost analysis.

5. **THE THEORY OF THE FIRM AND MARKET ORGANISATION**
   A. Characteristics of perfect competition. Short-run and long-run equilibrium of the firm and the industry. Short-run and long-run supply curve of the firm and the industry.
   B. Monopoly. Bases of Monopoly. Equilibrium under monopoly. Discriminating monopoly.
   C. Characteristics of Monopolistic Competition and Oligopoly

6. **THE MARGINAL PRODUCTIVITY THEORY OF DISTRIBUTION**
Rent and its determination. Supply of labour, determination of wages and the role of trade unions. Elements of profits. Concept of interest – gross and net interest, real and money interest.

7. **CONCEPT OF NATIONAL INCOME**
Different methods of measuring national income. Difficulties in measurement. National Income Determination. Consumption Function and Multiplier. Investment and Saving. Government and the circular flow of income. Fiscal Policy.

8. **THE QUANTITY THEORY OF MONEY**
Fisher's version and Cambridge version. Keynesian Liquidity Preference.

9. **BANKING**
Functions of Central Banks and Commercial Banks; Credit Creation; Credit Control methods.

10. **CONCEPTS OF INFLATION, DEFLATION AND STAGFLATION**
Demand-pull and cost-push inflation. Anti-inflationary monetary and fiscal policies.

11. **PUBLIC FINANCE**
Principles of taxation. Incidence of taxes, Effects of taxation. Public Debt and its effects.

12. **INTERNATIONAL TRADE**
Basis of trade, Gains from trade. Arguments for free trade and protection. Balance of Trade and balance of payments. Measures for correction of disequilibrium in balance of payments. The theory of exchange rates.

Group –B

13. **GROWTH AND DEVELOPMENT**
Features of Less Developed Countries

14. **GENERAL FACTORS IN ECONOMIC DEVELOPMENT**
Role of capital formation and the use of capital-output ratio in development planning. Population Growth and Economic Development.

15. **APPROCHES TO THE THEORY OF DEVELOPMENT**
The Classical theory. The stages of economic growth – Marx and Rostow. Lewis model of development with unlimited labour supply.

16. **STRATEGY OF DEVELOPMENT**
Choice of technique; Balanced vs. Unbalanced growth.

17. **INTERNATIONAL TRADE AND ECONOMIC DEVELOPMENT**
Foreign Aid; Role of Multinational in developing countries. The I.M.F. and the World Bank.

18. **ENVIRONMENT AND ECONOMIC DEVELOPMENT**
The problems of sustainable development.

19. **AGRICULTURE IN THE INDIAN ECONOMY**
Land reforms; Agricultural labour, Agricultural finance, Technological changes – Their impact on the economy. Agricultural marketing. Public Distribution system.

20. **INDUSTRIAL PROBLEMS IN INDIA**
Industrial Policy. Traditional and small scale industries. Some large scale industries—iron and steel, jute and cotton. Industrial Finance. Role and performance of the public sector. Industrial labour and industrial relations. Social Security for industrial workers.

21. **INDIAN BANKING SYSTEM AND MONETARY POLICIES**
Reserve Bank of India –functions, methods of note issue and credit control instruments. Performance of the nationalized commercial banks in recent years. Inflation during the plan period.

22. **FISCAL POLICY IN INDIA**
Revenue and expenditure of the Central Government. Revenue and expenditure of the West Bengal Government. Centre-State Financial relations.

23. **INDIAN FOREIGN TRADE AND BALANCE OF PAYMENTS.**
Changes in the pattern and direction of India's exports and imports. India's balance of payments. Government policies.

24. **INDIAN PLANNING**
Overall objectives of the Five Year Plans. Achievements and failures. Economic Reforms since 1991.

HIGHER SECONDARY (CLASSES XI AND XII)
EDUCATION (PG)

I. Philosophical Foundations of Education

(A) Concept and Aims of Education, Methods of Teaching and Role of Teachers in the light of Idealism, Nauralism, Pragmatism and Marxism.

(B) Philosophical and Psychological bases of Curriculum. Principles of Curriculum Construction. Evaluation of Madhyamik and H. S. Curriculum of W.B. in the light of the principles. Co-curricular activities. Freedom and discipline.

II. Psychological Foundations of Education

(A) Growth and development of the child – Stages and areas of development. Physical, Cognitive, Social and development upto the stage of adolescence.
Intelligence-Concept and Two factor theory.
Personality-Concept and Trait theory.

(B) Theories of Learning: Connectionism (Throndike, Pavlov, Skinner) and cognitive (Gestalt). Factors affecting Learning: Maturation Interest, and Motivation.
Memory and Attention.

III. Sociological Foundations of Education.

(A) Social Groups: Primary and Secondary
Social Processes: Associative and Dissociative.
Education, Society and Social Change.
Education and Socialization.

(B) Current sociological Problems of Education in India: Illiteracy and Universalisation of Primary Education Equality of Educational Opportunity – Education of SC, ST and OBC.

IV. Historical Foundation of Education

(A) Salient features of Brahmonic and Buddhist Education in Ancient Indian. Islamic Education in Mediaeval India.

(B) Landmarks in the History of India Education during pre-independence era;
Serampore Missionary activities in education
Macaulay's contribution to Indian education
Wood's Despatch, Hunter Commission. Sadler Commission. Wardha Scheme, Sargent Report.

V. Modern Development in Indian Education

(A) Landmarks in the History of Indian Education during post-independents era with special reference to structure, curriculum, medium of instruction at the Primary and Secondary stages: Report of the Mudaliar Commission Radhakrishnan Commission, Kothari Commission, Ramamurti Committee and Mitra Commission. Salient features of Education Policy statement, 1968. National Policy on Education, 1986, Contemporary issues in education.

(B) Present structure, administration and progress of Primary and Secondary education in India, particularly in West Bengal.

VI. Contribution of Great Educators

(A) Indian – Vidyasagar, Vivekananda, Rabindranath, Mahatma Gandhi.

(B) Western – Rousseau, Pestalozzi, Dewey and Froebel with special emphasis on Aim of Education, Methology, Discipline, Role of Teacher and their works.

VII. Guidance in Education and Impact of Mass Media on Education

(A) Guidance and Counselling in Education

Concept, Types and Tools of guidance and counselling. Techniques and importance of guidance and counselling.

(B) Impact of Mass Media on Education

Print media, Cinema, Radio, Electronic media including Television.

VIII. Mental Hygiene

(A) Concept and Criteria of Mental Health. Scope of Mental Hygiene.
Maladjustment: Concept and types, Causes, prevention and remedies of maladjustment.
Adjustment Mechanism.

(B) Mental disorder – classification and brief description
Therapeutic measures : Psychoanalytic, Behaviouristic and Play Therapies.

IX. Measurement and Evaluation in Education

(A) Concept of Measurement and Evaluation. Need and Scope of Evaluation in Education, Tools and Techniques of Evaluation. Construction and standardization of Achievement Tests. Defects of present system of Examination and Suggestions for its improvement.

(B) Different types of tests.
Tests for the measurement of Intelligence, Interest and Personality

X. Educational Statistics:

(A) Need for Statistics in Education. Frequency Distribution, Graphical Representation of Data, Measures of Central Tendency, Measures of Variability.

(B) Normal Probability curve its properties and uses. Skewness and Kurtosis. Percentile and Percentile Rank. Derived Scores – Standard Score, T-Score, Coefficient of Correlation by Rank difference and product moment method.

HIGHER SECONDARY (CLASSES XI AND XII)
ENGLISH (PG)

Poetry

Sidney	:	Loving in Truth
Spenser	:	One day I wrote her name
Shakespeare	:	Shall I compare thee....
John Donne	:	The Good Marrow
George Herbert	:	Virtue
Alexander Pope	:	The Rape of the Lock (Cantos I & II)
Blake	:	The Tyger; The Lamb
William Wordsworth	:	Tintern Abbey
Samuel Taylor Coleridge	:	Christabel; Kubla Khan
P. B. Shelley	:	Ode to the West Wind; to a Skylark
John Keats	:	Ode to a Nightingale; To Autumn
Alfred Tennyson	:	Ulysses
Robert Browing	:	My last Duchess
W.B. Yeats	:	The Wild Swans at Coole
Wilfred Owen	:	Strange Meeting
T.S. Eliot	:	Hollow Men

Drama

Shakespeare	:	Macbeth
Goldsmith	:	She Stoops to Conquer
George Bernard Shaw	:	Arms and the Man
J. M. Synge	:	Riders To the sea

Novel

Jane Austen	:	Pride and Prejudice
Charles Dickens	:	David Copperfield

Short Story and Essay

A. Short Story

Joseph Conard	:	The Lagoon
James Joyce	:	Araby
Somerset Maugham	:	The Lotos Eater
Katherine Mansfield	:	The Fly

B. Essay

Charles Lamb	:	Dream Children: A Reverie; The Superannuated Man
G.B. Shaw	:	Freedom
Francis Bacon	:	of Studies

Grammar and Usage

Common Errors
Subject Verb Agreement; Tenses; Active and Passive Voice, Articles, Prepositions, Adverbs, Adjective
Sentence Forms
Simple Compound, Complex, Relative Clauses
Joining and Splitting of Sentences
Narration
Direct and Indirect

Literary Devices:
Rhetoric and Prosody

HIGHER SECONDARY (CLASSES XI AND XII)
ENVIRONMENTAL STUDIES (PG)

MODULE 1: HUMAN SOCIETY AND ENVIRONMENT

a) Basics of Environmental Science
b) Environmental Education and Awareness
c) Interaction between Environment and Civilization
d) Ecological Footprints
e) Genesis of Environmentalism

MODULE 2: SEGMENTS OF THE ENVIRONMENT

a) Origin of Life and Evolution of Environment
b) Atmosphere, Hydrosphere, Lithosphere and Biosphere
c) Bio-geo chemical cycles
d) Climate and Weather

MODULE 3: ECOLOGY AND BIODIVERSITY

a) Principles of Ecology
b) Ecosystems and Services
c) Concepts of Biodiversity
d) Threats to Wildlife
e) Biodiversity Conservation Approaches

MODULE 4: NATURAL RESOURCES

a) Concepts of Natural Resources
b) Non-Renewable and Renewable Resources
c) Wise Use of Resources
d) Conservation and Management
e) Natural Resource Availability in India

MODULE 5: ENERGY SECURITY

a) Energy resources
b) Global Energy Use Patterns
c) Energy prospects of India
d) Conventional Energy Sources
e) Environmental Impacts
f) Renewable Energy Resources
g) Energy Budget of the Earth

MODULE 6: ENVIRONMENTAL POLLUTION

a) Air, Vehicular and Noise Pollution
b) Water, Soil and Marine Pollution
c) Radioactive and Thermal Pollution
d) Indoor Air Pollution
e) Case studies

MODULE 7: WASTE MANAGEMENT

a) Hazardous Wastes and Their Disposal
b) Bioremediation
c) Environmental Management in Industries
d) Recycling of Waste Material
e) Waste Minimization Technologies

MODULE 8: DISASTER MANAGEMENT

a) Nature, Scale and Types of Disaster
b) Natural Disaster
c) Anthropogenic Disaster
d) Effects on Environment
e) Disaster Preparedness and Post Disaster Response
f) Recovery Strategies
g) Case Studies

MODULE 9: ENVIRONMENTAL LAW AND ETHICS

a) Environmental Legislation in India
b) Provisions for Environment in Indian Constitution
c) Existing Acts and Laws in India
d) Indian Organization of Standards and Ecomarks
e) Environmental Ethics
f) Environment Justice

MODULE 10: SUSTAINABLE DEVELOPMENT

a) Nature vs nature
b) Population growth and Carrying capacity
c) Sustainability Indices
d) Strategies of Sustainable Development
e) Economic Development and Cost-Benefit Analysis
f) Using Economics to Assess Environmental Quality.

HIGHER SECONDARY (CLASSES XI AND XII)
GEOGRAPHY (PG)

A. Geo-Tectonics:
Earth's Crust (Composition and Layering); Rocks (Origin, Types and Characteristics); Folds and Faults (Types and Landforms); Mountain Building and Plate Tectonics, Continental Drift. Isostasy, Earthquakes (Causes and Effects) and Volcanoes.

B. Geomorphology:
Lithology and Landform; Weathering; Mass Wasting; Evolution of Slope; Hydrological Cycle; Run-off, Landform and Process (Fluvial, Glacial, Wind, Karst and Marine); Cyclic and Non-Cyclic concepts; Landscape Evolution, Geomorphic hazards.

C. Geographical Thoughts:
Approaches to Geographical Studies (Deterministic, Possibilistic, Quantitative Revolution, Welfare, Societal, Behavioral, Radical Schools, Functional, Structural, Materialistic, Ecological, Regional and Systematic); Concept of Space (Points, Distances, Interactions, Organization, Regions), Emergence of welfare geography.

D. Climatology:
Composition of the Atmosphere; Global Warming and possible consequences; Green House Effect, Elements and Factors of Climate; Insolation, Heat Belts; Pressure Belts; Planetary Wind System; Jet Stream; Humidity and precipitation; Cyclones and Anticyclones; Air mass; Monsoon; Thunderstorms; Climatic hazards, Climatic Classification --- Koppen's and Thornthwait's schemes.

E. Biogeography:
Soils (Factors and Processes of Formation, Soil Profiles, Physical and Chemical Properties); World Soil Groups (Zonal, Azonal and Intra-Zonal0; Soil Erosion and Conservation; Plants (Factors of Plant Growth, Major Types of Natural Vegetation and Environmental Relations); Forest Conservation, Social forestry, Biodiversity, Animal Communities.

F. Environmental Geography:
Ecosystem (Principles and Components, Energy Flow, Food Chain, Food Web and Bio-geochemical Cycles); Biomes (Concepts, Types and Ecological Adaptation); Environmental Degradation and Hazards, Management and Conservation; Meaning of Natural Environment; Man-Environment Relationship; Natural Regions and Environmental Adaptation of Human Life; Economy and Society.

G. Economic Geography:
Resources (Concept and Theories, Creating Factors and Processes, Classification, Utilization-processes, technology and environment quality); Economic Resources (Classification and Significance); Forms of Economy; Activity Components of Resource Utilization (Lumbering, Dairy Farming, Fishing, Mining, Power Generation; Agriculture and Industry), Models of Economic System; Theories of Location of Economic Activity, Ranking of World Economics, WTO and International trade, Economic disparity and social inequality; Sustainable development and impact of globalization.

H. **Human Geography:**
Population (Growth, Distribution, Age-Sex Composition, Occupational Resource; Characteristics of World's Human Resource; Theories of population growth, population growth, food security, unemployment, work participation, gender issues, social well being.

I. **Regional Geography of India:**
Relief; Drainage; Climate; Soil; Forest Resources; Mineral Resources, Power Resources; Irrigation; Agriculture, Industry; Population: Trade and Commerce, Transport, Basis of Regional Divisions of India (Physical and Economic), Concept, nature, type, scale and dimensions.

J. **Cartographic Techniques:**
Scale; Techniques of Data Representation; Map-Classification and Interpretation, Thematic Mapping, Principles and Methods of Projection, Elementary Surveying and Levelling (Principles and Methods with Chain, Compass, Dumpy Level and Theodolite); Common Statistical Techniques for Geographical Data Analysis, Aeria Photo and Satellite Imagery interpretation; Remote Sensing and GIS.

HIGHER SECONDARY (CLASSES XI AND XII)
HINDI (PG)

(1) हिन्दी साहित्य का इतिहास

(क) प्रवृत्तिमूलक अध्ययन : आदिकाल, भक्तिकाल, रीतिकाल, आधुनिक काल।

(ख) उल्लिखित चारों कालों के सामाजिक सांस्कृतिक परिप्रेक्ष्य।

(ग) प्रत्येक कालों के प्रमुख कवियों और कवियों के सामन्य परिचयात्मक अध्ययन।

(घ) हिन्दी भाषाका विकास, हिन्दी की बोलियाँ।

(ङ) राष्ट्रभाषा, राजभाषा और संपर्कभाषा में अंतर।

(2) मध्ययुगीन काव्य : कवियों के काव्यात्मक सामाजिक, सांस्कृतिक विश्लेषण के परिप्रेक्ष्य में :

(क) कबीरदास : सं : पारसनाथतिवारी कबीरवाणी-पद आरंभिक १० साखी आरंभिक २५

(ख) सुर सुषमा : सं नंददुलारे वाजपेयी : पद संख्या 1, 5, 12

(ग) विनय पत्रिका : तुलसीदास : पद संख्या 90, 101, 102, 105, 111, 112, 114, 162, 167, 172.

(घ) बिहारी दोहा– 1, 9, 11, 13, 15, 16, 22, 24, 29, 44, 58, 72, 73, 77, 80, 93, 97, 103, 112.

(3) आधुनिक काव्य : कवियों की प्रमुख रचनाओं के काव्यात्मक और विश्लेषणात्मक विवेचन : प्रसाद, पंत, निराला, महादेवी, अजेय, नागार्जुन।

(4) नाटककार के रूप में– जयशंकर प्रसाद, उपेन्द्रनाथ अश्क, रामकुमार वर्मा, मोहन राकेश की कृतियों का विशेष परिचय

(5) निबंधकार के रूप में– प्रेमचन्द, भीष्म साहनी, रेणु आदि।

(6) उपन्यासकार के रूप में– जयशंकर प्रसाद, प्रेमचंद, यशपाल, जैनेन्द्र, अज्ञेय, मोहन राकेश, राजेन्द्र यादव, मनु भंडारी, रेणु, भीष्म साहनी की कहानीकला

(7) व्याकरण भाग : कारक, संधि, समास, वाच्य, सर्वनाम, विशेषण के भेद, उपसर्ग, प्रत्यय, क्रिया, काल, मुहावरा, अनुवाद कला।

HIGHER SECONDARY (CLASSES XI AND XII)
HISTORY (PG)

I. Feature of the Indus Valley Civilization –decline of the Indus Civilization – the Vedic Civilization – Sodas'a Mahajanapadas – Buddhism and Jainism - The rise and fall of the Maura Empire: Asoka's Dhamma – Imperial Guptas – Palas and Senas of Bengal.

II. The establishment of the Delhi Sultanate – The Slave dynasty – the Khilji and Tughluq Rulers – The Khilji Revolution - The administrative structure under the Sultanate including provincial government – The problem of theocracy - the Vijayanagar Empire.

III. Disintegration of the Sultanate – Babar – the importance of his invasion of India – Mughal – Afghan contest and Sher Shah Suri – Consolidation of the Mughal empire under Akbar – Territorial expansion under Akbar – Manasabdari System – Religious policy.

IV. An overview of the reigns of Jahangir and Shahjahan – Aurangzeb's expansionist policies – conflict with the Marathas – Shivaji – The character of the Maratha Swarajya – Aurangzeb and the disintegration of the Mughal empire – The growth of regional powers, Bengal, Awadh, Hyderabad and the crisis of the empire in the early eighteenth century.

