

Section A

RESEARCH METHODOLOGY

- 1) **Basic Concept of Research Problem:** Rationale of research, Identification of research problem, Research objective and Types of research- fundamental/ applied/ action/ quantitative/ qualitative.
- 2) **Review of literatures:** Primary source, Secondary source, Searching e- resources, using search engines, Searching data base and writing literature review.
- 3) **Methods of Research:** Concept and formulation of hypothesis, Survey method, Experimental method (variable, designs), Historical methods and Content analysis
- 4) **Sampling of Data:** Concept of sampling, Probability sampling techniques, Non probability sampling techniques and sampling error
- 5) **Collection of Data:** Primary data generation, Secondary data collection, Methods of data generation/ collection – by experiments, questionnaire, interview schedule, focus groups etc
- 6) **Analysis of Data:** Statistical analysis techniques, Qualitative analysis techniques Application of computer in research data analysis
- 7) **Report Preparation:** Structure and component of research report, Organization of data, Indexing of journal and research output, Citation, references, bibliography Copyright, plagiarism and originality of research work
- 8) **Research Ethics:** Ethics in research, National and International regulations/ laws/ ethics related to research on Human, Animals and Environments.

Section B

PHARMACY

- 1) **Medicinal Chemistry:** Structure, nomenclature, classification, synthesis, SAR and metabolism of the following category of drugs, which are official in Indian Pharmacopoeia and British Pharmacopoeia. Introduction to drug design. Stereochemistry of drug molecules. Hypnotics and Sedatives, Analgesics, NSAIDS, Neuroleptics, Antidepressants, Anxiolytics, Anticonvulsants, Antihistaminics, Local Anaesthetics, Cardio Vascular drugs - Antianginal agents Vasodilators, Adrenergic & Cholinergic drugs, Cardiotonic agents, Diuretics, Antihypertensive drugs, Hypoglycemic agents, Antilipemic agents, Coagulants, Anticoagulants, Antiplatelet agents. Chemotherapeutic agents - Antibiotics, Antibacterials, Sulphadiazine. Antiprotozoal drugs, Antiviral, Antitubercular, Antimalarial, Anticancer, Antiamoebic drugs. Diagnostic agents. Vitamins and Hormones.
- 2) **Pharmaceutics:** Development, manufacturing standards Q.C. limits, labeling, as per the pharmacopoeal requirements. Storage of different dosage forms and new drug delivery systems. Biopharmaceutics and Pharmacokinetics and their importance in formulation. Formulation and evaluation of tablets, capsules, parenterals, liquid dosage forms and cosmetics like lipstick, shampoo, creams, nail preparations and dentifrices, tablet defects and tablet coating defects, Pharmaceutical calculations. Various dissolution test apparatus. Biopharmaceutical classification of drugs. Method of preparation, evaluation and application of Novel drug delivery systems like liposomes, ethosomes, neosomes, nanoparticles, microemulsions, nanoemulsions.
- 3) **Pharmacognosy and Biotechnology:** General methods of extraction, isolation, purification and characterization of natural products. Various separation techniques used for isolation of natural products. Biosynthetic pathways of various metabolites (e.g. Alkaloids, glycosides, tannins, lignans, saponins, lipids, flavonoids, coumarins, anthocyanidines etc.). Quality control of crude drugs, phytochemical screening methods, plant tissue culture. Recombinant DNA technique, Fermentation, Immunology and vaccines. Enzyme immobilization, Genetics and gene therapy, Fundamentals of cell and molecular biology.
- 4) **Pharmacology:** General pharmacological principles including Toxicology. Pharmacokinetics and pharmacodynamics, Drug interaction. Pharmacology of drugs acting on Central nervous system, Cardiovascular system, Autonomic nervous system, Gastro intestinal system and Respiratory system. Pharmacology of Autocoids,

Hormones, Hormone antagonists, chemotherapeutic agents including anticancer drugs. Bioassays, Immuno Pharmacology. Drugs acting on the blood & blood forming organs. Drugs acting on the renal system.

- 5) **Pharmaceutical Jurisprudence:** Drugs and cosmetics Act and rules with respect to manufacture, sales and storage. Pharmacy Act. Pharmaceutical ethics.
- 6) **Pharmaceutical Analysis:** Fundamental principles, basic instrumentation, and pharmaceutical applications of UVVisible spectroscopy, Infrared spectroscopy, PMR, C13 NMR spectroscopy, HPLC, HPTLC, Gel chromatography, Electrophoresis and ion-pair chromatography. Introductory principle, instrumentation and application of GC-Mass. Theory, methods and applications of enzyme and radioimmunoassay techniques, Differential scanning calorimetry (DSC), X-ray diffractometry (XRD), Validation and Calibration.
- 7) **Microbiology:** Principles and methods of microbiological assays of the Pharmacopoeia. Methods of preparation of official sera and vaccines. Serological and diagnostics tests. Applications of microorganisms in Bio Conversions and in Pharmaceutical industries.

BIOTECHNOLOGY

- 1) **Molecular Biology, Genomics, Proteomics, & Metabolic Engineering:** Structure and regulation of prokaryotes and eukaryotes genes, post-transcriptional and translational modifications, phylogenetics, molecular markers, genetic and physical mapping, cloning and expression vectors, rDNA technology, gene cloning approaches, whole genome sequencing & annotation, high throughput gene expression and function elucidation technologies, protein-protein interactions, MALDI-TOF MS, LC-MS, high throughput identification of biomarkers, Signal transduction pathways and their elucidation, primary and secondary metabolic pathways, systems biology frameworks for metabolic engineering, bioinformatics and statistics, Biodiversity, IPR, Biosafety & Bioethics
- 2) **Microbiology, Immunology and Diagnostics:** Biology of microbes, infectious diseases, immunology, molecular virology, cancer biology, cell & developmental biology, immunotechnology, antibody engineering, vaccines and the associated manufacturing processes, molecular diagnostics and their applications, cell culture technologies, regenerative medicine & transplantation technology, animal biotechnology.
- 3) **Bioprocess Engineering, Fermentation Technology & Downstream Processing:** Bioprocessing vs. chemical processing, Substrates for bioconversion processes, Inoculum development, Process technology for production of primary metabolites, such as baker's yeast, ethanol, citric acid, amino acids, polysaccharides and plastics, Microbial production of industrial enzymes, Production of secondary metabolites, Operation Batch, Fed-batch, CSTR, packed bed reactor, Immobilization, Aeration and agitation, Recovery and purification of fermentation products: removal of insoluble, concentration and purification, effluent treatment, principle and large scale instrumentation requirement for downstream processing.