V. Causes of the conflict between Siraj-ud-daula and the East India Company – Mir Kasim, private trade and the English East India Compay – Brief Overview of British expansion - the Colonial Economy : Land revenue settlements – Drain of Wealth – Deindustrialization – Limited development of modern industries.

VI. Early resistance to British rule – Paik, Chur & Poligar rebellions – Wahabi and Farazi movements – Santal Rebellion – The revolt of 1857; context and nature, Western Education and Social reform – Rammohan Ray, Young Bengal & Vidyasagar - Brahmo Samaj and prarthana Samaj – Aligarh Movement: Early stages of Indian nationalism – pre-Congress associations – foundation of the Congress – the nature of the early Congress.

VII The rise of Extremism in Indian Policies – Anti-parition and Swadeshi movement – separate electorate and the British divide and rule policy: Gandhi and Indian nationalism – Non-Co-operation, Civil Disobedience, Quit India Movement: Muslim League and the demand for Pakistan – Partition and Independenc.

VIII. The French Revolution of 1789 – Social context of the Revolution of Popular movement – the Reign of Terror: Robespierre – the rise of Napoleon Bonaparte – Napoleon's internal reconstruction – Napolean and Europe: Expansion and collapse of the Napoleonic empire.

IX. The Vienna Congress (1815) – The Metternich System – The Revolutions of 1830 – 1848 – the new political ideologies : Nationalism, Liberalism and Socialism – the unification of Germany and Italy – Industrialization in England and Europe.

X. European imperialism : Economic forces behind European Imperialism of the late 19th Century – colonialism and the Scramble for Africa –Germany's Welt Politik – Triple Alliance and Triple Entente – the origins of the First World War Peace settlement of 1919 – The Russian Revolution – Weimar Republic and the rise of Nazism in Germany – Fascism in Italy – Origins of the Second World War.

SYLLABUS FOR PHYSICAL EDUCATION (XI- XII)

1. Physical Education, Olympics, Recreation and Outdoor Education

Definition, meaning, aim, objectives, need, importance and scope of Physical Education, Modern concept of Physical Education, Play, Games and Sports, Body Types.

History of Physical Education in India, Contribution of important institutions and personalities, Sports awards of India, Sports organizations in India; Contribution of Akhara, Bratachari and Vyamshala, Olympic Games, Asian Games, Commonwealth Games.

Recreation in Physical Education and Modern Society, Outdoor education: Camp, Adventure Sports, Excursion, Picnic, Play Day; Folk Games culture of West Bengal.

2. Anatomy, Physiology and Exercise Physiology

Structure and functions of skeletal system including joint types and their movements, Structures and functions of muscular, circulatory and respiratory system.

Effect of exercise and training on muscular system, circulatory system and respiratory system. Tidal Volume, Residual Volume, Second wind, Minute ventilation, Vital capacity, Respiratory rate, Lung Volume; Athletic Heart, Stroke Volume, Cardiac output, Oxygen Debt, Blood Pressure, Pulse pressure, Heart rate. Blood: Composition, Group and Functions.

3. Psychology and Sociology of Physical Education and Sports.

Psychology and Sports Psychology, Learning, Motor learning, Transfer of training and learning, Personality, Attention, interest, instinct and emotion in Physical Education & Sports, Growth and development, Anxiety, Stress, Motivation, Aggression in Physical Education and Sports.

Sociology and Sports Sociology, Social values of Sports; Group dynamics; Leadership quality, Play theory; Social service and Social Agencies.
Meaning and concept of Gender studies; Sex differences; Gender inequalities in Sports; Women in Sports, Barrier of Women participation in Sports in our society.

4. Kinesiology and Biomechanics

Definition, Importance and Need; Different types of joint movements; Types of Muscle Contractions; Posture; Force, Lever, Laws of Motion, Friction, Projectile, Axes, Planes, Center of Gravity, Equilibrium; Analysis of Human Fundamental Movements.

5. Sports Training and Sports Medicine

Definitions, Aims, Objectives and Principles of Sports Training. Warm-up, Cooling down, Conditioning, De-conditioning; Differentp physical fitness components and its development; Training Load; Planning and Periodisation; Different Methods of Sports Training. Talent identification.

Meaning, definition and concept of sports medicine and rehabilitation; Aims, Objectives and principles of rehabilitation. Different rehabilitative exercises. Sports injury and its management. Postural deformities and corrective exercises; Massage. Doping.

6. **Health Education, Fitness and Wellness**

Definition, meaning and concept of Health, Health Education, Health Instruction and Health Supervision; Dimensions, Spectrum and determination of health; Health Service and personal hygiene; Communicable and non-communicable diseases; First Aid.

Meaning and modern concept of fitness; Physical fitness (Skill-related and health-related); Definition, meaning and concept of Wellness; Component of Wellness, Dimensions of wellness; Factors affecting wellness; Modern lifestyle; Effect of Smoking, Alcohol & Drugs; Hypokinetic diseases and its management; Stress management.

Physical activity and health benefits; Concept of Aerobic and anaerobic exercises; Different types of exercises for fitness development; Weight management; Obesity, BMI, Body composition, Balance diet, Food and nutrition and Sports nutrition, Types of nutrients (Macro and Micro); Role of Carbohydrate, Protein, Fat and Minerals for Sports performance.

7. **Educational Technology, Methods of Teaching and ICT**

Definition, Factors of teaching; Types of Education; Various methods (Indoor & Outdoor) of teaching used in Physical Education; Presentation Technique; Teaching Aid; Learning Design (Different types of Lesson Plans); Classification of students.

Need and Importance of ICT in Physical Education and Sports; Components and use of Computer in Physical Education and Sports; Software and their uses in Physical Education and Sports; MS Word; MS Excel; MS Power Point; Computer Memory; Types and Functions of Computer Network; Computer Virus.

8. **Test, Measurement and Evaluation**

Definition of test, measurement and evaluation; Criteria of a good test, need and importance of test, measurement and evaluation.

Measurement of strength, endurance, agility, flexibility, speed, reaction time, balance, coordination, body composition, strength endurance and power.

Skill Test: - Soccer, Basketball, Volleyball, Hockey, Tennis and Badminton.

Harvard Step Test, Queen's College Test, Beep Test, Margaria-Kalamen Test, Barrow Motor Ability Test, Youth Fitness Test and Health Related Physical Fitness Test.

Anthropometric Measurement, Measurement- Skin fold and Waist Hip Ratio.

9. **Management and Officiating in Physical Education and Sports**

Definition, Importance, Purpose, Principles, Scope of Sports Management and Officiating. Importance and Functions of Office Management; Care of equipments; Public Relations in Sports; Sports Journalism and Mass Media; Budget, Purchase, Duties and responsibilities of Officials, Qualities of an Official; Tournaments, Intramural and Extramural Competitions; Layout of Play fields, Grounds and Courts. Rules, Regulations and Officiating of Games & Sports.

10. **Yoga Education and Inclusive Education**

Definition of Yoga; Classical approach to Yoga Practices; Chakras, Nadis, Astanga Yoga, Karma Yoga, Kriya Yoga, Hatha Yoga; Yoga Therapy; Pancha Kosa; Patanjali Yoga Sutra; Effect of Asana and Pranayama on Human Body. Bandha, Mudra and Kriya.

Concept of Special Education: Integrated Education, Inclusive Education and their Relationship to Physical Education; Factors Affecting Inclusion; Advantages of Inclusive Education for the individual and society.

HIGHER SECONDARY (CLASSES XI AND XII)
MATHEMATICS (PG)

A. CLASSICAL ALGEBRA:

1. Integers: Statement of well ordering Principle, first and second principles of mathematical induction. Proofs of some simple mathematical results by induction. Divisibility of integers. The division algorithm. The greatest common divisor of two integers a and b – its existence and uniqueness. Relatively prime integers. Prime integers. Euclid's first theorem; if some prime p divides ab, them p divides a or b. Euclid's second theorem: there are infinitely many prime integers. Unique factorization theorem.
2. Complex numbers: Definition on the basis of ordered paris. Algebra of complex numbers, Modulus, Amplitudes, Argand Diagram, De-Moivre's theorem and its applications, Exponential, Sine, Cosine and Logarithm of a complex number.

   Definition of a^z ($a \neq 0$), Inverse Circular and Hyperbolic functions.
3. Polynomials with real co-efficeints: Fundamental theorem of classical algebra (statement only). The nth degree Polynomial equation has exactly n roots. Nature of roots of an equation (Surd and imaginary) roots occur in pairs). Statement of Decartes rule of signs and its applications. Multiple roots. Relation between roots and coefficients. Symmetric functions of roots. Transformation of equations. Reciprocal equations. Cardan's method of solving a cubic equation. Ferrari's method of solving a bi-quadratic equation.
4. Inequalities: A. M. $\geq$ G.M. $\geq$ H.M. and Cauchy's inequality – their simple and direct applications.

B. MODERN ALGEBRA

1. Basic Concepts: Sets, subsets, equality of sets, operations on sets – Union, Intersection, Complements and Symmetric difference. Properties including De-Morgan's laws. Cartesian products, Binary relation from a set to a set (domain, range, Examples from R x R). Equivalence relation. Fundamental thereon on Equivalence relation. Partition, Relation of partial order. Congruence relation modulo n is an equivalence relation.. Congruence classes. Mapping Inijection, Surjection and Bijection. Inverse and Identity mapping. Composition of mappings and its associativity.
2. Introduction of Group Theory: Groupoid, Semi-group, Monoid, Group definition with both sided identity and inverses. Examples of finite and infinite groups taken from various branches. Additive (multiplicative) group of integers modulo an integer (resp. a prime). Klein's 4 group Integral powers of an element and laws of indices in a group. Order a group and order of an element of a group. Subgroups. Nec. And Suff. Condition for a subset of a group to be subgroup. Intersection and Union of two subgroups. Cosets and Lgrange's theorem. Cyclic groups – definition, examples and subgroups of cyclic groups. Generators Permutations. Cycle. Transposition. Even odd permutations. Symmetric group. Definition and order of Alternating subgroup. Normal subgroups of a group -- Definition, examples and characterizations.

   Quotient group of a group by a normal subgroup. Homomorphism and Isomorphism of groups. Kernel of homomorphism. Fundamental

theorem of homomorphism. An infinite cyclic group is isomorphic to (z, +) and a finite cyclic group of order n is isomorphic to the group or residue classes modulo n.

3. Introduction to rigns and fields: Ring-definition and example. Ring of integers modulo n. Properties directly following from the definition. Integral domain and Field-Definitions and examples. Sub-ring sub-field & characteristic of a ring.

C. MATRIX THEORY AND LINEAR ALGEBRA:

1. Matrices of Real and Complex Numbers: Definition, examples, equality, addition, multiplication of matrices, Transpose of a matrix, Symmetric and Skew-symmetric matrices.
2. Determinants: Definition of a determinant of a square matrix, Basic properties, Minors and Cofactors, equations by Cramer's rule. Problems of determinants up to order 3.
3. Rank of a Matrix: Adjoint of a square matrix. For a square matrix A of order n, A. Adj. A – Adj A. A = det A. Singular, non-singular and invertible matrices. Elementary operations. Rank of matrix and its determination. Normal forms: Elementary matrices; The normal form equivalence of matrices. Congruence of Matrices. Diagonalisation of matrices. Real quadratic from involving three variable. Reduction to Normal form.
4. Vector/ Linear Space Over a Field: Definition and example of vector space. Subspace. Union, Intersection and sum of vector spaces. Linear span. Generators and basis of a vector spaces. Formation of basis from linearly independent subset. Special emphasis of R.
5. Row-space and column-space of a matrix: Definitions of row-space and column-space of a matrix. Row rank, column rank and Rank of a matrix.
6. System of Linear Equations: Solution space of a homogeneous system as a subspace. Condition for the existence of non-trivial solution of a system of linear homogeneous equations. Necessary and sufficient conditions for the consistency of a system of non-homogeneous equations. Solution of system of equations by matrix method.
7. Linear Transformation on Vector Spaces: Definition of linear transformation. Null space, Range space, Rank and Nullity of linear transformation. Sylvester's law of Nullity. (Inverse of linear transformation relative to ordered bases of finite dimensional vector spaces.)
8. Inner product space: Definition and examples. Norm. Euclidean Vector space – Triangle inequality and Cauchy – Schwarz inequality in Euclidean vector space. Orthogonality of vectors. Orthonormal basis. Gram-Schmidt process of Orthonormalization.
9. Eigen value and Eigen vector, Characteristics equation of a square matrix. Caley-Hamilton's Theorem. Simple properties of Eigen values and Eigen vectors.

II. REAL ANALYSIS

1. Real-Number: Geometric representation and Cantor, Dedekind Axiom. Salient properties taken as axioms Bounded set. Least upper bound axioms. Archimedean property. Decimal representation of real numbers.

2. Points Sets in R^1 and R^2: Elementary properties and union of atmost denumerable sets. Denumberability of rational numbers and non-denumberability of real numbers and of an interval. Neighbourhood of a point, interior point, of linear point set, open and closed sets, limit point of a set in R^1 and R^2 concepts and simple properties. Union, intersection and complement of open and closed sets and Bolzano-Weiestrass theorem in R^1. Covering by open intervals of linear point set, Lindeloff covering theorem and Heine Borel theorem (statements only) and compact sets in R^1.
3. Real-valued functions defined on intervals: Bounded and monotonic functions. Limits, Algebra of limits. Sandwich rule, condition for the existence of a finite limit. Important limits like.

$\frac{\sin x}{n}$, $\frac{\text{Log}(1+x)}{x}$, $\frac{e^x - 1}{x}$ as $x \to 0$ etc.

4. Sequence of Points in One Dimension: Bounds, limits, convergence and divergence. Operation on limits. Sandwich rule. Monotone sequence. Nested interval therem. Cauchy's General Principle of convergence. Cauchy sequence, Limits of important sequence. Definition of e. Cauchy's first and second limit theorem. Subsequence.
5. Infinite Series of Constant Terms: Convergene and divergene. Cauchy's criterion. Abel-Pringsheim's Test. Tests (Comparison test, Root Test) convergence of series of non-negative terms.
   Series of arbitrary terms. Absolutely convergent and conditionally convergent series. Alternative series. Leibnitz test. Root and Ratio Tests. Non-absolute convergence --- Abel's and Dirichlet's tests (statement and applications)
6. Continuity of a function at a point and on an interval: Continuity of some standard functions, continuity of composite functions. Piecewise continuous functions. Uniform continuity. Discontinuities of different kinds. Properties of continuous functions on a closed interval. Existence of inverse functions of a strictly monotone function and its continuity.
7. Concept of Differentiability and differential: Chain rule. Sign of derivative. Successive derivatives. Leibnitz theorem. Theorms on Derivatives : Darbox theorem, Rolle's theorem. Mean value theorems of Lagrange and Cauchy. Taylor's theorem.
   Maclaurin's series. Expansion of e^x, a^x, $a > 0$, $\log (1+x)$ $(1+x)^m$, Sinx, Cosx etc. with their respective ranges of validity.
8. Indeterminate forms: L Hospital's rule and its consequences.
9. Maxima and Minima: Points of local extremum of a functions in an interval. Sufficient condition for the existence of a local mixiumum/minimum of a function at a point. Applications in Geometrical and Physical problems.
10. Tangents and Normals: Pedal equation, Peadal of a curve, Rectilinear Asympotes (Cartesian and parametric form). Curvature- radius and centre of curvature. Chord of curvature. Curve-Tracing (familiarity with well-known curves)

11. Indefinite and Suitable Corresponding Definite integrals for the functions,

$\sin^m x$, $\cos^n x$, $\sin^n x$, $\frac{\sin^m x}{\cos^n x}$, $\tan^n x$, $\sec^n x$

$\cos^m x$, $\sin^n x$ etc. $\frac{l\cos x + m \sin x}{p\cos + q\sin x}$

$\frac{1}{(a + \cos x)^n}$ $\frac{1}{(n^2 + a^2)^n}$ where 1, m, p, q, n are positive integers

12. Area enclosed by a curve, length of a curve.
13. Sequence of functions: Pointwise and uniform convergence. Cauchy's criterion of uniform convergence. Limit function:
Boundness, Repeated limits, continuity and differentiability.
14. Series of functions: Pointwise and uniform convergence. Tests of convergence statements of Abel's and Dirichlet's tests and their applications.
Passage to the limit term-by-term; boundedness, continuity, integrability and differentiability of a series of functions in case of uniform convergence.
15. Power Series: Radius of convergence of its existence, Cauchy Hadamard theorem. Uniform and absolute convergence. Properties of sum function. Abet's limit theorems. Uniqueness of P. S. having the same sum function, Exponential. Logarithm and trigonometric functions defined by power series and deduction of their salient properties.
16. Riemann integration: Upper sum and lower sum. Upper and lower integral. Refinement of partitions and associated results. Darboux theorem. Necessary and sufficient condition of integrability. Integrability of sum, product, quotient and modulus. Integral on the limit of a sum. Integrability monotone function, continuous function and piece wise continuous function. Primitive, properties of definite integral, Fundamental theorem of integral calculus First and second mean-value theorem of integral calculus (statements and applications only).
17. Improper Integrants: Tests of convergene : comparison and r-test (statement only). Absolute and non-absolute convergence-corresponding test (statement only). Working knowledge of Beta and Gamma functions and their interrelations.
18. Functions of two variable: Limit, continuity, partial derivatives. Functions on R^2 differentiability, differential. Chain rule. Euler's theorem, commutativity of partial derivatives statement of Schwarz and Young theorems.

III. DIFFERENTIAL EQUATIONS

1. Significance of ordinary differential Equations: Geometrical and physical consideration. Formation of differential equation by elimination of arbitrary constants. Meaning of the solution of ordinary differential equation. Concepts of linear and non-linear differential equations.

2. Equations of first order and first degree: Statement of existence theorem. Separable, homogeneous and exact equations, condition of exactness, integrating factor. Equations reducible to first order linear equations.
3. First order linear equations: Integrating factor. Equations reducible to first order linear equations.
4. Equations of first order but not of first Degree: Clairaut's equation, singular solution.
5. Applications: Geometric applications, Orthogonal trajectories.
6. Higher order linear equations with constant coefficients: Complementary function. Particulars integral, Symbolic operator. D. Method of variation of parameters. Euler Equations – reduction to an equation of constant coefficients.

IV. ANALYTICAL GEOMETRY OF TWO AND THREE DIMENSIONS

A. TWO DIMENSIONS

1. Transformations of rectangular Axes: Translation, Rotation and their combinations. Theory of Invariants.
2. General Equations of Second Degree in two variables: Reduction to canon.
3. Paris of straight lines: Condition that the general equation of second degree in two variable may represent two straight lines. Point of intersection of two intersection straight lines. Angle between two lines given by $ax^2 + 2hxy + by^2 = 0$ Angle bisectors. Equation of two lines joining the origin to the points in which a line meets a conic.
4. Circle, parabola, ellipse and phyperbola : Equations of pair of tangents from an external point, chord of contact, Poles and Polars. Conjugate point and conjugate line.
5. Polar Equations: Polar equations of straight lines, circles and conic referred to a focus as pole, Equations of tangent, normal and chord of contact.

B. THREE DIMENSIONS

1. Rectangular cartesion co-ordinate in space: half and octants concept of a geometric vector (directed line segment projection of a vector on co-ordinate axis. Inclination of a projection of a vector on co-ordinate axis. Inclination of a projection of a vector on co-ordinate axis. Inclination of a vector with an axix. Co-ordinates of a vector. Direction cosine of a vector. Distance between two points. Division of a directed segment in a given ratio.
2. Equation of plane: General form, intercept and Normal forms. The sides of a plane signed distance of a point from a plane. Equation of a plane passing through the intersection of two planes. Angle between intersection planes, Besectors of angels between two intersecting planes. Parallelism and perpendicularity of two planes.
3. Straight lines in space: Equation (symmetric and parametric form) Direction ratio and Direction cosines. Canonical equation of the line of intersection to two intersecting plane. Angle between two lines. Distance of a point from a line. Condition of coplanarity of two lines. Equations of skewlines. Shortest distance between two skew lines.

4. Sphere: General equation, circle, sphere-through the inter section of two-spheres. Radical Plane. Tangent, Normal.
5. General equation of 2nd degree in 3 variable. Reduction to canonical forms. Classification of quadrics.

V. VECTOR ALGEBRA & ANALYSIS

1. Vector Algebra: Vector (directed line segment) Equality of two free vectors. Addition. Multiplication by a scalar. Position Vector: Point of division. Conditions of collinearity of 3 points and co planarity of 4 points. Rectangular components of a vector in two and three dimensions, product of two or more vectors: scalar and vector products, Scalar triple products and vector triple products. Products of four vectors.
   Direct applications of vector algebra in (i) Geometrical, trigonometrically problems, (ii) Work done by a force. Moment of a force about a point, vectorial equations of straight lines and planes. Volume of trahedron. Shortest distance between two skew lines.
2. Vector Analysis: Vector differentiation with reference to a sector variable. Vector functions of one scalar variable. Derivative of a vector. Second derivative of a vector. Derivatives of sums and products. Velocity and Acceleration as derivative.

VI. MECHANICS - I

1. Composition and Resolution of coplanar concurrent forces. Resolution of forces. Moments and Couples.
2. Reduction of a system of coplanar forces. Conditions of equilibrium of coplanar forces.
3. Fundamental ideas and principles of Dynamics. Laws of motion. Impulse and impulsive forces. Work, power and energy, principles of conservation of energy and momentum.
4. Motion in a straight line under variable acceleration. Motion under inverse square law. Composition of two S. H. M's of nearly equal frequencies. Motion of a particle tied to one end of an elastic string. Rectilinear motion in a resisting medium. Damped forced oscillation. Motion under gravity where the resistance varies as some integral (nth) power of velocity. Terminal velocity.
5. Impact of elastic bodies. Newton's experimental law of elastic impact. Loss of K. E. in a direct impact.
6. Expressions for velocity and acceleration of a particle moving on a plane in Cartesian and Polar co-ordinates. Motion of a particle moving in a plane in Cartesian and Polar co-ordinate.
7. Central forces and central orbits. Characteristics of central orbits.
8. Tangential and Normal accelerations. Circular motions.
9. Motion of a particle in a plane under different laws of resistance. Motion of a projectile in a resisting medium in which the resistance varies the velocity.
10. Laws of friction, cone of friction. To find the positions of equilibrium of a particle lying on a (i) rough plane curve, (ii) rough surface under the action of any given forces.
11. General formula for the determination of centre of gravity.

VII LINEAR PROGRAMMING PROBLEM (L.P.P.)

1. Definition of L.P.P. Formation of L.P.P. from daily life involving inequations. Graphical solution of L.P.P.
2. Basic solution and Basic Feasible solution (BFS) with reference to L.P.P. Matrix formulation of L.P.P. Degenerate and non-degenerate B.F.S. Hyperplane, convex set, Cone, Extreme points. Convex hull and convex polyhedron. Supporting and separating hyperplane. Simple results on convex sets like the collection of all feasible solutions of an L.P.P. constitutes a convex set.
   The extreme points of the convex set of feasible solutions correspond to its B. F.S. (no proof). The objective function has its optimal value at an extreme point of the convex polyhedron generated by the act of feasible solutions (no proof). Fundamental theorem (no proof). Reduction of a F.S. to a B.F.S.
3. Slack and Surplus variables. Standard form of L.P.P. theory of simplex method. Feasibility and optimality conditions.
4. The algorithm. Two phase method. Degeneracy in L.P.P. and its resolution.
5. Duality Theory: The dual of the dual to the Primal.
   Relation between the objective values of dual and the primal problems. Relation between their optimal values. Complementary slackness. Duality and simplex method and their applications.
6. Transporation and Assignment problems, and that optimal solution.

VIII. MECHANICS - II

1. Laws of friction, cone of friction. To find the positions of equilibrium of a particle lying on a (a) rough plane curve, (ii) rough surface under the action of any given forces.
2. General formula for the determination of centre of gravity.
3. Astatic equilibrium, Astatic Centre. Positions of equilibrium of a Particle lying on a smooth plane curve under action of given forces.
4. Virutal work: Principle of virtural work for a single particle. Deduction of the conditions of equilibrium of a particle under coplanar forces from the principle of virtual work. The principle of virtual work for a rigid body. Forces which do not appear in the equation of virtual work. Forces which appear in the equation of virtual work. The principle of virtual work for any system of coplanar force acting on a rigid body.
   Converse of principle of virtual work.
5. Forces in 3-dim: Moment of a force about a line. Axis of couple. Resultant of any number of couples acting on a rigid body. Reduction of a system of forces acting on a rigid body. Poinsot's Central axix. Wrench, Pitch, Intensity and screw. Invariant and equation of the central axis of a given system of forces.
6. Motions under inverse square law in a plane. Escape velocity. Planetary motions and Keplar's Laws. Artificial satellite Motion. Slightly disturbed orbit. Conservative field of force and principles of conservation of energy, Motion under rough curve (circle, parabola, ellipse, Cycliod) under gravity
7. RIGID DYNAMICS:

Moments and products of inertia. Theorem of parallel and perpendicular axes. Principles axes of inertia, momental ellipsoid Equimomental system. D'Alembert's principle. Equation of Motion. Principles of moments. Principle of conservation of linear and angular momentum. Principles of energy.

Equation of Motion of a rigid body about a fixed axis.

Expression for K.E. and moment of momentum of a rigid body moving about a fixed axis. Compound pendulum.

Equation of Motion of a rigid body moving in 2-dim. Expression for K. E.and angular momentum about the origin of a rigid body moving in 2 dim.

Motion of a solid revolution moving on a rough horizontal & inclined plane.. Conditions for pure rolling.

Impulsive action.

Generalised coordinates, momentum

Lagrangian, Cyclic coordinates, Ronthian

IX. A. MATHEMATICAL THEORY OF PROBABILITY

Random experiments. Simple and compound events. Event space. Classical and frequency definitions of probability and their drawbacks. Axioms of probability, Statistical regularity. Multiplication rule of probabilities. Bayes theorem. Independent events. Independent random experiments. Independent trials. Bernoulli trails and law. Multinominal law. Random variables, Probability distribution. Distribution function, descrete and continuous distributions. Bimominal, Poison, Uniform, normal distribution. Cauchy gamma distributions. Beta distribution of the first and of the second kind. Poison process. Transformation of random variables. Two-dim, prob. Distribution. Discrete and continuous distributions in two dimensions. Uniform distributions, and two-dimensional normal distribution. Conditional distributions. Transformation of random variables in two dimensions. Mathematical expectation. Mean, variance, moment, central moments. Measures of location, dispersion, skewness and Kurtosts. Median, Mode, quartiles, Moment-generating function characteristics function. Two dimensional expectation. Covariance. Co-relation Co-efficient. Joint characteristic function. Multiplication rule for expectations, conditional expectations, Regression curves, least square regression lines and parabolas. Chi square and distributions and their important properties, inequality Convergence in probability. Bermouli's limit theorem. Law of large numbers. Poissons approximation to binomial distribution. Normal approximation to binomial distribution. Concept of asymptotically normal distributions. Statement of central limit theorem in the case of equal components and of limit theorem for characteristic functions and in applications. (Stress should be more on distributive function theory than on combinational problems. Different combinatorial problems should be avoided).

B. MATHEMATICAL STATISTICS:

Random samples. Distribution of the sample. Tables and graphical representations. Grouping of data. Sample characteristic and their computation. Sampling distribution of a statistic. Estimates of a population characteristic or parameter. Unbiased consistent estimates. Sample characteristics as estimates of the corresponding population

characteristics. Sampling distributions of the sample mean and variance. Exact sampling distributions for the normal populations.

Bivariate samples. Scatter diagram. Sample correlation coefficient. Least square regression lines and parabolas. Estimation of parameters. Method of maximum likelihood. Applictions to binomial. Normal populations. Confidence intervals. Such intervals for the parameters of the normal populations. Approximate confidence interval for the paratmer of a binomial population. Statistical hypothesis. Simple and composite hypothesis. Best critical region of a test. Neyman Pearson theorem and its applications to normal populations. Likelihood ratio testing and its applications to normal population.

X.NUMERICAL ANALYSIS

1. Computational Errors: Round-off errors, significant digits, errors in arithmetical operations, guard figures in calculations.
2. Interpolation: Polynomial Interpolation, remainder, Equally-spaced interpolating points-difference, difference table, propagation of errors; Newton's forward and backward, Stirling and Bessel interpolation formulae, divided differences, divided difference, formula, confluent divided differences, inverse interpolation.
3. Numerical Differentiation: Error in numerical differentiation. Newton's forward and backward and Lagrange's numerical differentiation formula.
4. Numerical Integration: Degree of precision, open & closed formulae, composite rules. Newton-Cotes (closed-type) formula – Trapeezoidal, Simpson's one third and Weddle's rules, error formulae in terms of ordinates (proofs not necessary).
5. Numerical Solutions of Equations: Initial approximation by methods of tabulation and graph, methods of bisection, fixed point iteration with condition of convergence. Newton – Raphson & Regula-falsi methods, computable estimate of the error in each method.
6. Solution of ODE:
   First Order First degree: By Euler, RK4 and Milne's method.

HIGHER SECONDARY (CLASSES XI AND XII)
PHILOSOPHY (PG)

Group –A (INDIAN PHILOSOPHY)

1. **GENERAL FEATURES OF INDIAN PHILOSOPHY**

2. **CARVAKA:**
   - (a) Epistemology
   - (b) Metaphysics
   - (c) Ethics

3. **JAINISM**
   - (a) Anekantavada, (b) Syadvada, (c) Jaina theory of self and liberation

4. **BUDDHISM**
   - (a) Four noble truths, (b) Pratityasamutpada, (c) Nairatmyavada,
   - (d) Ksanabhangavada, (e) Four schools of Buddhism.

5. **NYAYA- VAISESIKA**
   - (a) Nyaya epistemology
   - (b) Nyaya theory of God
   - (c) Nyaya theory of soul
   - (d) Vaisesika metaphysics:
     - (i) Categories of reality (Padartha)
     - (ii) Dravya – Definition of dravya and its different kinds.
     - (iii) Guna – Definition of guna and a short account of its different kinds.
     - (iv) Karma – Definition and a short account of its different kinds.
     - (v) Samanya – Definition of samanya. Samanya and jati, upadhi and jati. Arguments for accepting samanya as a padartha. Classification of samanya. Jatibadhakas.
     - (vi) Visesa – Definition of visesa.

     Arguments for accepting visesa as a separate category
     - (vii) Samavaya – Definition of samavaya Distinction between samyoga and samayaya.

     Distinction between samavaya and svarup-sambandha.
     Arguments for accepting samavaya as a category
     Arguments for accepting samavaya as one and eternal
     - (viii) Abhava – Justification for accepting abhava as a separate category of reality.

     Refutation of the Prabhakara view that abhava is non-different from its locus.
     Different kinds of abhava

6. **SAMKHYA AND YOGA**
   (a) Samkhya theory of causation (satkaryavada); different forms of satkaryavada.
   (b) Samkhya theory of Prakrti
   (c) Samkhya conception of Guna
   (d) Relation between Prakrti and Gunas
   (e) Proofs for the existence of prakrti
   (f) Samkhya theory of Purusa; proofs for the existence; of purusa Doctrine of plurality of selves.
   (g) Theory of evolution (after Vacaspati's commentary)
   (h) Samkhya theory of liberation – jivanmukti and videhamukti.
   (i) Yoga conception of God.
   (j) Cittabhumi and Cittavrtti
   (k) Eight – fold means of Yoga.
   (l) Samadhi – its different types.

7. **MIMAMSA (PRABHAKARA AND BHATTA)**
   (a) Arthapatti and Anupalabdhi as sources of valid knowledge.
   (b) Pramanyavada in respect of origin of knowledge and knowledge of knowledge.

8. **VEDANTA (SAMKARA AND RAMANUJA)**
   (a) Nature of Brahman, according to Samkara.
   (b) Saguna Brahman and nirguna Brahman, according to Samkara.
   (c) Relation between Brahman and the world (Jagat) according to Samkara.
   (d) Samkara's doctrine of Maya
   (e) Ramanuja's criticism of Samkara's doctrine of Maya
   (f) The Advaita theory of liberation – Jivanmukti and videhamukti
   (g) Ramajuja's theory of Brahman
   (h) Relation between Jiva and Brahman, according to Ramanuja

Group –B (ETHICS)

1) The Nature of Ethics
2) Moral and Non-moral Action
3) The Nature of Moral Judgement
4) Object of Moral Judgement
5) Postulates of Morality
6) Theories of Punishment
7) Standard's of Morality

Hedonism:

(a) Psychological and Ethical, (b) Egoistic Hedonism, (c) Gross Egoistic Hedonism, (d) Refined Egoistic Hedonism (e) Altruistic Hedonism – Bent ham's Theory, (f) Mill's Utilitarianism, (g) Act – Utilitarianism and Rule – Utilitarianism

9. **Deontological Theories**
   Act - Deontological Theories
   Rule – Deontological
   Theories Kant's Theory

10. Practical Ethics

(i) The concept of Practical Ethics
(ii) Euthanasia
(iii) Killing Animals
(iv) Environmental Ethics

Group – C
(HISTORY OF WESTERN PHILOSOPHY)

Plato :	(a)	Theory of Knowledge
	(b)	Theory of Forms
Aristotle:	(a)	Doctrine of Causality
	(b)	Theory of Substance
	(c)	Matter and Form
	(d)	Criticism of Plato's Theory of Forms
Descartes:	(a)	Cartesian Method
	(b)	Cartesian Method of Doubt
	(c)	Cogito ergo sum
	(d)	Criterion of Truth
	(e)	Theory of Ideas
	(f)	Proofs for the Existence of God
	(g)	Doctrine of Substance
	(h)	Mind-Body Relation
	(i)	Proof of the External World
Spinoza:	(a)	Doctrine of Substance
	(b)	Relation between Substance and Attributes
	(c)	Doctrine of Modes
	(d)	Theory of Knowledge
	(e)	Mind – Body Relation
	(f)	Conception of Freedom; Intellectual Love of God.

Leibnitz: Doctrine of Monads: Truths of Reason of Truths of Fact; The Principles of Non-Contradiction, Sufficient Reason and the Identity of Indiscernibles; The Doctrine of Pre-established Harmony; Theory of Knowledge. Problem of Evil.

Locke: Refutation of Innate Ideas and Principles; Theory of Ideas: Distinction between Primary and Secondary Qualities. Theory of Knowledge.

Berkeley: Rejection of Materialism; Criticism of Abstract Ideas; Rejection of the Distinction between Primary and Secondary Qualities; Esseest Percipi; Role of God in Berkeley's Philosophy.

Hume: Distinction between Impressions and Ideas; Relation of Ideas and Matters of Facts; Causality; Self, Scepticism.

Kant: Apriori and Empirical Knowledge; Analytic and Synthetic Judgement; Synthetic Apriori Judgement-Kant's Problem; Copernican Revolution in

Philosophy; Space and Time; Categories of the Understanding.

Group – D
(PSYCHOLOGY)

Methods of Psychology: Introspection: Extrospection; Experimental Method.
Sensation: Definition; Attributes of Sensation; Weber-Fechner Law
Perception: Definition; Distinction between Sensation and Perception; Gestalt Theory of Perception.
Memory: Factors of Memory: Marks of Good Memory: Laws of Association. Causes of Forgetfulness.
Attention: Nature, Condition and Span of Attention: Division of Attention.
Learning: Theories of Learning- Trial and Error Theory; Pavlov's Conditioned Response Theory: Gestalt Theory.
Instinct: Biological Theory; Psychological Theory.
Consciousness: Levels of Consciouness; Proofs for the Existence of the Unconscious; Freud's Theory of Dream.
Intelligence: Definition; Measurement of Intelligence; I.Q. Binet – Simon Test of Intelligence; Terman Merril and Wecshler Test of Intelligence.
Theories of Intelligence: Unifactor; Two-Factor (Spearman's Theory); Multifactor Theory.

Group – E
(LOGIC)

Basic Concepts : Social Group; Community; Association ; Institution; Customs; Folkways and Mores.
Social Class and Caste : Principles of Class and Caste; Class Attitudes and Class Consciousness.
Social Change : The Marxist Theory of Social Change.
Political Philosophy : Nature and Scope; Scientific Theory and Philosophical theory. Political Ideals : Democracy – Its diferent forms.
Socialism – Utopian and Scientific.
Sarvodaya; Gandhiji's Conception of Non-violence. Gandhiji's Theory of Trusteeship.

Group – F
(SOCIAL AND POLITICAL PHILOSOPHY)

1) Categorical Propositions and Classes: Quality, Quality and Distribution of Terms; Translating Categorical Propositions into Standard form.
2) Immediate Inference: Conversion, Obversion, Contraposition: Square of Opposition; Determination of the truth-value of a proposition, given the truth-value of another proposition.
3) Categorical Syllogism: General Rules and Fallacies; Solving Problems and Proving Theorems concerning Syllogism.
4) Boolean Interpretation of Categorical Propositions, Venn Diagrammatic Representation of Categorical Propositions. Use of Venn Diagram to Test Arguments for validity; Review of the Traditional Laws of Logic concerning Immediate Inference and Syllogism: hypothetical and Disjunctive Syllogism: Dilemma.