BOTANY

- 1) **Microbiology** - Viruses and Bacteria Structure, classification and reproduction. General Account of infection, immunity and serology: Microbes in industry and agriculture.
- 2) **Pathology** - Knowledge of important plant disease in India caused by fungi. Modes of infection and methods of control.
- 3) **Plant Groups** - Structure, reproduction, life- history, classification, evolution, ecology and economic importance of algae, fungi, bryophytes, pteridophytes and gymnosperms.
- 4) **Morphology, anatomy and embryology of Angiosperms** - Tissues and tissue systems. Morphology and anatomy of stem, root and leaf (including development aspects and anomalous growth), Morphology of flower Structure of anther and ovule, fertilization and Development of seed.
- 5) **Taxonomy** - Principles of nomenclature and classification of angiosperms. Modern trends in Taxonomy. A general knowledge of the more important families of angiosperms.
- 6) **Cell Biology** - Cell as unit of structure and functions. Ultra structure function and interrelationships of plasma membranes endoplasmic reticulum, mitochondria, ribosomes chloroplasts and nucleus, Chromosomes- chemical and physical nature behaviour during mitosis and meiosis.

- 7) **Genetics and Evolution** - Mendelian concept of genetics. Development of the gene concept Nucleic acids their structure and role in reproduction and protein synthesis. Genetic code and regulation. Mechanism of microbial recombination. Organic evolution evidences, mechanism and theories.
- 8) **Physiology** - Photosynthesis history, factors, mechanism and importance. Absorption and conduction of water and salts. Transpiration, Major and minor essential elements and their role in nutrition, Nitrogen fixation and nitrate reduction Enzymes, Respiration and fermentation. General account of growth. Plant hormones and their functions. Photoperiodism. Seed dormancy and germination.
- 9) **Ecology** - Scope of ecology, structure, function and dynamics of ecosystems, Plant communities and succession. Ecological factors. Applied aspects of ecology including conservation and control of pollution.
- 10) **Economic Botany** - General account of important sources of food fiber, wood and drugs.

CHEMISTRY

INORGANIC CHEMISTRY

- 1) **Main Group Elements** : S-N compounds Sulphur-phosphorus compounds: Molecular sulphides such as P₄S₃, P₄S₇, P₄S₉ and P₄S₁₀. Phosphorus-nitrogen compounds: Phosphazines. Other P-N compounds.
- 3) Boron-nitrogen compounds:
- 4) **Metal Complexes**: Valence bond theory and its limitations. Ligand field theory: Splitting of d orbitals in different ligand fields Jahn-Teller effect MO diagrams of complexes with and without π bonds. Spectral & Magnetic properties of complexes.
- 5) **Nuclear Chemistry**: . Nuclear reactions: . Types of nuclear reactions. Spontaneous and induced fission.
- 6) Principles of working of the reactors of nuclear power plants. Breeder reactor. Nuclear fusion reaction.
- 7) **Analytical Principles**: Volumetric methods: Theories of indicators: Acid-base, redox, metallochromic, indicators. Complexation Precipitation Redox titrations. Gravimetric methods: Mechanism of precipitate formation. Aging of precipitates. Precipitation from homogeneous solutions. Coprecipitation and post precipitation. Contamination of precipitates. Washing, drying and ignition of precipitates.
- 8) **Water treatment**: Hardness, Alkalinity, Domestic water treatment Chemical analysis of water, D.O., B.O.D, C.O.D., T.D.S.

PHYSICAL CHEMISTRY

- 1) **Quantum Mechanics**: Introduction to Classical Mechanics: The blackbody radiation, photoelectric effect, Compton Effect and atomic spectra. Failure of classical mechanics to explain these phenomena. Quantum mechanical explanations.
- 2) **Chemical Kinetics**: Theories of reaction rate: Influence of temperature on reaction rate. Arrhenius equation and its limitations, activation energy. Collision theory and absolute reaction rate theory. Free energy of activation and volume of activation. Thermodynamic formulation of reaction rate. Effects of pressure and volume on the velocity of gas reaction.
- 3) **Surface Chemistry**: The colloidal state: Multimolecular, macromolecular and associated colloids. Stability of colloids. The zeta potential. Kinetic, optical and electrical properties of colloids: Electrophoresis, electroosmosis, sedimentation potential and streaming potential Catalysis: Mechanism and theories of homogeneous and heterogeneous catalysis. Acid-base and enzyme catalysis.
- 4) **Thermodynamics**: Intensive and extensive properties. Exact differentials. Intrinsic energy, enthalpy, entropy, free energy and their relations and significances. . Maxwell relations. Thermodynamic equations of state. Joule-Thomson effect. Joule-Thomson coefficient for van der Waals' gas. The third law of thermodynamics. .
- 5) **Spectroscopy**: Energy levels in molecules, rotational, vibrational, electronic NMR and ESR spectroscopy.

ORGANIC CHEMISTRY

- 1) **Principles of organic chemistry**: Inductive, mesomeric, electromeric effect. Carbocations, carbanions, carbens. Addition, Elimination, Substitution reactions

- 2) **Chemistry of Polymers:** Types and mechanism of polymerization reactions. Step-growth, free radical, addition, ionic polymerizations. Copolymers. Characterization of polymers. Manufacture and applications of polyolefins, thermoplastics, polyamides, polyesters, polyurethanes, epoxies and industrial polymers.
- 3) Chemistry of natural products- Biosynthesis of terpenes and alkaloids. Carbohydrate protein and nucleic acid.
- 4) **Organic Photochemistry:** Photochemical processes. Energy transfer, sensitization and quenching. Singlet and triplet states and their reactivity. Photoreactions of carbonyl compounds, enes, dienes, and arenes. Norrish reactions of acyclic ketones. Applications of photoreactions in laboratory and industrial synthesis.
- 5) **Separation Techniques:** Chromatographic methods: Classification of chromatographic separations. Theory of chromatography. Applications of chromatographic methods: Adsorption and partition chromatography. Paper, thinlayer and column chromatographic methods.

COMMERCE

- 1) **Business Environment:** Meaning and Elements of Business Environment, Economic Environment, Economic Policies, Economic Planning. Competition policy , Consumer protection, Environment protection Liberalization , Privatization and globalization, Second generation reforms , Industrial policy and implementation, Industrial growth and structural changes.
- 2) **Financial & Management Accounting:** Basic Accounting concepts, Capital & Revenue, Financial statements. Partnership Accounts: Admission, Retirement, Death, Dissolution and cash Distribution. Advanced Company Accounts: Issue, Forfeitures, Purchase of Business, Liquidation, Valuation of shares, Amalgamation, Absorption and Reconstruction, Holding company accounts. Cost Management Accounting: Ratio Analysis, Funds Flow Analysis , Cash Flow Analysis, Marginal costing & Break-even analysis, Standard costing, Budgetary control, Costing for decision making, Responsibility accounting.
- 3) **Business Economics:** Nature & uses of Business Economics, Concept of Profit & Wealth maximization. Demand Analysis & Elasticity of Demand, Curve Analysis Law Utility Analysis & Indifference Curve analysis, Laws of Returns and Law of Variable proportions.
- 4) **Business Statistics & Data Processing:** Data types , Data collection and analysis, Sampling, need , errors, & method of sampling, Normal Distribution , Hypothesis testing, Analysis and Interpretation of data. Correlation and Regression , small sample tests-t-test, F-test and chi-square test
- 5) **Business Management:** Concept of management Planning : Objectives, Strategies, Planning process, Decision-making. Staffing: Leading, Motivation, Leadership, Committees, Communication, Controlling: Corporate Governance and Business Ethics.
- 6) **Marketing Management :** The evolution of marketing concepts, Concepts of Marketing, Marketing mix, Marketing environment, Product decision, Pricing decision, Distribution decision.
- 7) **Financial Management:** Capital Structure, Financial & Operating leverage Cost of capital, Capital budgeting, Working capital management. Dividend Policy.
- 8) **Human Resources Management:** Concepts, Role and Functions of Human Resource management, Human Resource planning, Recruitment & Selection. Training & Development, Succession planning. Compensation: Wage & Salary Administration
- 9) **Banking & Financial Institutions:** Importance of Banking to Business, Types of Banks & Their functions. Development Banking: IDBI, IFCI, SFCs, UTI, SIDBI.
- 10) **International Business:** World Trade Organization: Its function & policies.

COMPUTER SCIENCE AND ENGINEERING

- 1) **High Performance Computer Architecture:** Basic Computer architecture. Performance Analysis, Architectural classification schemes, Memory models, Pipelining, RISC CISC, VLIW architectures, data dependency and interconnection network. Fault Tolerance and Scalability. Modeling Performance. Pipelined Systems. Interconnection Networks. Processor Array. Multi-computers. Multiprocessors. Systolic Array. Vector Processors. Structured Memory Design for Parallel Systems - Symmetric Shared, Distributed Shared and Synchronization. Grid computing.
- 2) **Software Systems:** Data structures and Algorithms: the notion of abstract data types, stack, queue, list, set, string, tree, binary search tree, heap, graph, tree and graph traversals, connected components, spanning trees, shortest paths, hashing, sorting, searching, design techniques (greedy, dynamic, divide and conquer, Algorithm design by induction), asymptotic analysis (best, worst, average cases) of time and space, upper and lower bounds, Basic concepts of complexity classes P, NP, NP-hard, NP-complete.
- 3) **Concepts of object-oriented programming** - Basic Concept of OOP Benefit of OOP Object Oriented language Structure of C++ Program Compiling and Linking Operators and expressions Looping Concepts Arrays and Structure, Functions Class Object Constructor and Destructors Polymorphism Functions Overloading Operators Overloading Inheritance pointer and Virtual Function Life I/O and Templates
- 4) **Operating Systems :** Synchronization Mechanisms. Process Deadlocks. Resource Models. Local and Global states. Distributed Operating Systems. Event Ordering. Timestamps. Distributed Mutual Exclusion. Token and Non-token based Algorithms. Comparative Performance Analysis. Concurrency Control. Shared Memory. File Systems. Agreement Protocols for handling Processor Failures. Coordination of Processes and related Algorithms. Failure Handling and Recovery Mechanisms. Multiprocessor Operating Systems and related Thread Handlings.
- 5) **Software Engineering:** SDLC, planning and managing the project, design, coding, testing, implementation, maintenance. Personal Software Process. Team Software Process. Usability. Agile Methods. Process Models- Iterative, Scrum, XP, and Evo. Requirements Engineering. Advanced UML, Petri net. Domain specific modeling. Systems Modeling Language. Meta modeling. Software architecture and design patterns. Software metrics. Software reliability. Advanced testing techniques.
- 6) **Database Systems:** Review of Database Systems. Web-enabled Database Systems. Storage and File Structures. Indexing and Hashing. Concurrency. Recovery. Query Processing. Query Optimization. Object Oriented DBMS. Extended Relational Model. Spatial databases. Multimedia Databases. Distributed Databases. Active Databases. Temporal Databases. Deductive Databases. Mobile Databases.
- 7) **Data Communication and Computer Networks:** Seven Layer OSI Model. TCP/IP details. IPv4 and IPv6 Protocols and its Applications. Real Time Communication Protocols. High speed local and wide area networks. Virtual networks. Network security. Broadband networks. Introduction to intelligent networking. Performance analysis of networks. Transmission media, data encoding, Multiplexing, Flow and error control, Network devices switches, Gateways, Routers, Network security cryptography, Digital signature, Firewalls, Routing concepts, ATM, Poisson and other distributions.

DESIGN

- 1) **Design** - An Introduction
- 2) **Visual Design** - Principles and Applications
- 3) **Design Methods** - Concept, Meaning, Nature and Importance
- 4) **Graphic Design** – Introduction and applications
- 5) **Brands/Designers**
- 6) **Quality Assurance** - Concept of Quality, managing quality through inspection and testing, seven tools of quality. Inspection: Inspection and its significance.

HINDI

इकाई - I

हिन्दी भाषा और उसका विकास।

हिन्दी की ऐतिहासिक पृष्ठभूमि : प्राचीन भारतीय आर्य भाषाएं, मध्यकालीन भारतीय आर्य भाषाएं—पालि, प्राकृत – शौरसेनी, अर्द्धमागधी, मागधी, अपभ्रंश और उनकी विशेषताएं, अपभ्रंश अवहट्ट, और पुरानी हिन्दी का संबंध, आधुनिक भारतीय आर्य भाषाएं और उनका वर्गीकरण। हिन्दी का भौगोलिक विस्तार : हिन्दी की उपभाषाएं, पश्चिमी हिन्दी, पूर्वी हिन्दी, राजस्थानी, बिहारी तथा पहाड़ी वर्ग और उनकी बोलियां। खड़ीबोली, ब्रज और अवधी की विशेषताएं। हिन्दी के विविध रूप : हिन्दी, उर्दू, दक्खिनी, हिन्दुस्तानी। हिन्दी का भाषिक स्वरूप : हिन्दी की स्वनिम व्यवस्था – खंड्य और खंड्येतर, हिन्दी ध्वनियों के वर्गीकरण का आधार, हिन्दी शब्द रचना –उपसर्ग, प्रत्यय, समास, हिन्दी की रूप रचना – लिंग, वचन और कारक व्यवस्था के सन्दर्भ में संज्ञा, सर्वनाम, विशेषण और क्रिया रूप, हिन्दी – वाक्य – रचना। हिन्दी भाषा – प्रयोग के विविध रूप : बोली, मानक भाषा, राजभाषा, राष्ट्रभाषा और सम्पर्क भाषा। संचार माध्यम और हिन्दी, कम्प्यूटर और हिन्दी, हिन्दी की संवैधानिक स्थिति। देवानागरी लिपि : विशेषताएं और मानकीकरण।