(5) Truth Functions: Negation, Conjunction, Disjunction, Conditional, Biconditional. Testing Argument-forms and Arguments for validity by applying (a) Truth-table Method, (b) Method of Resolution, (c) Shorter Truth-table Technique-Reductio Ad Absurdum. Testing Statement/Statement-form for Validity of Truth-table Method and method of Resolution. Proving invalidity, to Construct Formal Proof of Validity.

(6) Quantification: Translating Sentences into Quantificational Language: Quantification Rules – Ul, EI, UG EG. To Construct Formal Proof of Validity of Arguments involving Monadic Quantification, To Prove invalidity of Arguments involving Monadic Quantification.

(7) Analogy and Probable Inference: Induction by Simple Enumeration; Analogical Argument; Appraising Analogical Arguments.

(8) Causul Connection and Mill's Methods of Experimental Enquiry. The Meaning of Cause; Doctrine of Plurality of Causes: Method of Agreement; Method of Difference; Joint Method of Agreement and Difference; Method of Concomitant Variation; Method of Residues. Criticisms of Mil's Methods; Vindication of Mill's Methods.

9) Hypothesis: Distinction between Scientific and Unscientific Explanation; Criteria for appraising Scientific Explanation.

HIGHER SECONDARY (CLASSES XI AND XII)
PHYSICS (PG)

MECHANICS AND GENERAL PROPERTIES OF MATTER

Scalars and Vectors, unit vector, addition and subtraction of vectors (analytical method), product of two vectors, vector analysis, Matrices. Mechanics of single particle and a system of particles, Lagrangian and Hamiltonian formulation. Angular momentum, Conservation of angular momentum. Moment of inertia, radium of gyration. Theorem of parallel and perpendicular axes. Centripetal force and centrifugal force.

Relation between G and g, variation of g, Gravitational potential intensity at a point due to spherical and other symmetrical bodies, keplar's laws of planetary motion.

Elastic deformations, Torsion of wire, Torsional Oscillation. Bending of uniform beam, clamped at one end supported at both ends.

Surface tension and its molecular origin, surface energy. Excess pressure on a curved liquid surface, shape of liquid drops, surface tension and evaporation.

Coefficient of viscosity. Viscous flow through a capillary tube. Poiseuille's formula. Stokes law, Reynold number.

HEAT

1. Kinetic theory of Gases --- Basic assumptions of the theory, perfect gas equation. Temperature; Degrees of freedom; classical law of distribution of energy; specific heat of gases, Ratio of specific heats at constant pressure and at constant volume. Absolute scale of temperature.
2. Deviation from perfect gas equation, vander Wall's equation of State. Critical constants.
3. Heat conduction in Solid, conductivity and diffusivity.
4. First Law of thermodynamics.
   Second Law of thermodynamics, Reversible and irreversible processes. Condition of reversibility. Carnot's theorem. Kelvin temperature scale. Heat engines.
   Entropy concept. Entropy of an ideal gas, Entropy of a mixture of gases. Entropy change in reversible and irreversible processes, principle of increase of entropy.
5. Throttling process, Joule Thomson effect, liquefaction of gases – critical phenomena.

SOUND (OSCILLATION AND WAVES)

1. Simple harmonic Motion. Superposition of two harmonic oscillations with constant phase, frequency and amplitude difference beat phenomenon, coupled vibration.
2. Damped harmonic oscillator, Q-factor, Forced vibration. Resonance, sharpness of resonance. An harmonic oscillation.
3. Waves in continuous medium, Elastic waves in solids, liquids and gases, phase and group velocity. Energy transport by a traveling wave. Energy flux in a sound wave. Relative and absoluter intensity. Decibel and phone; standing wave.
4. Transverse vibration of strings.
5. Doppler effect in sound, ultrasonics.

OPTICS

1. Short wave-length limit and geometrical optics, Fermat's Principle and its application to reflection and refraction at plane surfaces, combination of lenses: equivalent lens. Thick lenses, Principal plane, Nodal points. Helmhotz-Lagrange law for magnification.

2. Aberrations – spherical aberration, causes and remedy. Qualitative ideas of astigmatism, distortion, chromatic aberration.
3. Ramsden and Huygens's eye pieces (Ray diagram), Angular magnification. Resolving power (no deduction).
4. Electromagnetic nature of light. Electromagnetic spectrum. Huygens's principle.
5. Interference of light, Coherent and incoherent sources. Interference by division of wave front and division of amplitude. Different types of interferometer (Principle only) Resolving power, Michelson and Fabry Perot interferometer.
6. Fresnel diffraction. Division of wave front into half period zones, zone plate. Plane diffraction grating. Resolving power, and dispersive power of a plane diffraction granting (Deduction not necessary).
7. Polarization: Biaxial and uniaxial crystals, ordinary and extra-ordinary rays. Half and quarter wave plates. Optical activity. Faraday effect, Kerr effect.

MAGNETISM, ELECTROSTATICS AND CURRENT ELECTRICITY

1. Magnetic potential and fields due to short magnet and magnetic shell.
2. Intensity of magnetization, moment of a magnet, magnetic saturation, permeability and susceptibility, Dia, Para and Ferro magnetism, Hysterisis.
3. Couple on a magnet in a uniform field, work done in deflecting a magnet, magnetic needle in tow cross magnetic fields.
4. Electric potential and electric intensity. Potential and intensity at a point due to charge. Electrostatic induction, lines of forces, distribution of charge and potential on a surface. Equipotential surface, total normal induction, Gauss theorem and its applications. Coulomb's theorem and its applications. Mechanical force on a charged surface, energy per unit volume of a medium. Capacity of conductor and factors controlling it, energy of a charge; Multiple expansion.
5. Electric polarization and dipole, electric displacement, dielectric constant, Capacitance of common condenser (spherical, parallel plate and cylindrical).
6. Magnetic effect of electric current, Laplace's equation, Biot savartlaw, Ampere's theorem. Magnetic field on the axis of a circular coil, solenoid, field due to a current in an infinitely long wire; effect of magnetic field on current carrying conductors; Moving coil Galvanometer, ammeter an voltmeter.
7. Kirchoff's laws and its application, Seebeck, Peltier and Thomson effect, Thermo electric power, Thermo couple.
8. Self and Mutual inductances, Varying currents, Growth and decay of currents in L-R circuit. Charging and discharging of a condenser in C-R circuit. Time constant and log decrement.
9. R.M.S. and mean values of alternating current. Reactance and impedance, phase angle. Power in a.c. circuits. LR, CR and LCR circuits series and parallel resonant circuits; Q-factor.

MODERN PHYSICS

1. X-rays, production and nature, Compton effect, Mosley's law, Rutherford model Bohr model of atoms. Pauli Principle, photo electric effect.
2. Planck hypothesis, deBroglie hypothesis, Schroedinger equation, eigenvalues and eigenstates, Orthonormalization, expectation value, commutation relation and measurement, particle in a box. Linear harmonic oscillator. Potential well and barrier problems.
3. Hydrogen atom, angular momentum, spherical harmonics, parity, atomic spectra, time independent perturbation method. Two electron atom, spin-orbit interaction, sodium D-lines, Zeeman and Stark effect.
4. Molecular spectra, vibration and rotation, Raman effect, selection rules, symmetry.

5. Crystal structure, direct and reciprocal lattice, lattice vibration, s=acoustic and optical modes, band theory, Kronig Penny model, Metal, semiconductor and insulator, Hall effect.
6. Statistical Mechanics, ensemble, canonical and grand canonical ensemble, Bose Einstein and Fermi Dirac statistics, Bose Einstein condensation.
7. Nuclear Physics, nuclear spin and nuclear magnetic moment, nuclear radium mass and binding energy, stability condition, Nuclear disintegration, short range interaction, Youkawa model, elementary particles, baryons and leptons.
8. Lasers, coherence properties, applications, He-Ne Laser, optical fiber.
9. Relativity, Lorentz transformation, four-vector, Energy-mass relations.

ELECTRONICS AND INSTRUMENTATION:

1. Diodes, p-n junction, zener diode, rectification.
2. Transistors: Bipolar junction transistor, hybrid parameters, CB, CC and CE configurations, amplifiers.
3. Boolean algebra, Logic gates, AND, OR, NOT, NAND AND NOR gates.
4. Vacuum techniques, production and measurement
5. Particle accelerators and detectors.

HIGHER SECONDARY (CLASSES XI AND XII)
PSYCHOLOGY (PG)

1. GENERAL PSYCHOLOGY:

(i) Introduction:
- Definition
- Nature
- Scope
- Methods
- Brief outline of two major schools- Behaviouristic and Gestalt

(ii) Attention, sensory processes and perception:
- Determinants of attention
- Fluctuation of attention
- Attributes of sensation'
- Theories of vision
- Concept of sensory thresholds
- Psychophysics – Weber- Fechner Law
- Determinants of perception
- Form perception
- Space perception
- Perception of movement
- Time perception

(iii) Learning processes:
- Learning theories – Trial and error, classical and operant conditioning, insight theory
- Transfer of training
- Short term memory
- Long term memory
- Encoding
- Storage and retrieval
- Forgetting – Nature, causes, curve of forgetting

(iv) Emotion:
- Theories – James-Lange, Cannon-Bard, Activation

2. BIOLOGICAL BASES OF BEHAVIOUR:

(i) The cell:
- Structure and function

(ii) The nervous system and brain:
- Structure and function
- Receptors and effectors
- Synapses
- Organization of the nervous system – CNS and ANS
- Spinal Cord – structure and function
- Cerebellum – structure and function
- Cerebral cortex – structure and function

3. **HUMAN DEVELOPMENT:**

(i) Development in each stage of life span:
- Physical development
- Cognitive development
- Emotional development
- Social development
- Moral development

4. **EDUCATIONAL PSYCHOLOGY:**

(i) Introduction:
- Role of Psychology in education
- Concept of assessment

(ii) Intelligence and aptitude
- Definition and theories of intelligence
- Definition of aptitude
- Relation between intelligence and aptitude
- Assessment of intelligence and aptitude

(iii) Exceptional children:
- Classification
- Characteristics
- Education of different classes of exceptional children

5. **PSYCHOLOGICAL RESEARCH AND ANALYSIS:**

(i) Research Methodology:
- Concept of variables
- Experimental method
- Field study and interview

(ii) Basic statistics:
- Frequency distribution and its graphical representation
- Measures of Central Tendency
- Measures of variability
- Correlation

6. **SOCIAL AND INDUSTRIAL PSYCHOLOGY:**

(i) Introduction-Social Psychology
- Definition of Social Psychology
- Methods of Social Psychology

(ii) Groups:
- Classification of groups
- Group structure and function
- Conformity and compliance
- Crowd and mob
- Leadership – definition and classification
- Morale

(iii) Introduction to Industrial Psychology:
- Scope and importance of Industrial Psychology

(iv) Working conditions and organizational climate:

- Effect of illumination
- Effect of noise
- Work schedule and rest period

7. **ABNORMAL PSYCHOLOGY:**

(i) Introduction:
- Concept of normality and abnormality
- Methods of studying abnormal behaviour – clinical and case history

(ii) Classification of mental disorder:
- Psychotic disorders
- Neurotic disorders
- Psycho-physiological disorders

(iii) Stress:
- Stressors
- Coping strategies

HIGHER SECONDARY (CLASSES XI AND XII)
POLITICAL SCIENCE (PG)

Group – A

1. **Introduction:**
   (i) Definition, Nature and Scope of Political Science
   (ii) Relations with History, Economics, Philosophy and Sociology
   (iii) Meaning of "Politics" and "Political"

2. **Approaches:**
   (i) Traditional approach: Basic Tenets –Historical, Philosophical and Legal approaches.
   (ii) Behavioural approach: Basic Tenets –Concepts of Power, Process and Quantification.
   (iii) Post-behavioural critique of Behaviouralism.
   (iv) Marxian approach: Basic Tenets – Dialectical Materialism. Materialist Interpretation of History. Base-Superstructure. Class and Class-struggle.

3. **State:**
   (i) Definition, (ii) Characteristic, (iii) State and other Associations.

4. **Origin of the State:**
   (i) Social Contract Theory of Hobbes, Locke and Rousseau-concepts of (a) State of Nature (b) Social Contract (c) Sovereignty (d) Individual Liberty-Value of the Theory
   (ii) Evolutionary Theory – Value of the theory
   (iii) Marxian theory –From Primitive Communism to emergence of classes and formation of State.

5. **Nature of the State:**
   (i) Idealist theory-Hegel and Green. (ii) Marxian Theory-Engels and V.I. Lenin (iii) Gandhian Theory-Concepts of Trusteeship and Sarvoday.

6. **Political System:**
   System theory (David Easton) and Structural-Functional Theory (Almond & Powel).

7. **Functions of State:**
   (i) Individualist Theory: Herbert Spencer, John Stuart Mill.
   (ii) Socialist Theory: (a) Guild Socialism (b) Syndicalism (c) Scientific Socialism.
   (iii) Theory of Welfare State.

8. **Sovereignty:**
   (i) Definition and characteristics, (ii) De Jure and De Facto, (iii) Monistic Theory of Sovereignty. (iv) Pluralistic Theory of Sovereignty (v) Popular Sovereignty (vi) Internal and external limitations of Sovereignty.

9. **Nationality, Nationalism and Nations:**
   (i) Definitions of the terms.
   (ii) Concepts of (a) Right of Self-determination of Nations,
   (b) Internationalism, (c) Globalisation.

10. **Citizenship:**
(i) Definition, (ii) Acquisition or Loss of Citizenship, (iii) Difference between Natural and Naturalised citizen.

11. **Rights and Duties:**
(i) Definition
(ii) Types of Rights – Civil, Economic, Political (including right to resistance) and Social (with special reference to Gender- equality)

12. **Liberty:**
(i) Definition of the concept, (ii) Relation between Liberty and Equality, (iii) Safeguards of Liberty in modern States.

13. **Democracy:**
(i) Democracy as an ideal, (ii) Democracy as a form of Governance, (iii) Representative Democracy and Participatory Democracy.

14. **Totalitarianism:**
(i) Definition and characteristics, (ii) Fascism as a form of Totaliratianism.

15. **Public Opinion:**
(i) Definition, (ii) Different Media, (iii) Role and Importance.

16. **Political Party:**
(i) Definition, (ii) Function, (iii) Definition of Party System, (iv) Types of Party System.
(a) Single Party System (b) Bi-Party System (c) Multi-Party System (d) Dominant Party System

17. **Pressure Groups:**
(i) Definition (ii) Difference with Political Party, (iii) Functions.

18. **Representation:**
(i) Definition, (ii) Methods of Representation – (a) Territorial (b) Functional (c) Proportional (iii) Adult Franchise-Arguments for and against.

19. **Ideologies:**
(i) Liberalism (ii) Democratic Socialism

20. **Law:**
(i) Definition, (ii) Sources of Law

Group – B

1. **Constitution:**
(i) Definition, (ii) Classification
(iii) Difference between (a) Constitution and Convention, (b) Convention and Custom, (c) Convention and Law, (d) Constitution and Law

2. **Forms of Government:**

(i) Features of Cabinet form of Government, (ii) Features of Federal Government (iii) Difference between Federation and Confederation.

3. **Preamble to the Indian Constitution:**
(i) Definition (ii) Significance

4. **Indian Federation:**
(i) Nature of Indian Federalism, (ii) Difference with American Federalism
(iii) Growth and development of Regionalism in India, (iv) Concept of Cooperative federalism.

5. **Fundamental Rights and Duties in Indian Constitution:**
(i) Different types of Fundamental Rights-description, significance and limitations. (ii) Fundamental Duties-significance.

6. **Directive Principles of State Policy in Indian Constitution:**
(i) Description of the Principles (ii) Constitutional Status and Importance.

7. **President of India:**
(i) Position, (ii) Functions, (iii) Comparison with American President and the President of Peoples' Republic of China.

8. **Prime Minister of India:**
(i) Position (ii) Functions (iii) Role. (iv) Comparison with British Prime Minister and the Prime Minister of Peoples' Republic of China

9. **State Executive:**
(i) Role of Governor in the administration of a State.
(ii) Powers and Position of Chief Minister

10. **Indian Parliament:**
(i) Composition, (ii) Nature of Parliamentary Sovereignty in India
(iii) Comparison with British Parliament (iv) Relations between the two Houses (Lok Sabha and Rajya Sabha) (v) Role of Speaker of Lok-Sabha-Comparison with that in British Parliament. (vii) Parliamentary control over Executive in India, Britain, U.S.A. and Peoples' Republic of China (viii) Definition of (a) Money Bill and (b) Budget (ix) Functions of (a) Public Accounts Committee and (b) Estimates Committee in Indian Parliament.

11. **Indian Judicial System:**
(i) Difference with American Judicial System, (ii) Composition and functions of the Supreme Court of India. (iii) Judicial Review in India and USA, (iv) Meaning of Judicial Activism (v) Recent trends of Judicial Activism in India.

12. **Amendment procedure of Indian Constitution:**
(i) Procedure, (ii) Comparison with U.S. Constitution and the Constitution of Peoples' Republic of China.

13. **Election Commission of India:**
(i) Comparison and functions of the Election Commission
(ii) The role of the Chief Election Commissioner.

14. **Scheduled Castes and Scheduled Tribes, Minorities and Anglo Indians:**
Special Provisions in the Constitution of India for the Scheduled Castes, Scheduled Tribes, Anglo-Indians and Minorities.

15. **Planning Process in India:**
(i) Composition and functions of Planning Commission of India.
(ii) Composition and functions of National Development Council.
(iii) Composition and functions of State Planning Board of West Bengal.
(iv) Composition and functions of District Planning Committees of West Bengal.

16. **District Administration:**
Role of (i) District Magistrates, (ii) Sub-divisional Officers, (iii) Block Development Officers.

17. **Panchayati-Raj in West Bengal:**
Structure and Functions of (a) Zilla Parishad, (b) Panchayat Samiti (c) Gram Panchayat.

18. **Municipal Administration in West Bengal:**
(i) Structure and Functions of Calcutta Municipal Corporation (ii) Structure and Functions of Municipalities in West Bengal.

Group-C

1. **International Law:**
(i) Definition of International Law, (ii) Nature of International Law

2. **International Organisation:**
(i) Origin of the United Nations, (ii) Aims and Objectives of U.N. (iii) Composition and functions of (a) General Assembly, (b) Security Council, (c) Secretariate-the role and importance of the Secretary General (d) Economic and Social Council, (e) International Court of Justice (f) Specialised Agencies.