इकाई – II

हिन्दी साहित्य का इतिहास

हिन्दी साहित्येतिहास दर्शन
हिन्दी साहित्य के इतिहास लेखन की पद्धतियां
हिन्दी साहित्य का कालविभाजन और नामकरण, आदिकाल की विशेषताएं एवं साहित्यिक प्रवृत्तियां, रासो-साहित्य, आदिकालीन हिन्दी का जैन साहित्य, सिद्ध और नाथ साहित्य, अमीर खुसरो की हिन्दी कविता, विद्यापति और उनकी पदावली तथा लौकिक साहित्य
भक्तिकाल
भक्ति-आंदोलन के उदय के सामाजिक-सांस्कृतिक कारण, भक्ति-आंदोलन का अखिल भारतीय स्वरूप और उसका अन्तःप्रादेशिक वैशिष्ट्य।
भक्ति काव्य की सामाजिक-सांस्कृतिक पृष्ठभूमि, आलवार सन्त। भक्ति काव्य के प्रमुख सम्प्रदाय और उनका वैचारिक आधार। निर्गुण-सुगुण कवि और उनका काव्य।
रीतिकाल
सामाजिक-सांस्कृतिक पृष्ठभूमि, रीतिकाल की प्रमुख प्रवृत्तियां (रीतिबद्ध, रीतिसिद्ध, रीतिमुक्त)
रीतिकवियों का आचार्यत्व।
रीतिकाल के प्रमुख कवि और उनका काव्य
आधुनिक काल
हिन्दी गद्य का उद्भव और विकास। भारतेन्दु पूर्व हिन्दी गद्य, 1857 की क्रान्ति और सांस्कृतिक पुनर्जागरण, भारतेन्दु और उनका युग, पत्रकारिता का आरम्भ और 19वीं शताब्दी की हिन्दी पत्रकारिता, आधुनिकता की अवधारणा।
द्विवेदी युग : महावीर प्रसाद द्विवेदी और उनका युग, हिन्दी नवजागरण और सरस्वती, राष्ट्रीय काव्य धारा के प्रमुख कवि, स्वच्छन्दतावाद और उसके प्रमुख कवि।
छायावाद : छायावादी काव्य की प्रमुख विशेषताएं, छायावाद के प्रमुख कवि, प्रगतिवाद की अवधारणा, प्रगतिवादी काव्य और उसके प्रमुख कवि, प्रयोगवाद और नई कविता, नई कविता के कवि, समकालीन कविता (वर्ष 2000 तक) समकालीन साहित्यिक पत्रकारिता।

इकाई – III

साहित्यशास्त्र

काव्य के लक्षण, काव्य हेतु और काव्य प्रयोजन।
प्रमुख संप्रदाय और सिद्धान्त – रस, अलंकार, रीति, ध्वनि, वक्रोक्ति और औचित्य।
रस निष्पत्ति, साधारणीकरण।
शब्दशक्ति, काव्यगुण, काव्य दोष
प्लेटो के काव्य सिद्धान्त।
अरस्तू : अनुकरण सिद्धान्त, त्रासदी विवेचन, विरेचन सिद्धान्त।
वर्ल्सवर्थ का काव्यभाषा सिद्धान्त।
कॉलरिज : कल्पना और फैंटेसी।
टी.एस.इलिफ्ट : निर्वैयक्तिकता का सिद्धान्त, परम्परा की अवधारणा।
आई.ए.रिचर्ड्स : मूल्य सिद्धान्त, संप्रेषण सिद्धान्त तथा काव्य-भाषा सिद्धान्त। रूसी रूपवाद।
नयी समीक्षा। मिथक, फन्तासी, कल्पना, प्रतीक, विम्ब।

इकाई – IV

वैचारिक पृष्ठभूमि

भारतीय नवजागरण और स्वाधीनता आन्दोलन की वैचारिक पृष्ठभूमि
हिन्दी नवजागरण । खड़ीबोली आन्दोलन। फोर्ट विलियम कॉलेज
भारतेन्दु और हिन्दी नवजागरण,
महावीर प्रसाद द्विवेदी और हिन्दी नवजागरण
गांधीवादी दर्शन
अम्बेडकर दर्शन
लोहिया दर्शन
मार्क्सवाद, मनोविक्षेपणवाद, अस्तित्ववाद, उत्तर आधुनिकतावाद, अस्मितामूलक विमर्श
(दलित, स्त्री, आदिवासी एवं अल्पसंख्यक)

इकाई – V

हिन्दी कविता

पृथ्वीराज रासो – रेवा तट
अमीरखुसरो – खुसरों की पहेलियाँ और मुकरियाँ
विद्यापति की पदावली (संपादक – डॉ. नरेन्द्र झा) – पद संख्या 1 - 25
कबीर – (सं.- हजारी प्रसाद द्विवेदी) – पद संख्या – 160 - 209
जायसी ग्रंथावली – (सं. राम चन्द्र शुक्ल) – नागमती वियोग खण्ड
सूरदास – भ्रमरगीत सार – (सं.- राम चन्द्र शुक्ल) – पद संख्या 21 से 70
तुलसीदास – रामचरितमानस, उत्तर काण्ड
बिहारी सतसई – (सं.- जगन्नाथ दास रत्नाकर) – दोहा संख्या 1 – 50
घनानन्द कवित्त – (सं.- विश्वनाथ मिश्र) – कवित्त संख्या 1 – 30
मीरा – (सं.- विश्वनाथ त्रिपाठी) – प्रारम्भ से 20 पद
अयोध्या सिंह उपाध्याय हरिऔध – प्रियप्रवास
मैथिलीशरण गुप्त – भारत भारती, साकेत (नवम् सर्ग)
जयशंकर प्रसाद – आंसू, कामायनी (श्रद्धा, लज्जा, इडा)
निराला – जुही की कली, जागो फिर एक बार, सरोजस्मृति, राम की शक्तिपूजा, कुकरमुत्ता,
बाँधो न नाव इस ठाँव बंधु।
सुमित्रानन्दन पंत – परिवर्तन, प्रथम रश्मि
महादेवी वर्मा – बीन भी हूँ मैं तुम्हारी रागिनी भी हूँ, मैं नीर भरी दुख की बदली, फिर विकल है
प्राण मेरे, यह मन्दिर का दीप इसे नीरव जलने दो, द्रुत झरो जगत के जीर्ण पत्र
रामधारी सिंह दिनकर – उर्वशी (तृतीय अंक), रश्मिरथी
नागार्जुन – कालिदास, बादल को घिरते देखा है, अकाल और उसके बाद, खुरदरे पैर, शासन की
बंदूक, मनुष्य हैं।
सच्चिदानंद हीरानन्द वात्स्यायन अज्ञेय – कलगी बाजरे की, यह दीप अकेला, हरी घास पर क्षण
भर, असाध्यबीणा, कितनी नावों में कितनी बार
भवानीप्रसाद मिश्र – गीत फरोश, सतपुड़ा के जगल
मुक्तिबोध – भूल गलती, ब्रह्मराक्षस, अंधेरे में
धूमिल – नक्सलवाड़ी, मोचीराम, अकाल दर्शन, रोटी और संसद

फणीश्वर नाथ रेणु – मैला आंचल
 यशपाल – झूठा सच
 अमृत लाल नागर – मानस का हंस
 भीष्म साहनी – तमस
 श्रीलाल शुक्ल – राग दरबारी
 कृष्णा सोबती – जिन्दगी नामा
 मन्सू भंडारी – आपका बंटी
 जगदीश चन्द्र – धरती धन न अपना
इकाई –VII

हिन्दी कहानी

राजेन्द्र बाला घोष (बंग महिला) - चन्द्रदेव से मेरी बातें, दुलाईवाली
 माधवराव सप्रे – एक टोकरी भर मिट्टी
 सुभद्रा कुमारी चौहान – राही
 प्रेमचंद – ईदगाह, दुनिया का अनमोल रतन
 राजा राधिकारमण प्रसाद सिंह – कानों में कंगना
 चन्द्रधर शर्मा गुलेरी – उसने कहा था
 जयशंकर प्रसाद – आकाशदीप
 जैनेन्द्र – अपना-अपना भाग्य
 फणीश्वरनाथ रेणु – तीसरी कसम, लाल पान की बेगम
 अज्ञेय - गैंग्रीन
 शेखर जोशी – कोसी का घटवार
 भीष्म साहनी – अमृतसर आ गया है, चीफ की दावत
 कृष्णा सोबती – सिक्का बदल गया
 हरिशंकर परसाई – इस्पेक्टर मातादीन चांद पर
 जानरंजन – पिता
 कमलेश्वर – राजा निरबंसिया
 निर्मल वर्मा - परिंदे

इकाई –VIII

हिन्दी नाटक

भारतेन्दु – अंधेर नगरी, भारत दुर्दशा
 जयशंकर प्रसाद – चन्द्रगुप्त, स्कंदगुप्त, ध्रुवस्वामिनी
 धर्मवीरभारती – अंधायुग
 लक्ष्मीनारायण लाल – सिंदूर की होली
 मोहन राकेश – आधे-अधूरे, आषाढ का एक दिन
 हवीब तनवीर – आगरा बाज़ार
 सर्वेश्वरदयाल सक्सेना – बकरी
 शंकरशेष – एक और द्रोणाचार्य
 उपेन्द्रनाथ अशक – अंजो दीदी
 मन्सू भंडारी – महाभोज

इकाई –IX

हिन्दी निबंध

भारतेन्दु – दिल्ली दरबार दर्पण, भारतवर्षोन्नति कैसे हो सकती है
 प्रताप नारायण मिश्र - शिवमूर्ति
 बाल कृष्ण भट्ट – शिवशंभु के चिट्ठे
 रामचन्द्र शुक्ल – कविता क्या है
 हजारी प्रसाद द्विवेदी - नाखून क्यों बढ़ते हैं
 विद्यानिवास मिश्र – मेरे राम का मुकुट भीग रहा है
 अध्यापक पूर्ण सिंह - मजदूरी और प्रेम
 कुबेरनाथ राय – उत्तराफाल्गुनी के आस-पास
 विवेकी राय – उठ जाग मुसाफिर
 नामवर सिंह – संस्कृति और सौंदर्य

इकाई –X

आत्मकथा, जीवनी तथा अन्य गद्य विधाएं

रामबृक्ष बेनीपुरी – माटी की मूरतें

महादेवी वर्मा – ठकुरी बाबा

तुलसीराम – मुर्दहिया

शिवरानी देवी – प्रेमचन्द घर में

मन्नू भंडारी – एक कहानी यह भी

विष्णु प्रभाकर – आबारा मसीहा

हारिवंशराय वसुन – क्या भूलूँ क्या याद करूँ

रमणिका गुप्ता – आगहुबरी

हरिश्चंकर परसाई – भोवाराण का जीव

कृष्ण चन्दर – जामुन का गेड़

विनाकर – संस्कृति के चार अध्याय

सूक्तिबोध – एक लेखक की डायरी

राहुल सांकृत्यायन – मेरी तिजलत यात्रा

अनेक – अरे बाबावर रहेगा बाद

PSYCHOLOGY

- 1) **Emergence of Psychology** Psychological thought in some major Eastern Systems: Bhagavad Gita, Buddhism, Sufism and Integral Yoga. Academic psychology in India: 2000s: Emergence of Indian psychology in academia. Issues: The colonial encounter; Post colonialism and psychology; Lack of distinct disciplinary identity. Western: Structuralism, Functionalism, Psychoanalytical, Gestalt, Behaviorism, Humanistic-Existential, Transpersonal, Cognitive revolution, Multiculturalism. Four founding paths of academic psychology – Wundt, Freud, James, Dilthey. Essential aspects of knowledge paradigms: Ontology, epistemology, and methodology.
- 2) **Psychological testing**
Types of tests. Test construction: Item writing, item analysis Test standardization: Reliability, validity and Norms
Areas of testing: Intelligence, creativity, neuropsychological tests, aptitude, Personality assessment, interest inventories. Attitude scales – Semantic differential, Staples, Likert scale..
- 3) **Biological basis of behavior**
Sensory systems: General and specific sensations, receptors and processes
Neurons: Structure, functions, types, neural impulse, synaptic transmission. Neurotransmitters. The Central and Peripheral Nervous Systems – Structure and functions. Neuroplasticity. Biological basis of Motivation: Hunger, Thirst, Sleep and Sex. Biological basis of emotion: The Limbic system, Hormonal regulation of behavior.
- 4) **Attention, Perception, Learning, Memory and Forgetting**
Attention: Forms of attention, Models of attention
Perception: Approaches to the Study of Perception: Gestalt and physiological approaches
Perceptual Organization: Gestalt, Figure and Ground, Law of Organization
Perceptual Constancy: Size, Shape, and Color; Illusions
Perception of Form, Depth and Movement
Role of motivation and learning in perception
Learning Process: Fundamental theories: Thorndike, Guthrie, Hull Classical Conditioning: Procedure, phenomena and related issues Instrumental learning: Phenomena, Paradigms and theoretical issues; Reinforcement: Basic variables and schedules; Behaviour modification and its applications. Theories of Forgetting: Interference, Retrieval Failure, Decay, Motivated forgetting

5) Personality, Motivation, emotion, stress and coping

Approaches to the study of personality: Psychoanalytical, Neo-Freudian, Social learning, Trait and Type, Cognitive, Humanistic, Existential, Transpersonal psychology.

Approaches to the study of motivation: Psychoanalytical, Ethological, S-R Cognitive, Humanistic Exploratory behavior and curiosity, Self-regulation and Flow.

Emotions: Physiological correlates Theories of emotions: James-Lange, Canon-Bard, Schachter and Singer, Lazarus, Lindsley.

6) Social Psychology

Traditional theoretical perspectives: Field theory, Cognitive Dissonance, Sociobiology, Psychodynamic Approaches, Social Cognition.

7) Human Development and Interventions

Theories of development: Psychoanalytical, Behavioristic, and Cognitive Various aspects of development: Sensory-motor, cognitive, language, emotional, social and moral.