HIGHER SECONDARY (CLASSES XI AND XII)
SANSKRIT (PG)

1. **GRAMMAR:**

Case-ending: Stress on Principles and Application in Language, i.e. syntactic structure, Declension (Special stress on stems ending in *at, an, as*, Sarvanamans, numerals one to eight)
Conjugation (Special stress on the groups Bhavadi, Adadi, Rudhadi, and Hvadi. Further stress on the tenses and moods – *lat, lot, lan, vidhilin, Irt, and lit*)
Sandhi (specially Visargasandhi)
Krt – Suffixes
Taddhita-suffixes (special stress on *apatya matup* etc *iyasun* and *isthan*)
San, Yan addition to roots.
Namadhatu-s
Rules and application of Atmanepada and Parasmaipada
Samasa (excluding *samasantavidhana*)

2. **HISTORY OF LITERATURE:**

Vedic – Samhitas, Upanisads, Vedangas (Total Structure of the Vedic Literature)
Ramayana and Mahabharata. General Knowledge about the Puranas and their content.
Dramatic Literature (up to 12^{th} Century A.D.)
Narrative Literature
General Knowledge about the works of Manu and Kautilya
Imp. Question on Grammar and translation (from Bengali, English into Sanskrit) should be set in such a way that sense of language and grammatical application could be tested in a varied but integrated form.

HIGHER SECONDARY (CLASSES XI AND XII)
SOCIOLOGY (PG)

The five broad areas are: Sociological Thought, Sociological Theory, General Sociology, Research Methods and Indian Society

Sociological Thought

Comte	:	Positivism, Sob cila Statics & Social Dynamics, Hierarchy of Sciences, Law of Three Stages.
Spencer	:	Organicism, Social Evolution, Typology of Societies.
Durkheim	:	Methodology, Division of Labour, Suicide, Religion, Social Fact.
Weber	:	Methodology, Social Action, Authority, Rationality, Protestant ethic and capitalism
Marx	:	Methodology, Class, Class struggle & Revolution, Alienation, Stages of Social Development, State.
Pareto	:	Logical and non-logical action, Residues and Derivations. Circulation of Elite.

Sociological Theory

Nature and task of theory, Macro and Micro-Sociology, Research and Theory

Functional Theory

General Proposition, parsons' Social System theory, Merton's Middle Range theory, General criticisms.

Conflict Theory

General Propositons, Dahrendorh's Dahrendorf's Dialectical Analysis, Coser's Functionalisst Analysis, General Criticisms.

Exchange Theory

General Propostions, Homans' Principle of Exchange, Blau's Structuralism, General criticisms.

Symbolic Interactionism

General Propositions, Mead's analysis of Self & Society, Blumer's theory.

General Sociology

Issues & Concepts, Sociology's distinctive perspective and methodologies.
Some general concepts: Society, Community, Association, Institution, Role & Status, Socialization, Conformity and Deviance, Ethnicity and Race.

Culture

Concept of Culture, Components of Culture, Functions of Culture. Cultural diversity, Cultural identity and ethnocentrism

Social Control

Nature and Types, Agencies.

Social Stratification

Meaning & Forms, Mobility, Principal Theories, Gender and Stratification.

Social change

Meaning and Types, Factors, Principal Theories. Trans-national Corporation & Globalization, Revolution and Social change.

Indian Society

Family: Structure, Function and Changes, Marriage: Different froms and functions.
Caste: Attributes, functions, changes, sanskritization
Under-privileged groups:
SC, ST & OBC: Problems and Policies
Women: Dowry, Divorce
Child Labour
Population: Fertility, Mortality, Migration, Population policy of the Government of India
Change: Industrialization, Urbanisation, Environmental movements in India.
Panchayats & Municipalities: Democratic decentralization
Research Method. Sampling: Types
Observation: Types, uses and limitations.
Questionnaire: Types, uses and limitations.
Interview: Types, uses and limitations
Variables, Propositions and Hypotheses.

HIGHER SECONDARY (CLASSES XI AND XII)
COMPUTER APPLICATION (PG)

1. **Computer Fundamentals:**

Parts of a Computer, Block diagram of a Computer system and brief description of each functional unit, Input and Output devices, Memory hierarchies, Application and System software, Computer Languages.

2. **Computer Arithmetic:**

Positional number systems and conversion of one base to another, Binary arithmetic, Negative number representation using 1's and 2's complement, Various codes: ASCII, EBCDIC, BCD, BCD arithmetic.

3. **Digital logic fundamentals:**

Boolean algebra: Concepts and basic postulates, Forming Boolean expression, Minimization of function using algebra and K-maps, Implementation using basic gates.
Combinational Circuits: Half Adder, Full Adder, Multiplexer and Demultiplexer.
Sequential Circuits: Flip flops and Counters.

4. **Operating System:**

Concept of Operating System, Functions of Operating System, Classification of Operating System, Process scheduling, Brief study about processor Management and memory management algorithm, Concept of Deadlock.

5. **Data Structure:**

Date types and Structures-defination, Concept of linear and nonlinear data structures, Linear data structure: Array, Linkist, Stack, Queue.
Nonlinear data structure: Graph, Tree
Brief Study of algorithm, Complexity of an algorithm, Studies of searching and Sorting algorithms.

6. **Programming Language:**

(a) C- Language:
Basic structure, Character set, Keywords, identifiers, Constant and variables-type declaration. Arithmetic, Relational, Logical and Assignment operator, Conditional Operator, Formatted Input and Output, Branching and Looping. Array-one dimensional and two dimensional, Pointers, Structure and Union, File handling.

(b) Object Oriented Programming:
Concept, Difference with procedure oriented programming, data abstraction-object, class and methods, inheritance and polymorphism, OO approach- C++ as OO language.

7. **DBMS:**

Advantage of using DBMS, Architecture, Relational Data Model, E-R data model, Writing of simple query, using relational algebra and SQL, Normalisation.

8. **Network:**

Goals of Computer Network, Performance of a network, LAN, MAN, WAN and Internet, Various topologies and transmission media, OSI and TCP/IP Model, Concept of Protocols, Routing techniques, Switching techniques: Circuit and packet switching, Addressing schemes: Physical, logical and port addressing, Application of Network: e-mail, chatting, file transfer, Basic concept about WWW, DNS, URL.

HIGHER SECONDARY (CLASSES XI AND XII)
BIOLOGICAL SCIENCE (PG)

ZOOLOGY

Invertebrates:

1. Classification of major phyla upto subclass with examples.
2. Special features: Reproduction a Protozoa. Polymorphism of Siphonophira, Respiration in Arthropod. Nervous system in Gastropod. Water vascular system in Starfish.

Chordates:

1. Classification of Amphibians. Reptilians & Mammalians upto order with Examples.
2. Special features, Lateral sense organ in fishes. Non-poisonous and poisonous snakes. Heart and aortic arches, Brain in man Exoskeleton structures in bird.

Cytology, Histology & development Biology:

1. Structure & function of plasma membrane. Mitochondria, Golgi complex and Endoplasmic reticulum.
2. Nucleic Acids: DNA-Physico Chemical structure-replication, transcription & role in cell cycle, RNA types: Structure of RNA function & role in protein synthesis.
3. Histology of Liver, Pancreas and Kidney.
4. Histological technique: Fixation & Fixative. Outline classification of dyes.
5. Outline knowledge of Gametogenceis; Ultra structure of sperm & ovum.
6. Morphogenetic movements and fate map.
7. Concept of organizers in development.
8. Organogenesis: Development of eye in chick.
9. Placenta types, structure and functions in rodents.

Distribution, Evolutionary Biology & Systematics:

1. Zoogeographical realms and subdivisions & their characteristic fauna.
2. Chemical basis of Origin of life.
3. Modern concept of evolution – Neo-Darwinism and Harby-Weinberg equilibrium.
4. Adaptation types: Adaptive radiation & adaptive convergence in mammals: Desert adaptation,
5. Biological species concept.
6. Importance of classification; Principles of zoological nomenclature.
7. Modes of speciation – Sympatric, allopatric & parapatire processes.

Ecology, Animal behaviour, Biodiversity & Conservation:

1. Energy flow in the ecosystem.
2. Population Ecology: growth forms; regulation of population density.
3. Community ecology: habitat & niche concept. Resource partitioning, species diversity.
4. Ecological succession.
5. Instinctive and learning behaviour.
6. Complex behaviour: fixed action pattern; circadian, rhythm; migratory behaviour in bird.
7. Concept of biodiversity: Types of biodiversity & its importance mega diversity zones & Biodiversity Hotspots with special reference to India.
8. Concept of conservation: in situ and ex situ methods.
9. Wildlife conservations strategies.

Parasitology & Immunology:

1. Lifecycle, pathogenecity, clinical features & control of ---- *Plasmodium vivax, and Wuchereria bancrofti*
2. Mosquitoes as vector for disease transmission.
3. Classification of immunoglobin; acquired & innate immune system; lymphoid & myeloid cells in immune system: T & B cell co-operation: macrophage.

Genetics & Molecular Biology:

1. Cell cycle.
2. Allele concept, multiple allele (ABO blood group); pseudo allele; isoallele; allelic interaction.
3. Sex determination with special reference to Drosophila and Man.
4. Gene as a structural & functional unit --- cistron concept; one gene – one polypeptide; sickle cell anemia; thalassemia.
5. Genetics and molecular biology of replication, transcription and translation.
6. Mutation-types, detection, molecular mechanism, chromosomal aberration.
7. Elementary idea of DNA finger printing, PCR, cloning, oncogene.

Animal Physiology & Biochemistry:

1. Enzymes: Classes, kinetics and factors affecting it.
2. Structure and function of haemoglobin.
3. Structure of mammalian nephron; Physiology of urine formation; osmoregulators & osmoconformer.
4. Nature, origin and propagation or nerve impulse along a neuron.
5. Transport of oxygen & Carbon dioxide in mammals.
6. Elementary idea of structure of carbohydrate, protein & lipid.

Endocruiology and reproductive biology:

1. Endocrine glands and hormones --- classification of hormones, mechanism and effects of hormonal actions.
2. Hormonal regulation of gametogenesis in males and females of mammals, reproductive cycle in mammals.
3. Brief notes on Endocrine disorders, RIA, ELISA, cry preservation of gametes.

Environment Biology:

1. Nature, sources & effects of major pollutants of air & water; noise pollution.

Applied Zoology:

1. Aquaculture: Induced breeding. Composite fish culture, Exotic fishes & their role. Freshwater & brackish water prawn culture.
2. Sericulture: Silk varsities in India; mulberry silkworm culture, diseases of silkworm and their control.
3. Biology & control of pests: Paddy pest *(Scirpophegor in ortutus)* Anomies sobulifra stored grain pest *(Sitophilus oryzea)* rodent pest *(Bandicoota begabusi)* Biological and Integrated Pest Management.
4. Animal husbandry: common dairy breeds (cow); techniques of dairy management (brief idea); common poultry breeds (fowl) rearing methods, diseases & control.

BOTANY

A. CELL:
   (a) Prokaryotes and Eukaryotes: Characteristics, and differences with reference to their Nuclear and cell wall compositions.
   (b) Structure, function and significance of cellular organelles and cell membrane. Chromosomes: Ultra-structures and chemical compositions.

B. PLANT ANATOMY
Plant Tissue: Definition, Classification, Distribution and Functions including Mechanical tissues.
Stele: Types & Evolution
Normal and anomalous secondary growth in stems and roots in plants. Root-steam Transition.

C. ECOLOGY AND ENVIRONMENT:

Divisions of ecology, ecological factors, ecological units; Energy flow in ecosystem; Ecological niche; General ideas about global warming; Eutrophication; Ozone depletion; Acid rain; Sustainable development. Afforestation – Process and significance; Briosphere Reserve. Pollution air, water and soil.

D. PLANT GROUPS:

1. ALGAE: Range of thallus structures; Economic importance (as food, fodder, fertilizer and sources of iodine, laminarine starch, phycocolloid, agar, algin diatomite.
2. FUNGI: Structure of cell wall, mycelium, spore forms reproduction types: Homo-and heretrohallism, Parasexuality. Economic importance.
3. BRYOPHYTES & PTERIDOPHYTES: Structural organization or gametophytes and sporophytes-a brief knowledge. Economic importance.
4. GYMNOSPERMS & ANGIOSPERMS: Structural organization of ovule, male and female gametophytes in cycas and pixus post-fertilization changes in embryo-sac in angiosperms.

E. PLANT PATHOLOGY:

Necrosis, hypo plastic and hyperplastic symptoms of plant diseases, mechanism of infection Disease control-a brief knowledge, with emphasis on chemical and biological control.

F. TAXONOMY:

Concept of artificial, natural and phylogenetic system of classification; Outline classification of Cronquist (1981). Role of Cytology and Phytochemistry in tamonomic studies. Diagnostic characters, evolutionary significance of the following families: Magnoliaceae, Nymphaeacea, Compositae (Asteraceae). Alismataceae, poaceae (Graminee) and Ochidaceae.

ICBN-principles, rules of priority, effective and valid publication, brief note on cladistics. Functions of Herbaria and Botanical Gardens; Biodiversity and conservation-in-situ and ex-situ, Brief note on IUCN and Biosphere Reserves.

G. PALEOBOTANY:

Fossils --- Types, processes of fossilization, Geological time scale.

H. PLANT PHYSIOLOGY:

(b) Preliminary ideas about acid, base, and buffer.
(c) Transpiration: Mechanism and factors affecting it.
(d) Role of mineral elements in plants.
(e) Photosynthesis: Photosynthetic pigments and their properties, photo-phosphorylation. Calvin cycle, C4-cycle & photorespiration, CAM.
(f) Respiration – Concept of fermentation in terms of Industrial Bio-technology, Glycolysis, pentose phosphate pathway, Kreb's cycle and Electron transport system.
(g) Hormones-Role of auxin, gibberellins, cytokinnis, ethylene and abscistic acid in plant growth and development.
(h) Enzymes: Definition; Properties of Enzymes, and types of enzymes.

I. PLANT BIOCHEMISTRY:
General Chemistry of carbohydrate, protein and fat.

J. CYTOGENETICS & PLANT BREEDING:
Cell Cycle – Definition and different phases. Mendelism, Linkage and Crossing over - Types with examples Chromosome aberration, Aneuploidy, Euploidy; Gene Mutation – Definition, types and importance, Gene regulation (Operation concept), genetic code, protein synthesis, Brief Knowledge about Transposon. Oncogene, Gene cloning, Gene transfer ,PCR.
Definition, methods and importance of mass selection, pureline selection, hybridization and hybrid vigour. Tissue culture- Definition, Types and Prospects in Agriculture and Forestry.

K. PHARMACOGNOZY:
Active principles, macroscopic, microscopic characters and uses of the following drug-yielding plants: *Azadirachta* (neem) *Andrographis* (Kalmegh), *Rauvolfia*

L. MICROBIOLOGY:
Virus: general properties, structure of bacteriophage; concept of Plasmid. Electron microscopic structure of a bacterial cell. Development of endospore. Process of Transduction. Nutritional groups of Bacteria (Photo-autotroph. Chemoautotroph, Photoorganotroph and Chemoorganotroph).

PHYSIOLOGY

1. **Cellular Physiology:**

Molecular structure of cell membrane and mitochondria.
Enzymes – Properties, mechanism and kinetics of action, regulation of enzyme action, enzyme inhibitors.

2. **Biochemistry & Metabolism:**

Chemistry of carbohydrates, proteins, lipids and nucleic acids. Metabolic pathways – glycolsis, HMP shunt, TCA cycle, beta-oxidation of fatty acids, glycogenesis choleseterol synthesis, protein synthesis, purine and pyrimidine biosynthesis. Hormonal regulation of metabolic pathways. Oxidative phosphorylation.

3. **Nutrition & Dietetics:**

Digestion and absorption of nutrients, composition, functions and regulations of salivary juice, gastric juice, pancreatic juice and bile, Balanced diet, RDA, BMR, RQ, Specific dynamic action. Calorie value of foods, Biological value of proteins, NPU Vitamins – sources, functions, deficiency symptoms, hypervitaminosis, antivitamins. Minerals – functions and deficiency symptoms. Undernutition and overnutrition and overnutrition. Diet chart formulation for adult person and pregnant woman.

4. **Body fluid and Immunology:**

Composition and functions of blood. Buffers in blood and regulation of blood pH. Coagulation of blood. Blood Groups. Formation, circulation and functions of lymph and tissue fluid. Immunity – Innate and acquired immunity, Humoral an cell mediated immunity. Hypersensitivity, Acquired Immuno Deficiency Syndrome.

5. **Heart & Circulation:**

Heart rate and its regulation. Cardiac output-measurement and factors affecting. ECG-normal ECG, leads, vectocardiogram. Blood pressure-vasomotor centres, vasomotor reflexes, capacitance and resistance vessels. Molecular mechanism of vasoconstriction and vasodilatation. Hypertension, arterial and venous pulse. Peculiarities of coronary of coronary and cerebral circulation.

6. **Respiration:**

Volumes and capacities of lungs, Mechanics of breathing-lung compliance, intrathoracie & intrapleural pressure, surfactant, work of breathing, Hypoxia, Oxygen toxicity Neural centers and reflexes regulating respiration.

7. **Physiology of Excitable Tissue:**

Molecular mechanism of contraction and relaxation of different types of muscles, Sarcotubular system and excitation – contraction coupling. Different elastic components of muscles, Heat production in muscles during activity.
Nerve impulse. Compound action potential of nerve. Membrane current and conductance. Voltage gated channels, molecular basis of synaptic transmission. Electron microscopic structure of my neural junction-active zones, gutter, post synaptic receptors, EPP, MEPP.

8. **Nervous System:**

Stretch reflex, inverse myototic reflex, muscle spindle, propiospinal reflex, spinal shock, Structure, connections and functions of cerebellum, basal ganglia, thalamus, Hypothalmic control of food and water intake, neuro-endocrine functions. Functions of association cortex, Asymmetric functions of cerebral cortex, Functions of limbic system,

Neural basis of memory. Sleep and REM Sleep. Impulse transmission in autonomic ganglia. Molecular basis of autonomic neural activity on effector organs.

9. Special Senses:

Receptors as biological transducer, Muller's law of specific nerve energies, Transduction mechanism in rods and cones, auditory hair cells, gustatory and olfactory Neural basis of sensory coding – Pitch And loudness perception, odor and taste discrimination, physiology of colour vision, visual acuity.

10. Renal Physiology:

Histological structure of nephron and filtering membrane, glomerular filtration, counter current exchanger and multiplier. Physiological mechanism of tubular reabsorption and secretion. Diuresis. JG apparatus.

11. Endocrine system and Chronobiology:

Physiological functions of the hormones – pituitary, thyroid, parathyroid, pancreas, adrenal. Cell signaling mechanism of hormones – cAMP, IP_3 , DAG, Tyrosine kinase, Jak-STAT Pathway. Hypo and hyperactive states of endorcrine glands – Acromoegaly, Frolich's Syndrome, hashimoto's disease, Curshing's syndrome, Pheochromocytoma, Biorhythm, Zeitgeber, Free running rhythms, Cardian rhythm in adrenal, pineal and sleep-wake behaviour, neural basis of single and multiple oscillators of cardian rhythm jet-lag.