Psychopathology: Concept, Mental Status Examination, Classification, Causes

Psychotherapies: Psychoanalysis, Person-centered, Gestalt, Existential, Acceptance Commitment Therapy, Behavior therapy, REBT, CBT, MBCT, Play therapy, Positive psychotherapy, Transactional Analysis, Dialectic behavior therapy, Art therapy, Performing Art Therapy, Family therapy.

8) Emerging Areas

Wellbeing and self-growth: Types of wellbeing [Hedonic and Eudemonic], Character strengths, Resilience and Post-Traumatic Growth.

Health: Health promoting and health compromising behaviors, Life style and Chronic diseases [Diabetes, Hypertension, Coronary Heart Disease], Psycho-neuro-immunology [Cancer, HIV/AIDS].

ELECTRONICS AND COMMUNICATION

- 1) **NETWORKS:** Network graphs: matrices associated with graphs; incidence, fundamental cut set and fundamental circuit matrices. Solution methods: nodal and mesh analysis. Network theorems: superposition, Thevenin and Norton's maximum power transfer, Wye-Delta transformation. Steady state sinusoidal analysis using phasors. Linear constant coefficient differential equations; time domain analysis of simple RLC circuits, Solution of network equations using Laplace transform: frequency domain analysis of RLC circuits. 2-port network parameters: driving point and transfer functions. State equations for networks
- 2) **ELECTRONIC DEVICES:** Energy bands in silicon, intrinsic and extrinsic silicon. Carrier transport in silicon: diffusion current, drift current, mobility, and resistivity. Generation and recombination of carriers. p-n junction diode, Zener diode, tunnel diode, BJT, JFET, MOS capacitor, MOSFET, LED, p-I-n and avalanche photo diode, Basics of LASERS. Device technology: integrated circuits fabrication process, oxidation, diffusion, ion implantation, photolithography, n-tub, p-tub and twin-tub CMOS process
- 3) **ANALOG CIRCUITS:** Small Signal Equivalent circuits of diodes, BJTs, MOSFETs and analog CMOS. Simple diode circuits, clipping, clamping, rectifier. Biasing and bias stability of transistor and FET amplifiers. Amplifiers: single- and multi-stage, differential and operational, feedback, and power. Frequency response of amplifiers. Simple op-amp circuits. Filters. Sinusoidal oscillators; criterion for oscillation; single-transistor and op-amp configurations. Function generators and wave-shaping circuits, 555 Timers. Power supplies
- 4) **DIGITAL CIRCUITS:** Boolean algebra, minimization of Boolean functions; logic gates; digital IC families (DTL, TTL, ECL, MOS, CMOS). Combinatorial circuits: arithmetic circuits, code converters, multiplexers, decoders, PROMs and PLAs. Sequential circuits: latches and flip-flops, counters and shift registers. Sample and hold circuits, ADCs, DACs. Semiconductor, Microprocessor(8085): architecture, programming, memory and I/O interfacing.
- 5) **SIGNALS AND SYSTEMS:** Definitions and properties of Laplace transform, continuous-time and discrete-time Fourier series, continuous-time and discrete-time Fourier Transform, DFT and FFT, ztransform. Sampling theorem. Linear Time-Invariant (LTI) Systems: definitions and properties; causality, stability, impulse response, convolution, poles and zeros, parallel and cascade structure, frequency response, group delay, phase delay. Signal transmission through LTI systems

- 6) **CONTROL SYSTEMS:** Basic control system components; block diagrammatic description, reduction of block diagrams. Open loop and closed loop (feedback) systems and stability analysis of these systems. Signal flow graphs and their use in determining transfer functions of systems; transient and steady state analysis of LTI control systems and frequency response. Tools and techniques for LTI control system analysis: root loci, Routh-Hurwitz criterion, Bode and Nyquist plots. Control system compensators: elements of lead and lag compensation, elements of Proportional-Integral-Derivative (PID) control. State variable representation and solution of state equation of LTI control systems
- 7) **COMMUNICATIONS:** Random signals and noise: probability, random variables, probability density function, autocorrelation, power spectral density. Analog communication systems: amplitude and angle modulation and demodulation systems, spectral analysis of these operations, superheterodyne receivers; elements of hardware, realizations of analog communication systems; signal-to-noise ratio (SNR) calculations for amplitude modulation (AM) and frequency modulation (FM) for low noise conditions. Fundamentals of information theory and channel capacity theorem. Digital communication systems: pulse code modulation (PCM), differential pulse code modulation (DPCM), digital modulation schemes: amplitude, phase and frequency shift keying schemes (ASK, PSK, FSK), matched filter receivers, bandwidth consideration and probability of error calculations for these schemes. Basics of TDMA, FDMA and CDMA and GSM.
- 8) **COMPUTER NETWORKS:** ISO/OSI stack, LAN technologies (Ethernet, Token ring, etc), Flow and error control techniques, Routing algorithms, Congestion control, TCP/UDP and sockets, IP(v4), Application layer protocols (dns, smtp, pop, ftp, http); Basic concepts of hubs, switches, gateways, and routers.
- 9) **OPTICAL FIBRE COMMUNICATION:** Introduction, propagation of light, propagation of light in a cylindrical dielectric rod, Ray model, wave model. Different types of optical fibers, Modal Analysis of a step index fiber. Optical channel Modeling – Signal degradation on optical fiber due to dispersion and attenuation. Fabrication of fibers measurement techniques like OTDR, Optical sources – LEDs and Lasers, Photo-detectors – Pin-detectors, detector responsively noise, Optical link design – BER calculation, quantum limit, power penalties.
- 10) **ELECTROMAGNETICS:** Elements of vector calculus: divergence and curl; Gauss' and Stokes' theorems, Maxwell's equations: differential and integral forms. Wave equation, Poynting vector. Plane waves: propagation through various media; reflection and refraction; phase and group velocity; skin depth. Transmission lines: characteristic impedance; impedance transformation; Smith chart; impedance matching; S parameters, pulse excitation. Waveguides: modes in rectangular waveguides; boundary conditions; cut-off frequencies; dispersion relations. Basics of propagation in dielectric waveguide and optical fibers. Basics of Antennas: Dipole antennas; radiation pattern; antenna gain.

ENGLISH

Unit –I : Drama

Unit –II : Poetry

Unit –III : Fiction, short story

Unit –IV : Non-Fictional Prose

NOTE: The first four units are from 14th Century to the 21st Century and must also be tested through comprehension passages to assess critical reading, critical thinking and writing skills. These four units will cover all literatures in English.

Unit –V : Language: Basic concepts, theories and pedagogy. English in Use.

Unit –VI : English in India: history, evolution and futures

Unit –VII : Cultural Studies

Unit –VIII : Literary Criticism

Unit –IX : Literary Theory post World War II

Unit –X : Research Methods and Materials in English.

MANAGEMENT

- 1) **Management Process & Organizational Behavior-Overview** : Functions and Principles of management; Management Thought and Concepts; Management Decision Making Processes and Types. Overview of

Organizational Behaviour; Understanding and managing Individual Behavior-personality, Perception, Values, Attitudes, Learning and Motivation; Group Dynamics and Team Work. Leadership; Overview of Organizational Development: Organizational structure; Organizational design; OD Interventions & Change Management.