12. Reproductive Physiology:

Hormonal control of ovulation. Physiology of implanation, Hormonal control of preganancy and lactation, Spermatogenesis and its hormonal control. Control of fertility and population.

13. Exercise and Sports Physiology:

Maximum aerobic power and factors affecting it. Excess post exercise oxygen consumption (EPEOC). Effect on training on physiological systems. Anaerobic threshold. Anaerobic capacity. Anaerobic and aerobic requirements in different sports activities.

14. Body temperature Regulation:

Structure of skin, composition of sweat, channels of heat loss and gain. Neural and humoral control of body temperature.

15. Environmental Physiology:

Physiological changes in extreme environment: Hot, Cold, Hypobaric and Hyperbaric conditions. Heat stress. Acclimatization in high altitude, hot and cold environment Cardiovascular and respiratory effects of positive and negative G-Forces, Noise pollution and its impact on human life, lonizing radiation hazards, Toxicology of industrial wastes-diseases due to excess accumulation of Pb, Hg and Cd in body. Addiction to tobacco, alcohol and narcoties, Over population – its causes and effects.

16. Biomedical Instruments:

Basic principles and uses of following instruments : UV – Spectrophotometer, ECG, EMG, EEG, Pulmonary function analyzer, CT Scan, MRI, Ultrasonography (USG), Dialyser, Pacemaker, Endoscopy.

পাঠক্রম

বাংলা [Higher Secondary (Classes XI & XII)

১। পাঠ্যপুস্তক (Text) নির্ভর প্রশ্ন

পশ্চিমবঙ্গ মধ্যশিক্ষা পর্ষদ প্রকাশিত 'সাহিত্য সঞ্চয়ন' (প্রথম ভাষা- নবম ও দশম শ্রেণি), 'সাহিত্য সম্ভার' (দ্বিতীয়ভাষা- নবম ও দশম শ্রেণি), 'প্রোফেসর শঙ্কুর ডায়রি', 'কোনি'; (পশ্চিমবঙ্গ উচ্চ-মাধ্যমিক শিক্ষা সংসদ প্রকাশিত 'সাহিত্যচর্চা' (প্রথম ভাষা- একাদশ ও দ্বাদশ শ্রেণি), 'সাহিত্যকথা' (দ্বিতীয়ভাষা- একাদশ ও দ্বাদশ শ্রেণি) অবলম্বনে প্রশ্ন রচিত হবে।

২। বাংলা শিল্প, সাহিত্য ও সংস্কৃতির ইতিহাস

ক. পশ্চিমবঙ্গ উচ্চ-মাধ্যমিক শিক্ষা সংসদ প্রকাশিত 'বাঙালির ভাষা ও সংস্কৃতি' (একাদশ শ্রেণি) এবং 'বাংলা ভাষা ও শিল্প সাহিত্য সংস্কৃতির ইতিহাস' (দ্বাদশ শ্রেণি) অবলম্বনে প্রশ্ন রচিত হবে।

খ. বাংলা সাহিত্য: নতুন দিগন্ত (অনুবাদ ও অনুষঙ্গ):

- **ভারতীয় সাহিত্য:** কালিদাস, শূদ্রক, কবীর, ইকবাল, ভানুভক্ত, অমৃত প্রীতম, প্রেমচন্দ, বিজয় তেন্ডুলকার, গোপীনাথ মহান্তি, আইয়াপ্পা পানিক্কর
- **আন্তর্জাতিক সাহিত্য:** শেক্সপিয়র, টলস্টয়, চেকভ, মপাঁসা, গ্যোয়েট, নেরুদা, গাবরিয়েল গার্সিয়া মার্কেজ, ল্যাংস্টন হিউজ, আর্নেসট হেমিংওয়ে, টি.এস.এলিয়ট

৩। ব্যাকরণ

- **ধ্বনি ও ধ্বনি পরিবর্তন:**
  - **ক.** ধ্বনি- বাংলা ধ্বনির শ্রেণিবিভাগসহ বিস্তারিত আলোচনা।
  - **খ.** ধ্বনি পরিবর্তনের কারণ ও পরিবর্তনের বিভিন্ন রীতি।
  - **গ.** সন্ধি
- **শব্দগঠন:** উপসর্গ, অনুসর্গ, ধাতু ও প্রত্যয়
- **বাংলা শব্দ-ভান্ডার**
- **শব্দ ও পদ:** বিশেষ্য- বিশেষণ-সর্বনাম-অব্যয়-ক্রিয়া বিস্তারিত আলোচনা
- **কারক ও অ-কারক সম্পর্ক:** শ্রেণিবিভাগ, বিভক্তি ও অনুসর্গ অনুযায়ী কারকের শ্রেণিবিভাগ
- **সমাস:** পরিভাষা ও তাদের ব্যাখ্যা, শ্রেনিবিভাগ
- **বাক্য:**

  ক. বাক্য নির্মাণের শর্ত- যোগ্যতা, আকাঙ্ক্ষা, আসক্তি
  খ. উদ্দেশ্য ও বিধেয় সম্পর্কে ধারণা
  গ. বিশেষ্যখন্ড, ক্রিয়াবিশেষণখন্ড, ক্রিয়াখন্ড
  ঘ. বাক্যের গঠনগত ও অর্থগত শ্রেণিবিভাগ
  ঙ. বাক্যের রূপান্তর- গঠন ও অর্থ অনুসারে
- **বাচ্য:** শ্রেণিবিভাগ বাচ্য পরিবর্তন

এছাড়াও পশ্চিমবঙ্গ উচ্চ-মাধ্যমিক শিক্ষা সংসদ প্রকাশিত একাদশ শ্রেণির বাঙালির ভাষা ও সংস্কৃতির 'ভাষা' অংশ এবং দ্বাদশ শ্রেণির 'বাংলা ভাষা ও শিল্প সাহিত্য সংস্কৃতির ইতিহাস' গ্রন্থের ভাষা অংশ অবলম্বনে প্রশ্ন রচিত হবে

৪। সাহিত্যের রূপরীতি

কাব্য: মহাকাব্য গীতিকবিতা
নাটক: ট্র্যাজেডি, কমেডি, প্রহসন, একাঙ্ক
উপন্যাস, ছোটোগল্প, প্রবন্ধ: রূপবৈচিত্র্য

HIGHER SECONDARY (CLASSES XI AND XII)

MUSIC (PG)

HISTORY AND THEORY OF INDIAN MUSIC

1. **Contents of Musicological tests:**
   (a) Ancient Period: Natyasastra, Brhaddesi, Sangita-ratnakara.
   (b) Mediaeval Period: Sangita_Parijata, Hridyayaprakasa, Chaturddandi-Parakasika.
   (c) Modern Period: Srimallakshita-sangitam, Abhinava-ragamanjari, Ragavijnana.

2. **Musical Forms:**
   (a) Ancient & Classical forms —
   Dhruva, Prabandha, Dhrupada, Dhamar, Khayal, Tappa, Thumri

   (b) Folk-songs of Bengal:
   Regional Characteristics and social background of Bengali Folk songs.

   (c) Bengali songs:
   Nature of Bengali songs during 18^{th} and 19^{th} Century. A Brief account of Kavigana and Bengali Tappa and also of Bengali Kirtana (contribution of Nazrul, D. L. Roy and Atulprosad)

   (d) Tagore Songs:
   Chief features of Rabindra Sangit, Rabindranath's contribution towards the development of Bengali songs.

3. **Life Sketches with contributions:**
   Kshetra Mohan Goswami, Sir S. M. Tagore, Pdt. V. N. Bhatkhandey, Swami Prajnanananda, Dr. Bimal Roy, Rajeswar Mitra, Dr. K. C.D. Brihaspati.

4. **Definition with examples:**
   Nada, Swara, Sruti, Murchhana, Alamkara, Tan, Raga, Mela, Thata, Tara, Gamaka, Palta, Ghasit, Sunt, Mizrab, Jawa, Chikari, Parda, Gat, Meend, Ans. Andla, Pakad, Tali, Khali, Bibhag, Sam, Laya, Alpatva Bahutva, Vadi, Samvadi Anuvadi, Vivadi and Raga-jati.

5. **Theory of Raga:**
   Ten Lakshanas of ancient and Hinsusthani Ragas. Uttarnanga and Purvanga Ragas. Time theory (of pdt. Bhakhande) of Hindusthan Ragan Janaka and Janya Raga, Sandhiprasashak and Paramela Praveshak Raga.
   Ten Hindusthani Thatas, Theory of 72 Karnataka Melas of Pdt. Venkatamakhi.
   Difference between Mela and Thata, Raga and Thata.

6. **Musical Scales:**
   Three Ancient Indian Musical scales or Gra¯mas.
   Hindustha¯ni and Karna¯taka. Suddha- Vikrita Swaras, Twenty one Murchhana¯s in three ancient Indian Gramas.
   Fixing Suddha and Vikrita Swaras on 22 sruits of modern Hindusthani musical scale.

7. **Musical Instruments (Stringed and Drum):**
Hindusthani classical and Folk. Ability to draw pictures and to identity their parts.

8. **Notation systm:**
Knowledge of Akarmatrik, Dandamatrik and Hindusthani notation system (of Pdt. Bhatkhande). Ability to write a compostion of Dhrupad, Dhamar, Khayal, Bengali, song, Folk song, Rabindra Sangeet, Dwijendra giti, Atulprasadi and Nazrul-giti under any one of the above notation systems.

9. **Theory of Tala:**
Ten Pranas of ancient Tala system, Dugun- Trigun-Chougun Lavakari of Talas as prescribed in Practical syllabus under Hindusthani Tl-lipi system. Jatis of Hindusthani Talas.

HIGHER SECONDARY (CLASSES XI AND XII)
SANTHALI (PG)

১। সাঁওতালী সাহিত্য -- সাঁওতালী সাহিত্যের ইতিহাস (সানতাড়ী সাঁওহেত্ রেয়া : নাগাম)

(ক) আদিকাল (হড়অবতার) 1854 ইং সেরমা খণ মাড়াংরেয়া হড় সাঁওহেত্। (i) লোকগীতি -- ডাহার, বাহা, কারাম, সোহরায়ছ ছাটয়ীর, দাঁসায়, বাপলা, ভাডান এমান। (ii) লোক কাহনী - মারে কাঁহনী আর মারেকাথাক। (iii) বাঁখেড় বিনতি আর ঝার্নিক।

পাঠ্য পুস্তক - (i) হড় সেরেঞ - স. ডবলিউ জর্জ আর্চার, (ii) হর সেরেঞ-পর রঘুনাথ মুরমু, (iii) বাহা সেরেঞ - স বলরাম টুডু, (iv) দং সেরেঞ- ভাগবত মুরমুঠাকুর, (v) মড়েসিঞ মড়েঞিদা-সং রূপচাঁদ হাঁসদঃ, (vi) হর সেরেঞ- বাবুলাল মুরমু, (vii) খেরোয়াড় বংশী ধরম পুথী-মাঝি রামদাস টুডু বসিকা, (viii) হড়কোরেন মারে হাপড়ামক রেয়ঃ কাথা - রেভা এল ও. ফ্রেফসরুনড, (ix) জমসিম বিনতি 'লিটা' - নায়েক মঙ্গল চন্দ্র তুডকুলুমাস সরেন। (x) গাক কাঁহনী - স্টেফেন চাঁদ মুরমু (xi) হড় কাহনীকো - রেভা পি. ও. বোডিং (xii) বাঁখেড় - পর রঘুনাথ মুরমু।

(খ) মধ্যকাল (খেরওয়াড় অবতার) - 1855 ইং সেরমাখন 1947 ইং সেরমারেনা)

পাঠ্য পুস্তক -- (i) কাব্য সাহিত্য এবং কাব্যকার -- ঈশ রড়-সাধু রামচাঁদ মুরমু, (ii) অনড়হেঁ বাহা ডালওয়ঃ - পাউল জুঝার সরেন, (iii) সেরেঞ ইতা-কয়েল পঞ্চানন সরেন, (iv) এতেন আড়াং - ঠাকুর প্রসাদ মুরমু।

নাটক সাহিত্য এবং নাট্যকার ----(i) বিদুচাঁদান - পর রঘুনাথ মুরমু (ii) ছতোর পুতি কিস্কুরাজ - শ্যাম সুন্দর হেমব্রম।

উপন্যাস সাহিত্য এবং উপন্যাসকার ----- হাড়মা আঃ আতু - আর আর কিস্কুর রানাজ।

(গ) আধুনিক কাল (সানতাড় অবতার) - 1948 ইং সেরমা খন নিতইদাবিচ্

পাঠ্য পুস্তক ---

1. কাব্য সাহিত্য এবং কাব্যকার -- (i) ভুরকাঃ ইপিল -- সারদা প্রসাদ কিস্কু, (ii) আসাড় বিনতী -- নারায়ন সরেন 'অড়েসুতাম' (iii) তিরয়ো তেতাং - হরিহর হাঁসদঃ (iv) সায় সেরমা রেনঃ অনড়হেঁ - স সুহৃদকুমার ভৌমিক। 2. নাটক সাহিত্য এবং নাট্যকার (i) জুখখাঁতির - ড. কৃষ্ণ চন্দ্র টুডু, (ii) খাঁরি দাকারে মেতদঃ - খেরওয়াল সরেন (iii) বেডিও গায়ান - পরিমল হেমব্রম, (iv) জুডাসি গায়ান মালা - বাদল হেমব্রম 3. কাহনী সাহিত্য এবং কাহনীকার -- (i) গাথাও মালা - নিরমল বি কে সরেন (ii) কাহনী থপে গৌর চন্দ্র মুরমু (iii) আরসি - কলেন্দ্র নাথ মান্ডি, (iv) মিতসায় মিত কাঁহনী - স. সুহৃদ কুমার ভৌমিক 4. উপন্যাস সাহিত্য এবং উপন্যাসকার ---- (i) মানুমতি -চন্দ্রমোহন হাঁসঃ, (ii) শভাওঃ কুকমু - বাদল হেমব্রম 5. নিবন্ধ সাহিত্য এবং নিবন্ধকার ---- (i) তেতেদ তুমীল - ডা রামচন্দ্র মুরমু (ii) নাহঃ সানতালী অনল - বাবুলাল মুরমু 'আদিবাসী' (iii) জুডাসি অনল মালা - সারদা প্রসাদ কিস্কু। 6. পত্র-পত্রিকা এবং পত্রকার -- (i) মারশাল -- সিহরি মুরমু, (ii) জুগ সিরিজডল --নাথানিয়ল মুরমু, (iii) হোড় সম্পদ --ডঃ ডমন সাদু 'সমির' (iv) এক্কেন সাকওয়া -- কালিপদ সরেন (v) সিলি -- কলেন্দ্র নাথ মানডি, (vi) চিঠি সাকাম -- গৌরিন্দ্রে মানডি (vii)লাহান্তি --স্বপন কুমার পরামানিক, 7. বিবিধ সাহিত্য এবং সাহিত্যকার -- (i) ছোট রায় দেশ মাঝিয়া, কাথা - রামা সরেন (ii) হাজারিবাগ রেয়ঃ ইতিহাস - টিকে রাপাজ, (iii) রামায়ণ - বিরাম হাসদঃ (iv) সাওতালী ভাষা ও সাহিত্যের ইতিহাস - ধীরেন্দ্র নাথ বাস্কে

২। সাঁওতালী ভাষা এবং ব্যাকরণ ---

(ক) (১) ভাষা এবং উপভাষা (২) পৃথিবীর ভাষা বংশ বা শাখা, (৩) ভাষার উৎপত্তি, বিকাশ এবং সম্বন্ধ, (৪) ধ্বনি বিজ্ঞান, (৫) শব্দ বিজ্ঞান, (৬) বাক্য বিজ্ঞান, (৭) অর্থ বিজ্ঞান (৮) লিপি বিচার -- ব্রাহ্মী, গুপ্ত, কুটিল, নাগরী, অলচিকি এবং রোমান

(খ) ব্যাকরণ -- সংজ্ঞা, সর্বনাম, বচন, পুরুষ, লিঙ্গ, বিশেষণ, ক্রিয়া, কাল, কারক, প্রত্যয়, ভেনতা কাথা, মেনকাথা আর কুদুম।

সহায়ক পাঠ্যপুস্তক -- (i) A Santali Grammar for Beginners -- Rev. P.O. Bodding. (ii) Material for Santali Grammar (VI + II) - Rev. P.O. Bodding (iii) ভাষা বিজ্ঞান - ডঃ ভোলানাথ তিওয়ারি (iv) ঝাড়খন্ডী বাংলা উপভাষা - ডঃ ধীরেন্দ্র নাথ সাহা (v) বাংলা ভাষার সংক্ষিপ্ত ইতিবৃত্ত - ডঃ জীবেন্দু রায়, (vi) ভাষা জিজ্ঞাসা - ডঃ রাম রঞ্জন সেন (vii) রনড় -পন্ডিত রঘুনাথ মুরমু (viii) পারসি উনুবাম -- ডঃ কৃষ্ণ চন্দ্র টুডু (ix) সানথালী সেনকাথা আর ভেনতাকাথা - ধীরেন্দ্র নাথ বাস্কে (x) হড় কুড়ুম পুথি - স্টেফন এবং মুরমু।

HIGHER SECONDARY (CLASSES XI AND XII)
URDU (PG)

NAZMEN :-

Iqbal - (Taswir - e - Drad) تصویردرد نظم

Faiz - (Nesar Main Teri Galyon Mein) نثار میں تری گلیوں میں

MASNAVI :-

Mir Hasan - Piece (Sehrul Beyan) آغاز داستان

QASIDA :-

Sawan Mein Diya Phir Mahe Shawwal Dekhai ساون میں دیا پھر ماہ شوال دکھائی by مدّ دا

DASTAN :-

Mir Amman - Syer Tisre Darwesh Ki سیر تیسرے درویش کی

FICTION :-

Manto - (Naya Qanoon) نیا قانون ازمنٹو

Bedi - (Gram Kot) گرم کوٹ

Drama - Agha Hashr Kashmiri - " Khubsoorat Bala " خوبصورت بلا از اغا حشر کاشمیری

Khutut - Khutut - e- Ghalib - Khat No. 9 - 83 - 88 خطوط غالب خط نمبر ۹۔ ۸۳۔ ۸۸۔

Khaka - Rashid Ahmed Siddiqi - (Ganj - hai - Granmaya - "Asghar Gondwi" رشید احمد صدیقی کا گنجہائے گرانمایہ

GRAMMAR :-

Phrases - Gender - Opposites

HIGHER SECONDARY (CLASSES XI AND XII)
STATISTICS (PG)

Classical and Axiomatic approaches of statistical probability. Conditional probability and statistical independence. Bayes' theorem. Random variables and probability distributions. Mathematical expectations and moments. Probability generating and moment generating function. Characteristic function and Inversion theorem (statement only). Chebyshev' inequality. Weak and strong laws of large numbers. Bermoulli's theorem. Laws of convergence. Central limit theorem (case of independent variables) and its use.

Concept of statistical population, random sample, frequency curve and coefficient of concentration. Measures of location and dispersion. Moments and measures of skew ness and kurtosis (β_1 – β_2) diagram and its uses. Some standard Univariate distributions (e.g. binomial, Poisson, hyper geometric, negative-binomial, normal and log-normal). Simple correalation and linear regression involving two variables. Non linear regression. Correlation ratio and correlation index. Measures of association and contingency. Rank correlation. Intra-class correlation. Kendall's t Multivariate distributions. Linear regression involving more than one independent variable. Partial and multiple Correlation Coefficients.

Concept of random sampling, sampling fluctuations, sampling distribution of statistics and standard error. Sampling distribution of sums of binomial, Poisson, rectangular and gamma variables. X^2, t and F distributions (central with derivation and non-central without derivation). Sampling distributions under normal set-up for a single mean, a single variance, difference of two means, student's ratio, a variance ratio, a regression coefficient (simple and partial) and correlation coefficient (simple, partial and multiple). Sampling distributions, of order statistics and range from a continuous Univariate distribution. Large sample distribution of a sample quantile. Sampling distribution of Hotelling's T^2 –statistic and its uses. Wilk's A-creterion in sampling from multinormal population. Principal Components and Canonical Correlations. Mahalanobis generalized distance.

Reduction of data—Statistics, sufficient, statistic factorization criteria for sufficiency (statements only) and minimal sufficient statistics. Point estimation – criteria for a good estimator; mean squared error, unbiased ness, minimum variance unbiased estimators, Cramer-Rao inequality. Rao-Blackwell theorem. Completeness, consistency and efficiency (in large sample sense). Methods of estimation – method of moments, maximum likelihood method, least square method. Properties (without detailed proof). Testing of hypotheses – Statistical hypotheses . Classical testing problem, type I and type II errors, critical region, randomized test, size and level of a test, Power function. Neyman-Pearson lemma, test of a simple hypothesis against a simple alternative. MP tests, UMP test, unbiased tests ,UMPU tests. Composite hypothesis. Likelihood ratio tests. Interval estimation – confidence interval and confidence coefficient. Relationship with the theory of hypothesis testing. Sequential analysis—Wald's SPRT. ASN and OC curves. Approximations to ASN and OC functions (without proofs). Optimum properties of SPRT (without proof). Comparison with fixed sample size test under normal case.

Exact test for one or two Bermoulli and Poisson distributions. Exact tests and confidence intervals under normal set up – for a single mean, difference/ ratio of two variances; for a correlation coefficient (simple, partial and multiple), for one or more regression coefficients (simple and partial). Analysis of variance for one-way classified data, two-way classified data and regression problem. Test for homogeneity of variances Large sample tests for one or more proportions and under normal set-up for one or two variances and simple correlation coefficient. Stabilization of variances – $\sin^{-1}\sqrt{p}$, $\sqrt{x}$,

$\log_c$s and Fisher's z-transformations. Pearsonian x^2-tests for goodness of fit, homogeneity and independence (including Yates continuity correction). Nonparametric tests for location, dispersion and randomness. Nonparametric confidence limits and tolerance limits.

Construction and use of price index numbers and tests in connection with them, Consumer price index number. Different components of time series. Determination of trend by different methods. Determination of seasonal indices by methods of ratio to trend and ratio to moving average. Price and income elasticities of demand.

Measurement of mortality – Culde, specific, standardized death rates. Complete life table. Measurement of fertility and reproduction – crude birth rate, general, specific and total fertility rates, gross and net reproduction rates.

Basic principles of design – randomization , replication and local control. Completely randomized design. Randomized block design and Latin square design. Factorial experiments - Main effects and interactions, 2^2 and 2^3 experiments, notion of confounding.

Advantages of sampling method, steps involved in sampling enquiry, requirements of a good sample. Random sampling numbers and their uses. Simple random and stratified random sampling procedures (estimates and their standard errors). Sampling and nonsampling errors.

Statistical quality control – Rational subgroups. Control charts for mean, range, standard deviation, fraction defective and the number of defects. Sampling inspection – single and double sampling procedures by attributes.

SYLLABUS OF VISUAL ART (XI-XII)
(INDIAN ART)

Introduction to Indian Art

* Vimbetka cave paintings of pre-historic period

1. * Indus valleys Civilization emphasizing on

   a) Great Bath

   b) Terracotta seal

   c) Mother goddess

   d) Dancing Girl

   e) Male torso

2. * Mauryan period : -

   a) Mauryan pillars emphasizing on Mauryan polish

   b) Terracotta sculptures

   c) Ashokan Capital

3. Sunga Art emphasizing on the Amaravati Stupa & Lomas Rishi cave

4. Kushan Art : -

   a) Gandhara b) Mathura

5. Gupta period : - (emphasizing on the specific indigenous style of Gupta)

   a) Painting

   b) Sculpture

6. Ajanta & Ellora caves

7. Chola Bronzes

8. Temple Architectures:-

   a) Nagada b) Drabida c) Vesara

9. Manuscript paintings:-

   a) Jain b) Pala

10. Miniature paintings:-

    a) Mughal b) Rajput c) Pahari

11. Bengal terracotta temples emphasizing on Bankura & Birbhum

12. Patachitra emphasizing on Kalighat pata & Orissa pata paintings.

13. Company paintings

14. Column paintings

    a) Lucknow

b) Benaras

c) Murshidabad

d) Patna

15. Raja Ravi Verma

16. Bengal school of Art:

a) Abanindra Nath Tagore

b) Nandalal Bose

c) Khitindra Nath Majumder

d) Asit Halder

e) Abdul Rahman Chugtai

17. Shantiniketan School:-

a) Rabindra Nath Tagore

b) Binod Behari Mukherjee

c) Ram Kinkar Beij

d) K.G Subramanayan

18. Imperative Art critics:-

a) E.B. Havell

b) A. K. Coomaroswamy

c) Stella Kramrisch

d) Sarasi Kumar Saraswati

19. Contemporary Artists (Indian)

a) Amrita Shergil

b) Jamini Roy

c) Chitto Prasad

d) Devi Prasad Roy Chowdhury

e) Somnath Hare

f) M.F. Husain

g) S.H. Raja

h) Meera Mukherjee

i) Sankha Chowdhury

j) Chintamoni Kar

k) F.N. Souza

l) Gopal Ghose

m) Pradosh Dasgupta

n) Ganesh Pyne

o) Bikhash Bhattacharjee

p) Paritosh Sen

SYLLABUS OF VISUAL ART (XI-XII)
(WESTERN ART)

- : WESTERN ART : -

1. Prehistoric Art emphasizing of Altamira & Lascaux.

2. Egyptian Art both painting & sculpture

3. Greek Art : -
   - Archaic
   - Classical
   - Hellenistic

4. Roman Art

5. Byzantine Art

6. Romanesque Art

Gothic Art :- Giotta & Massacio

8. Renaissance Art :
   - Bosch
   - Leonardo-da-Vinci
   - Michelangelo
   - Raphael

9. Baroque and Rococo emphasizing on Rembrandt, Vermeer, Frans Hals

10. Mannerism - El-Greco, Titian

11. Romanticism
    - Delacroix
    - Turner
    - Constable

12. <u>Realism & Impressionism</u>
    - Caret
    - Courvet
    - Claude Monet
    - Edward Monet
    - Edgar Degas
    - Auguste Rodin
    - Toulouse Lautrec
    - Renoir

13. <u>Post Impressionism</u>
    - Vincent van Gogh
    - Gaugin
    - Cezanne

14. Fauvism
Matisse

15. Cubism

- Braque
- Picasso

16. Dadaism

- Marcal Duchamp
- Man Ray

17. Surrealism

- Max-Ernst
- John-Miro
- Salvador Dali
- Rene Magritte
- Bracusi

18. Constructivism

- Tatlin
- Naum Gavo
- Pevsoner

19. Abstract Expressionism

- Blue Rider Group
- Die-Bruke Group
- Mark Rathko
- Jackson Pollock

20. Individual Artists:

- Paul Klee
- Piet Mondrian
- Robert Smithson
- Klimth

21. Pop Art

- Andy Warhol
- Richard Hamilton

Syllabus for Accountancy(PG)

I. Accounting (A) Financial Accounting (B) Corporate Accounting (C) Cost & Management Accounting-

(A) Financial Accounting:

Principles of Accounting; Accounting Concepts- Entity, Fund, Going Concern, Dual Aspects, Money Measurement, Periodicity, Accounting Equation; Accounting Conventions- Conservatism, Disclosure, Consistency, Materiality; Accounting Cycle; Basis of Accounting- Cash, Accrual; Measurement of Periodic Income- Revenue Recognition and Matching Process; Process of Accounting- Preparation of Journal, Ledger, Trial Balance, Adjusting Entries and Rectification of Errors; Depreciation, Provisions and Reserves- Concepts and Different Types; Preparation of Final Accounts of Non-corporate Entities- Trading Account, P & L Account and Balance Sheet; Accounting for Bill of Exchange (excluding accommodation bill), Hire Purchase and Installment Payment System; Branch and Departmental Accounts; Partnership Accounts- Appropriation of Profits, Admission, Retirement, Dissolution;

(B) Corporate Accounting:

Company Accounts- Issue and Forfeiture of Shares; Redemption of Preference Shares and Debentures, Capitalisation of Reserves; Accounting for Amalgamation; Internal Reconstruction; Accounting for holding company (excluding chain and cross holding); Preparation of Final Accounts of Corporate Entities- Statement of P & L and Balance Sheet (Division I of Schedule III to Companies Act, 2013); Accounting Standards- Concept, Needs and Process of Setting Standards in India

(C) Cost & Management Accounting:

Cost concepts and classification; Elements of Cost- Materials, Labour and Overhead; Cost Sheet; Process Costing (excluding valuation of equivalent products), Service Costing; Budget and Budgetary Control- Cash, Sales, Flexible Budget; Standard Costing (Only Material and Labour Variances); CVP Analysis; Fund Flow and Cash Flow Analysis; Ratio Analysis and Interpretation of Financial Statements.

II. Auditing:

Definition; Principles and Procedures; Types of Audits; Internal Control and Check; Vouching; Verification and Valuation of Assets and Liabilities; Auditor's Report and Certificate; Investigation; Areas of Auditing- Cost Audit, Management Audit, Tax Audit.

III. Taxation:

Direct and Indirect Taxes; Tax Structure in India; Income Tax – Definition: Assessee, Person, Previous Year, Assessment Year, Income, Gross Total Income, Net Income; Residential Status and Scope of Total Income (for individuals); Salaries- Allowances and Perquisites; Income from House Property (provisions relevant to A.Y. 2024-25); Goods and Services Tax- Features and Scope, Taxable Event, Types of GST.

IV. Business Mathematics & Statistics:

Business Mathematics- Simple and Compound Interest; Annuity; AP and GP Series; Business Statistics- Meaning, Uses, Classification of Data; Measures of Central Tendency; Measures of Dispersion; Index Number; Correlation (Simple and Rank).

V. Financial Management:

Concept, Objectives, Functions; Sources of Finance; Cost of Capital; Capital Structure; Leverage Analysis; Working Capital Management; Capital Budgeting- ARR, Payback and Discounted Payback, NPV and IRR, Dividend Theories.

VI. Business Economics:

Demand and Supply Function- Concept of Equilibrium Price; Price Elasticity of Demand; Basic Theory of Consumer Behaviour; Cardinal and Ordinal Utility; Indifference Curve and its Properties.

Producer's Behaviour- Short-run and Long-run Production Function, Returns to Scale, Economies of Scale; Basic Concepts of Total Cost, Average Cost, Marginal Cost, Total Revenue, Average Revenue, Marginal Revenue and Profit.

Markets and Price Determination under Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly.

National Income- Concepts, GDP, GNP, Balance of Payment, Real vs. Nominal Income; Inflation- Concept and Types; Functions of Central Bank.

Notion of Consumption Function, Investment Function, Concepts of IS and LM Curves, Investment Multiplier.

HIGHER SECONDARY (CLASSES XI AND XII)
AGRICULTURE (PG)

Basic Concepts of Crop Husbandry:

Classification of field crops-origin and distribution of major cereals, pulses, oilseeds, fibre crops, sugarcane and starch crops, spices and condiments, and narcotics, Climatic requirements and adaptation of these crops. Quality seeds: production and preservation.

Tillage and Tillage Operations:

Objects and Principles of tillage, types of tillage, prerequisites for tillage operations, factors influencing tillage, seed bed and nursery bed preparation, tillage of sowing seeds and transplantation of seedlings, intercultivation use of traditional and improved farm implements and their comparative efficiencies.

Soil and Soil Management:

Definitions of soil, soil formation factors, soil profile development, physical, chemical and biological properties of arable soil, soil organic matter, soil groups of India and their distribution and cropping pattern. Soil management for cultivation of crops. Problem soils of India and their management. Soil erosion and conservation.

Nutrient Management:

Essential elements and their functions in crops, important organic manures, biofertilizers and commercial fertilizers, preparation of organic manures and biofertilizers. Amount of application, time and method of application in different crops. Use of soil amendments. Compound fertilizers, their properties and use. Mixed fertilizers and their preparation. Integrated nutrient management.

Water Management:

Importance of water in crops, forms of soil water, soil water at field capacity, wilting point and available water, factors affecting water holding capacity. Water requirement, irrigation requirement and scheduling of irrigation water, Methods of irrigation, minor and major irrigation projects in India. Drainage and its importance, systems of drainage of excess water. Water conservation methods. Watershed management: its concept and utilities.

Crop protection:

Nature of damage caused by pests, diseases and weeds, and their control measures, stored grain pests and their control, protection against rodents. Integrated pest management. Precautions required to handle agro-chemicals.

Agronomic Practices of Field Crops :

Selection of crops according to soil type and climate conditions, regional infrastructure and marketing channels. Preparation of land for sowing and transplantation, selection, preparation of seeds for sowing. Methods and time of sowing and /or transplantation, intercultural operations, manures and fertilizers management, irrigation management. Harvesting, processing and storage of crops. Cost of cultivation.

The above items be studied on major cereals, pulses, oil seeds, fibre crops, sugarcane, narcotics etc.

Cropping Systems and Patterns:

Crop rotation, objectives and factors affecting crop rotations inter/ mixed cropping. Dryland farming and selection of crops.

Operations Barga:

Principles, objectives and advantages / disadvantages.

HIGHER SECONDARY (CLASSES XI AND XII)
AGRONOMY (PG)

1. **INTRODUCTION**
   Agriculture and Agronomy; History of Agriculture; Agricultural Science, Meaning of Agronomy; Content of Agronomy; Scope of Agronomy

2. **CLIMATE**
   Atmosphere; Structure of Atmosphere; Weather element and their effect on crop; Hydrologic Cycles; Monsoon; Seasons; Abnormalities in Weather --- Floods, droughts, etc.; Weather forecasting; Forecasting information. Types and methods of Weather forecasting.

3. **CLASSIFICATION OF FIELD CROPS**
   All types of classification of field crops

4. **TILLAGE**
   Objectives of tillage, Influence of tillage on soil physical properties; types of tillage; Preparatory cultivation, after cultivation; Tillage implements --- Primary and Secondary tillage implements; Implements for layout of seedbed and sowing and intercultivation; Tilth; Modern concepts of tillage; Puddling.

5. **SEEDS AND SOWING**
   Introduction, characteristic of good quality seed; Selection of seed, seed production, vegetative propagation ; Micro propagation, Types of Pure seed, other types of seed in agronomic use; Real value of seeds seed dormancy. Viability of seeds, Seed treatment; Types of sowing; Direct sowing, transplanting: time of sowing/ planting; Depth of sowing.

6. **PLANT POPULATION**
   Yield of individual plant and community; Plant population and growth, and yield, Biological and economic yield, Optimum Plant population and environment, Factors affecting optimum plant population; Maintaining optimum plant population, planting pattern, gap filling and resowing.

7. **CROP ROTATION**
   Concepts, Reasons for crop rotation; Essentials of a good rotation, planning the rotation; Examples of good rotation.

8. **NUTRIENT MANAGEMENT**
   Mineral nutrition – Essential elements, Functions of nutrients, Nutrient availability; Soil fertility and productivity; Manures --- different types; Fertilizers: Classification, Micronutrients, Biofertilisers. Method and time of Fertilizers application, Integrated nutrients management.

9. **WATER MANAGEMENT**
   Importance of water, in crops. Soil-Plant atmosphere system, soil water, water requirement of crops, factors influencing ET, ET and crop yield, irrigation requirement. Scheduling of irrigation, Method of irrigation; measurement of irrigation water. Qualities of irrigation water; Drainage – excess water, Agricultural drainage.

10. **DRYLAND AGRICULTURE**
    Concept, Importance of dryland agriculture, problems of crop production in dryland. Moisture stress – Development of moisture stress – Constraints associated with dryland agriculture, Management practices and management techniques for dryland farming areas.

11. **WEED MANAGEMENT**
    Concept, Weed problem, classification of weeds, crop weed competition, Establishment of weed, Weed control measures; chemical weed control, classification of herbicides, Herbicides formulation, mode of action, method, time and dosage of application, Effect of herbicides on crop, Fate in Soil, Interaction with other agro-chemicals, Integrated weed management.

12. **CROPPING SYSTEM**
    System approach, Efficient cropping system, Interactions between different component crops; Assessment of yield advantage and land use, Economic evaluation, Management of cropping system.

HIGHER SECONDARY (CLASSES XI AND XII)
ANTHROPOLOGY (PG)

BIOLOGICAL ANTHROPOLOGY

Section I: Aim, Scope and Branches of Biological Anthropology and its development in India.

Section II: Anatomy and Morphology.

1. Morphological features of man (Homo sapiens, sapiens)
2. Study of human skeleton: names and position of bones.
   (a) Skull: study of different normas.
   (b) Post cranial osteology: Vertebral column, Pectoral girdle, Thorax, Pelvis, Upper and lower extremities.
3. Determination of sex from skull and pelvis.
4. Anatomical modifications in the skeleton as a consequence of evolution bipedalism.

Section III: Primates and Evolution of man

1. The Order Primates: General Characters (or evolutionary trends)
2. Classification of the Order : Simpson and Van Valen
3. Study of living Primate's family with special reference to their morphology, distribution and behaviour.
4. Comparative morphology and anatomy of living anthropoid apes: Asian and African.
5. Study of fossil apes: Parapithecus, Dryopithecus, Sivapithecus Ramapithecus.
6. Study of proto-hominids: Australopithecus (afferensis, africanus, robustus and boiseir)
7. Evolutionary theories: Lamarckism, Darwinism and modern synthesis.