- 2) **Managerial Economics-Overview of Micro-Economics** : Basic Concepts of Demand and Supply; Demand Analysis; Production Function; Cost-Output Relations; market Structures; Pricing theories; Overview of macro-Economics; National Income Concepts; Budgeting.
- 3) **Quantitative Techniques Overview of Probability**: Types of Probability distributions (e.g. Binomial, Poisson, Normal and Exponential). Co-relation & Regression Analysis; Overview of Sampling: Sampling distributions; Tests of Hypothesis; Large and small samples. Univariate and Bivariate Data Analysis: t-test, z-test, Chi-square tests; ANOVA.
- 4) **Strategic Management- Overview of Strategic Management**: Concept of Corporate Strategy; BCG Model; GE-9 Cell Model ; Value Chain Analysis; SWOT & TOWS Analysis; Porter's Generic Strategies; Competitor Analysis. Overview of Strategy Formulation and Implementation at Corporate and Business level. Strategic Control.
- 5) **Ethics in Business Overview of Ethical issues in Business**: Value Based Organizations; Ethical Issues on Individual in Organizations; Gender Issues; Ecological Consciousness; Environmental Ethics; Social Responsibilities of Business; Corporate Governance and Ethics; Benefits of Corporate Social Responsibility.
- 6) **Human Resource management Overview of HRM**: Concepts and Perspectives in HRM; HRM in Changing Environment, Overview of HR Planning: Objectives Process and Techniques; Job Analysis ;Recruitment and Selection, Induction; Training and Development; Performance & Potential Appraisal, Overview of Industrial Relations: Wage Policy and Determination; Trade Unions; Dispute Resolution and Grievance Management; Labour Welfare .Overview of e- HRM.
- 7) **Finance- Overview of Financial Accounting**; Analysis of Balance Sheet Statement, Overview of Cost Accounting: Costing Methods and Techniques, Overview of Financial Management: Fund Flow Analysis; Management of Working Capital, Overview of Capital Budgeting: Capital Budgeting Decisions; Capital Structure and Cost of Capital. Overview of Dividend Policy: Determinants; Long-term and Short-term Financing Instruments; Mergers and Acquisitions.
- 8) **Marketing Management**: Overview of Marketing: Marketing Mix, Market Segmentation, Targeting and Positioning; Overview of Product Management; Product Mix Decisions; Product Life Cycle, New Product Development, Branding; Pricing Methods and Strategies. Overview of Promotional Management: Promotion Mix; Advertising; Personal selling; Supply Chain Management; Viral & Niche Marketing; Customer Relation management. Overview of e-Marketing: Uses of Internet as Marketing Medium; Issues in Branding, Market Development, advertising and Retailing on Internet.
- 9) **Production Management**: Overview of Production management: Demand Forecasting for Operations; Production Scheduling; Work Measurement; time and Motion Study; Statistical Quality Control; Facility Location; Layout Planning. Overview of Operations Research: Linear programming; Transportation model; Inventory control; Queuing theory; Decision theory; PERT/CPM.
- 10) **Information System-Overview of MIS**: Application of Information Systems in management; MIS and Decision Making; System Analysis and Design. Overview of Database Management System; Overview of E-Commerce.

JOURNALISM & MASS COMMUNICATIONS

- 1) **Introduction to Journalism and Mass Communication**
Concept of Journalism and mass communication, mass communication in India. History, growth and development of print and electronic media. Major landmarks in print and electronic media in Indian languages. Media's role in formulation of states of India. Media criticism and media literacy, Press Council and Press Commissions of India, status of journalism and media education in India. Media policies of the Government of India since Independence. Models and theories of mass communication, normative theories, administrative and critical traditions in

communication, media and journalism studies, communication and theories of socio-cultural, educational and agricultural change. Technological determinism, critique of Marshall McLuhan's views on media and communication and Marxist approaches. Information and knowledge societies.

Indian traditions and approaches to communication from the Vedic era to the 21st century. Western and Eastern philosophical, ethical and aesthetic perceptions of communication - Aristotle and Plato, Hindu, Buddhist, and Islamic traditions.

Media and culture - framework for understanding culture in a globalised world. Globalisation with respect to politico-economic & socio-cultural developments in India.

2) Communication for Development and Social Change

Concept and definition of development communication, role of media and journalism in society, characteristics of Indian society – demographic and sociological impact of communication, media and journalism. Media and specific audiences. Development and social change. Issues and post-colonial conceptions. Deconstruction of dominant paradigm of communication and development. Responses and critique of dominant models.

Corporatisation of development - Corporate Social Responsibility, non-state actors in development, mass campaigns by NGOs, Government of India, international agencies and corporates. Paradigms and discourse of development communication.

Emergence of global civil societies, public sphere, global communication system - nation state-universal, national communication policies.

Leading influencers of social reform in India - Raja Rammohan Roy, Pandit Madanmohan Malviya, Bal Gangadhar Tilak, Mahatma Jyotiba Phule, Mahatma Gandhi, Acharya Vinoba Bhave, Dr B. R. Ambedkar, Deendayal Upadhyay, Dr Ram Manohar Lohia etc.

3) Reporting and Editing

News-concepts, determinants (values), structure and perspectives. Reporting for print, radio, television and digital media. Types of reporting. National and international news agencies and feature syndicates, functions and role.

Writing for print, electronic and digital news media. Translation and transcreation. Editing and presentation techniques for print, television and digital media. Journalism as profession, reportage of contemporary issues, ethics of reporting. Critique of western news values, effect of new technology on global communication flows. Niche Reporting.

4) Advertising and Marketing Communication

Definition, concept, functions, types, evolution of advertising, standards and ethics in advertising. theories and models of communication in advertising. Brand management. Advertising management - agency-role, structure and function, client-agency relationship, media planning and budgeting. Advertising and creativity, language and translation. Advertising campaign and marketing. Advertising and marketing research.

5) Public Relations and Corporate Communication

Public Relations and Corporate Communication - definition, concept and scope. Structure of PR in State, Public, Private and non-government sectors. Tools and techniques of PR and Corporate Communication. Crisis communication and crisis communication management. Ethics of Public Relations. International Public Relations, communication audit.

6) Media Laws and Ethics

Concept of law and ethics in India and rest of the world. The Constitution of India, historical evolution, relevance. Concept of freedom of speech and expression in Indian Constitution. Defamation, Libel, Slander-IPC 499-502, Sedition IPC 124(A), Contempt of Courts Act 1971, Official Secrets Act 1923, Press and Registration of Books Act 1867, Working Journalists and other Newspaper Employees (Conditions of Service) and Miscellaneous Provisions Act 1955, Wage Boards, Law of Obscenity (Section 292-294 of IPC); the Miller test, the Hicklin test, Indecent Representation of Women (Prohibition) Act 1986, Scheduled Castes and Tribes (Prevention of Atrocities) Act, 1989, Parliamentary Privileges. Famous cases involving journalists and news media organisations.