Palaeoanthropology and Prehistory

Group A: Palaeoanthropology and Prehistory

1. Basic concept and approaches of Palaeoanthropology with special reference to India.
2. Environmental background of human evolution.
3. Biocultural process and mechanism of emergence and evolution of man
4. Main stages of human evolution and ancestral hominoid stalk (Aegyptopithecus zedxis)
5. Origin of the genus Homo: Homo habilis, Homo erectus, (Java man, Peking man, Olduvai man and Narmada man)
6. Emergence of species Homo sapiens.

(a) Homo sapiens Neanderthalensis Progressive and Conservative (La chapelle, Tabun and Skhul finds)
(b) Homo sapiens sapiens Cro Magnon, Grinaldi and Chancclade, finds.

Group B: Prehistory

1. Methodology in prehistory and its difference with Archeological methods.
   a) Exploration, b) Excavation, c) Collection d) Dating
   e) Preservation f) Classification and Interpretation

2. Methods of dating : Absolute and Relative
   a) Absolute methods- C-14, K-Ar, Fission Track, thermoluminiscene, Amino Acid, Racemization, Dendrochronology and Archaeomagnetism, Flurine Test.
   b) Relative methods – Stratigraphy and Type Technology and associate finds.
3. Sequence of Prehistoric cultures of the Old World
   a) Palaeolithic / Early Stone. Age cultures of Europe, India and Africa (East Africa –Olduval george)
   b) Mesolithic cultures of Europe and India (Bagor, Langhnaj and Birbhanpur)
   c) Neolithic General features and distributions (Europe and India). Indian site study: Burzaliom Bellary.
   d) Megalithic monuments of India.
4. Indus Valley Civilization with special reference to distribution: Town planning, Trade, Pottery and Religion.

SOCIAL AND CULTURAL ANTHROPOLOGY

Group A : Social Anthropology

1. Aim, Scope and Branches of Social Anthropology, Relationship with other disciplines of Social Science, Development of Social Anthropology in India and abroad.
2. Brief Introduction to the concepts: Society, Group, Community, Unit, Social Institutions, Social Organizations, Social System, Social Structure, Social Process, Social Exchange.
3. Introduction to the Themes: Kinship components (Family, Lineage, Clan, Phratry, Moity, Kindred). Kinship terminological systems, Gender, Tribe, Caste, Class, Marriage, State, Religion, Property and inheritance. Division of labour, village and Socialization.
4. Social Organization of Indian Tribes (Santal, Toda,, Garo, Toto, Andaman Islanders) and Non-Indian Tribes (Arunta, Nuer and Eskimo).

Group B : Cultural Anthropology

1. Aim, Scope and Branches of Cultural Anthropology, Relationship with other disciplines of Social Science, Development of Cultural Anthropology in India and abroad.
2. Brief Introduction to the concepts: Culture, Technology, Trait, Trait-Complex, Pattern, Culture area, Universals of Culture. Diffusion. Symbol. World-view, Cognition, Integration, Phenomenon, Acculturation, Enculturation.
3. Contemporary cultures:
   a) Modes of subsistence: Gathering, Hunting, Fishing, Pastoralism, Raising of Crops. (Shifting and Settled)
   b) Forms of habitation and spatial organization, Clothings and decoration, Food processing, technique of fire making and Tribal craft.
   c) Introduction to other Themes
   Power and Politics: Myth, Magic and religion, Law, Order and War, Art, Education, Music and Dance, Life cycle, Witchcraft. Sorcery, Diuvination, Cults.
4. Study of Material Cultures of Indian tribes (Santal, Toda, Garo, Toto and Andaman Islanders) and Non-Indian Tribes (Arunta, Nuer and Eskimo)

Group- A Human Genetics

1. Biological basis of inheritance
   a) Structure and function of animal cell
   b) Somatic and germ cell
   c) Cell division: Significance of meiosis
   d) Gametogenceis
   e) Chromosomes and DNA-Human Karyotypes.
   f) Some Genetic terms : Coden exzyna, intron genetic code lethality and epistasis.
2. Mendel's laws of inheritance
3. Criteria of inheritance of Mendelian traits in man Autosomal dominant Autosomal recessive. Sex linked (X and Y linked); Sex limited and Sex controlled \ Multiple allelism.
4. Brief outlines of methodology of Human Genetics : Pedigree method: Twin method: Population genetical method(gene frequency; estimation e.g. Benstein method for ABO blood groups)
5. Brief outline of Population Genetics Hardy Weinberg Equilibrium Law; Mutation, Selection, Drift, Admixture.

Group-B: Population Biology

1. Definition, Concept and misconcept of Race (Historical development)
2. (A) Static approach – typological concept
   (B) Dynamic approach Population genetical concept (race as a Mendelian population)
   (C) Ecological concept (geographical, local and micro races);
   (D) Univariate and Multivariate approaches in assessing racial affinities (Population affinities)
   (E) Special categories of races / populations (e.g. Ainu morphologically Special) basque genetically special.
3. Traits used for assessing population affinities.
4. Qualitative: ABO blood groups Skin colour, Hair form, Nose and Dermatoglyphic and ridge count.
5. Racial groups of mankind. Typological (Haddon), Population genetical (Boyd) and Ecological (Garn).
6. Racial classification of India (undivided) after Risley, Guha and Sarkar
7. Population variation in India: Regional Approach (Mahalanobis), Cline (Sarkar)
8. Human adaptation to Environment: Hot adaptation Nilotic Negro, Cold adaptation Eskimo.

HIGHER SECONDARY (CLASSES XI AND XII)
ARABIC (PG) CODE -

There shall be a paper of 60 marks. The Syllabus, distribution of marks and the pattern of questions shall be as follows:

1. Translation / Explanation of an extract into English or vowel signs from the following B.A. Pass Arabic Selection Prose Part-II 1963 edition. And Arabic Hons. Course Pub by C.U. 1976. Eight questions each are having two marks.

(a)	Al-Muntakhabatu Minal-Kashshaf	Pages	26 - 39
(b)	Al-Muntakhabatu Fi Sirah	Pages	47 - 67
(c)	Al-Muntakhabatu Min Muqaddamah	Pages	68 - 84
(d)	Al-Iqab	Pages	175 - 204
(e)	Al-Nahdat al-Lughat at-Arabiyya	Pages	299 - 336
(f)	Ala Hamish al-Sirah Book-I by Dr. T. Hossain		
(g)	Al-Ayyam - do –		
(h)	Maqamat Al-Hariri ------ Introduction & 1 to 3 Chapters		
(i)	Ki-Tab Al-Fakhri upto IInd Chapter from beginning		

2. Explanation /Translation of Different verses or vowel signs from the following poetry B.A. Pass Arabic Selection Poetry Part-II. Eight question each having two marks. University Arabic Selection 1976.

(a)	Diwan-Al-Zuhair	Pages	141 - 143
(b)	Al-Mutanabbi : Qasidah Lamiya	Pages	139 - 146
(c)	Abul Ala al-Maarri	Pages	168 - 185
(d)	Al-Muntakhabatu Min Diwani Ibnil Farid (Arabic Hons. CoursePub by C.U. 1976)	Pages	120 - 127
(e)	Hafiz Ibrahim	Pages	231 - 245
(f)	Jamil Sidqi Al-Zahawi	Pages	286 - 303
(g)	Al-Shawqiyat: Al Hilal, Ayyuhan Nil, Al-Dimashq, Munajatul Ahram, Al-Riqqu Wal-hurriyyaat, Masair-al-Ayyam, Dhikra Istibal al-Suriya & Tut. Ankh Amun		

3. **Grammar**. *There will be six questions each having two marks*

(a) Etymology : (I) Verbs their measures and salient features
(II) Irregular verbs includes perfect (Sahih) Hamzated (Mahmuz) Infirm(Mutal) Surb (Mudhaaf)

(b) Nouns and cases of nouns
(c) Number Singular & Plural
(d) Different kinds of Particles (Al-Huraf)
(e) Syntex : Different kinds of sentences (II) Grammatical Analysis of any sentence or verse with vowel signs. (III) Mafail Khamsa,Hal, Tamiz, Mushabbah bil Fil etc.
(f) Powers (Al-Awamil al-Samaiyya)
(g) Rhetoric & Prosody

I. Ilmul Bayan, ILmul badi II. Al Magta, Al-Akran, Al-Illat, Al-Bahr and Al-Taqti

(h) Philology: A short answer type question on Semitic Languages.

4. History of Arabic Literature from Pre-Islamic period to upto 1990 A.D. on the different aspects of life and works of the famous scholars, writers and poets etc.

(b) Arabic Literacy Criticism especially on Pre-Islamic and Abbasid Poetry, Critics and poets etc. There will be 8 (eight) questions each having two marks.

HIGHER SECONDARY (CLASSES XI AND XII)
HOME MANAGEMENT AND HOME NURSHING (PG)

Topics	Range of knowledge
1. Effective Management of a Home	(a) Meaning and definition of Home Management (b) Roll of Home Management in a changing world.
2. An Ideal Home maker	(a) Qualities of a good home maker (b) Management and use of different resources including Human resources and non-human resources. (c) Planning and processing of daily duties of a home maker (d) Cleaning and care of the house. (e) Cleaning and polishing of furniture and metal used in household.
3. Clothing and its needs	(a) Clothing and its needs and purpose. (b) Choice of cloths for different occasions according to age, sex, vocation, seasonal variations. (c) selection of fabrics with emphasis on beauty, comfort, wash ability, durability, ease or handling, money.
4. Knowing the textile Fibres and their Washing and storage	(a) Study of different kinds of Textiles fibres. (b) Fibre Identification (c) Methods of washing and finishing of different types of clothing.
5. Hygiene	(a) Air – its composition, impurities and ventilation (b) Water – its sources, pollution and purification
6. Home Nursing	(a) Basic principles of Home Nursing (b) Qualification of a good nurse and her duties (c) Family health care – immunization and dental care for children (d) Recognising symptoms of illness at home. (e) Care of the old and infirm at home.
7. Care of the sick at home	(a) Arrangement of sick room at home. (b) Bed making with and without the patient. (c) Nursing of the patient at different age levels – child, adult and old.
8. Common Infectious Diseases	(a) Elementary knowledge about Symptoms of infectious diseases. (b) Preventive measure – (i) Early diagnosis (ii) Isolation (iii) Notification (iv) Quarantine, (v) Disinfection, (vi) Immunization, (vii) Health education
9. Care of children and adolescents	(a) Care of children – food, clothing, play aterials, (b) Puberty and growth (c) Problems of adolescents and delinquents

10. Family Life Education for Future Home Maker	(a) Preparation for marital life. (b) Responsibility of parenthood. (c) Interpersonal relationship in family life. (d) Concept of Family Planning and personal health.

HIGHER SECONDARY (CLASSES XI AND XII)
HOME SCIENCE (PG)

Objectives: a) To be acquainted with the basic knowledge components of Home Science as a subject.
b) To create scientific interest in young girls about the art and science of living in a community (both in and outside family)

Topics	Range of knowledge
1. A Family set up and its housing needs	(a) Selection and planning accommodation for residential purposes for different Socio-economic levels. (b) Beautifying a house, colour schemes, flower arrangement, wall and floor decoration as a part of interior decoration.
2. A good home manager	(a) Principles of management and its practices for both rural, semi urban and urban communities. (b) Cleaning and care of the house, use of different reagents, labour saving devices in household practices. (c) Use of resources --- Human and non human family budget. Savings, Household accounts. (d) Background of Indian home life and family relationship, preparation of Marital life, responsibility of parenthood.
3. Dress designing and clothing needs	(a) Selection of clothing according to age sex, vocation, seasons and climate care of clothing. (b) Knowledge about classification of fibres, physical and chemical tests. (c) Stain removal and laundering methods, use and selection of water for laundering purposes.
4. Personal health and hygiene	(a) Knowledge of human body parts and its care including the study of different organs and hormones. (b) Air and Water – their composition, source, pollution and purification.
5. Human Development	(a) Growth and development of a child, place of a child in a home throughout the different phases of childhood. (b) Child welfare (c) Role of parents, superiors at home, teachers, peers. (d) Child in special needs causes of school drop out, delinquency --- care and

		preventive measures.
6. Care of the sick at home	(a)	Basic nursing skills and qualities of a good nurse.
	(b)	A well equipped sick room and its equipment.
	(c)	Care and management of a patient.
7. First Aid and Health Education	(a)	Preparation and use of First Aid Box. Accidents and emergencies, different types of bandaging.
	(b)	A well equipped sick room
	(c)	Care and management of a sick room
	(d)	Health care – Primary health care (PHC) components and communication of health education, preventive measures from personal and public point of view.
	(e)	Formula for home made Oral rehydration solution (ORS). Oral rehydration therapy (ORT), immunization schedule – common childhood diseases.
	(f)	Mother and child health (MCH), National and International agencies and their roles in the field of community health.
8. Basic Principles of Physico-Chemical changes of matter in relation to housecraft	(a)	Structure and functions of animal cells and tissues.
	(b)	Composition and functions of blood.
	(c)	Understanding of different weights and measures commonly used at home.
9. Community Nutrition	(a)	Basic food groups, function of food, Macro and Micro nutrients for different age groups and workers in special condition.
	(b)	Balanced diet and meal planning. Planning therapeutic diets for different human ailments.
	(c)	Integrated child Development service (ICDS) and other programmes and agencies related to community education.
10. House as a Part of human society and the training for good citizenship	(a)	Role of human personality in a democracy.
	(b)	Role of Indian womanhood in modern society.
	(c)	Rural and urban self-government --- Public responsibilities of the Indian Community

HIGHER SECONDARY (CLASSES XI AND XII)

NUTRITION (PG)

1. **Nutrition for Health & Growth: Meal Planning to Meet Recommended Allowances.**
Nutrition to-day. Basic Meal Pattern and its Modification to suit different. Income Levels, Age and Physiological State. Community Nutrition Programme. Role of the Dietetian in the Community. Estimation of Human Dietary Needs. Calorie Allowances. Interpretation and use of Tables. Meal Planning to Fit Personal & Family Needs. Menus and Market Order for a family of Four. Economy Hints. Regional, National and Cultural Food Patterns.

2. **Diet in the Treatment of Disease/ Therapeutic Diet.**
The Hospital Basic Diet. Progressive House Diets. Dietary Modifications for specific conditions. Nutritional Adequacy of Hospital Diets. Basic concept and Methods of (i) Orad Feeding (ii) Tube Feeding (iii) Parenteral Nutrition (iv) Intravenous Feeding. Diet During Febrile Condition, Infection & Surgical Condition. Role of Dietatian in the Hospital. Patient Check-up and councelling education of the patient follow up. Relation between Nutrition and Infection.

3. **Nutrition in Pregnancy & Lactation**
Nutritional demands of Pregnancy. Food selection in Pregnancy. Complications of Pregnancy involving diet. Diet during Labour Diet following delivery. Diet in Lactation.

4. **Nutrition during Infancy**
Breast Feeding. Formula Feeding. Digestive disturbances of Infacy. Weaning. Formulas: Types and Preparation. Supplementary Foods. The Infant Diet. Weight Gain.

5. **Nutrition for Growth**
Diet in Early Childhood. Elementary School Age. High School Age. Nutrition studies of Children. The School Lunch Programme. Nutritional Education. Evaluation of Growth & Nutritional Status.

6. **Geriatric Nutrition**
Adult Nutrition. Our aging Population. Food habits of Older People. Food requirements of Older People. Planning Meals for Older people.

7. **Nutrition of Athletes**
Nutrition Requirement. Meal Planning.

8. **Diseases of Gastro-intestinal Tract, Liver and Biliary Diet.**
The pathway of Digestion. Diagnostic Procedures. Peptic Ulcer, Gastritis, Diarrhorea, Colitis. Constipation. Flatulence. Dietary Modification in the Above Diseases.

9. **Diseases of the Kidneys**
Functions of Kidney. Nephritis. Glomeurlonehiritis. Uremia. Kidney Failure. Nephrosis. Therapeutic Diet.

10. **Dietary Therapy in**
(a) Diabetes Mellitus & Obesity. (b) Cardiovascular Diseases : Hyperlipidemia Atherosclerosis Hypertension.

HIGHER SECONDARY (CLASSES XI AND XII)
PERSIAN (PG)

A: LANGUAGE
(i) Prose Text
(ii) Poetry Text

B: RHETORIC & PROSDY

C: HISTORY OF PERSIAN LITERATURE

PROSE TEXT :

1 Chahar Maqala - Nizami Uruzi Samarqandi

(The Chapter - ماهیت شاعر و شعر او

2 Qaboos Nama - Amir Kai Kaus bin Askandar bin Qabus Washimgir. (The Following Chapters only)

(الف) در آفرینش پیغمبران و ستایش ایشان (ب) اندر سپاس داشتن از خداوند نعمت (ج) در مهمان کردن و مهمان شدن
(د) اندر فرزندی و حق پدر

3 Aaine-Muhammad Hijazi : (The following soties only)

(الف) شاهزاده (ب) دو گدا (ج) آسایش زندگی

4 Darya - i - Gauhar - Dr. Mahadi Hamidi : (The following Stories only)

(الف) خانه پدری از سعید نفیسی (ب) عدل از صادق چوبک

5 Dastannha - i - Dil Angiz -i- Adabiyat -i- Farsi - Dr. Zohra Khanlari : (The following Stories only)

(الف) شیخ صنعان (ب) خسرو و شیرین (ج) ویس و رامین

A POETRY TEXT :

1. Mathnavi of Maulana Rumi - Maulana Jalaluddin Rumi — Page 44-59

2. Poems of Abul Qasim Lahuti — آزادی و استقلال، گم شده ایران، لوح مزارم، نقاب لازم نیست

3. Payam -i- Mashriq - Dr. Md. Iqbal : (The following poems only)

گل نخستین، کرم کتابی، اگر خواهی حیات اندر خطر زی، کرمک شب تاب

4. Barguzida -i- Sher -i- Farsi -i- Maasir. Vol II - Munibur Rahman (The following poems only)

(الف) شب یلدا (ب) [illegible] (ج) غروب

5 Rubaiyat -i- Umar Khayyam - Edited by A. C. Bose, Calcutta, 1976 : (The following Rubaiyat Nos. only) 2, 5, 13, 22, 26, 41, 66, 74

B. RHETORIC AND PROSODY :

(a) Definition with example of the following :

تشبیه، استعاره، کنایه، مبالغه، غلو، تلمیح، عکس، تضاد، تجرید، حسن طلب، حسن تعلیل، لف و نشر

(b) Scansion from the following metres. (بحور) — بحر رجز، بحر رمل، بحر متقارب

C. HISTORY OF PERSIAN LITERATURE :

(1) History of Persian Literature from the Mongols down to the Pahlavi Dynasty.

(2) Indo-Persian Literature during Medieval India.