Right to Information Act 2005, Copyright Act 1957, Intellectual Property Rights, Cable Television Network (Regulation) Act 1995, Information Technology Act (relevant) 2000 and cyber laws, Cinematograph Act 1952, Film Censorship, Press Council Act as amended from time to time, IPR, ASCI, Drugs and Magic Remedies (Objectionable Advertisements) Act, 1954, Various regulatory bodies for print, TV, Advertising, PR, and Internet.

Rules, regulations and guidelines for the media as recommended by Press Council of India, Information and Broadcasting ministry and other professional organisations, adversarial role of the media, human rights and media.

7) Media Management and Production

Definition, concept of media management. Grammar of electronic media. Communication design theories and practice. Media production techniques – print and electronic. Digital media production techniques. Economics and commerce of mass media in India. Principles and management in media industry post liberalisation.

8) ICT and Media

ICT and media - definition, characteristics and role. Effect of computer mediated communication. Impact of ICT on mass media. Digitisation. Social networking. Economics and commerce of web enabled media. Mobile adaption and new generation telephony by media, ethics and new media. ICT in education and development in India, online media and e-governance. Animation - concepts and techniques.

9) Film and Visual Communication

Film and television theory. Film and identity in Indian film studies, leading film directors of India before and after Independence. Indian cinema in the 21st century. Approaches to analysis of Indian television. Visual Communication. Visual analysis. Basics of film language and aesthetics, the dominant film paradigm, evolution of Indian cinema-commercial and 'non-commercial' genres, the Hindi film song, Indian aesthetics and poetics (the theory of Rasa and Dhvani).

National cinema movements: Soviet Montage cinema, German Expressionistic cinema, Italian Neo-Realistic cinema, French New Wave cinema, British New Wave cinema, Indian New Wave cinema, Period cinema. Cinema in the new millennium.

10) Communication Research

Definition, concept, constructs and approaches to communication research process.

Research Designs - types, structure, components, classical, experimental and quasi experimental, variables and hypotheses; types and methods of research; basic, applied, descriptive, analytical, historical, case study, longitudinal studies. Research in journalism, Public Relations, advertising, cinema, animation and graphics, television, I nternet, social media practices, magazines, children's media. Communication, journalism and media research in India.

Levels of measurement: sampling-probability and non-probability, tests of validity and reliability, scaling techniques. Methods and tools of data collection-interviews, surveys, case studies, obtrusive and non-obtrusive techniques, ethnography, schedule, questionnaire, dairy, and internet based tools, media specific methods such as exit polls, opinion polls, telephone, SMS surveys and voting with regard to GEC (general entertainment content). Data analysis, testing, interpretation, application of statistical tests-parametric and non-parametric, tests of variance-univariate, bivariate and multivariate, tests of significance, computer mediated research. Ethical considerations in communication, media and journalism research, writing research reports, plagiarism.

MATHEMATICS

- 1) **Linear Algebra** : Finite dimensional vector spaces; Linear transformations and their matrix representations, rank; systems of linear equations, eigen values and eigen vectors, minimal polynomial, Cayley-Hamilton Theroem, diagonalisation, Hermitian, Skew-Hermitian and unitary matrices; Finite dimensional inner product spaces, Gram-Schmidt orthonormalization process, self-adjoint operators.
- 2) **Complex Analysis** : Analytic functions, conformal mappings, bilinear transformations; complex integration; Cauchy's integral theorem and formula; Liouville's theorem, maximum modulus principle; Taylor and Laurent's series; residue theorem and applications for evaluating real integrals.
- 3) **Real Analysis** : Sequences and series of functions, uniform convergence, power series, Fourier series, functions of several variables, maxima, minima; Riemann integration, multiple integrals, line, surface and volume integrals,

theorems of Green, Stokes and Gauss; matrix spaces, completeness, Weierstrass approximation theorem, compactness; Lebesgue integral, Fatou's lemma, dominated convergence theorem.

- 4) **Ordinary Differential Equations** : First order ordinary differential equations, existence and uniqueness theorems, systems of linear first order ordinary differential equations, linear ordinary differential equations of higher order with constant coefficients; linear second order ordinary differential equations with variable coefficients; method of Laplace transforms for solving ordinary differential equations, series solutions; Legendre and Bessel functions and their orthogonality.
- 5) **Algebra** : Normal subgroups and homomorphism theorems, automorphisms; Group actions, Sylow's theorems and their applications; Euclidean domains, Principal ideal domains and unique factorization domains. Prime ideals and maximal ideals in commutative rings; Fields, finite fields.
- 6) **Functional Analysis** : Banach spaces, Hahn-Banach extension theorem, open mapping and closed graph theorems, principle of uniform boundedness; Hilbert spaces, orthonormal bases, Riesz representation theorem, bounded linear operators.
- 7) **Probability and Statistics** : Probability space, conditional probability, Bayes theorem, independence, Random variables, joint and conditional distributions, standard probability distributions and their properties, expectation, conditional expectation, moments; weak and strong law of large numbers, central limit theorem; Sampling distributions; Testing of hypothesis, standard parametric tests based on normal, Chi-Square, t, F - distributions; Linear regression; Interval estimation.

MECHANICAL ENGINEERING

1) Fluid Mechanics

Basic Concepts and Properties of Fluids, Manometry, Fluid Statics, Buoyancy, Equations of Motion, Bernoulli's equation and applications, Viscous flow of incompressible fluids, Laminar and Turbulent flows, Flow through pipes and head losses in pipes.

2) Thermodynamics and Heat Transfer

Thermodynamic systems and processes; properties of pure substance; Zeroth, First and Second Laws of Thermodynamics; Entropy, Irreversibility and availability; analysis of thermodynamic cycles related to energy conversion: Rankine, Otto, Diesel and Dual Cycles; ideal and real gases; compressibility factor; Gas mixtures. Modes of heat transfer, Steady and unsteady heat conduction, Thermal resistance, Fins, Free and forced convection, Correlations for convective heat transfer, Radiative heat transfer – Radiation heat transfer co-efficient; boiling and condensation, Heat exchanger performance analysis.

3) IC Engines, Refrigeration and Air Conditioning

SI and CI Engines, Engine Systems and Components, Performance characteristics and testing of IC Engines; Fuels; Emissions and Emission Control. Vapour compression refrigeration, Refrigerants and Working cycles, Compressors, Condensers, Evaporators and Expansion devices, Other types of refrigeration systems like Vapour Absorption, Vapour jet, thermo electric and Vortex tube refrigeration. Psychometric properties and processes, Comfort chart, Comfort and industrial air conditioning, Load calculations and Heat pumps.

4) Turbo Machinery

Reciprocating and Rotary pumps, Pelton wheel, Kaplan and Francis Turbines, velocity diagrams, Impulse and Reaction principles, Steam and Gas Turbines, Theory of Jet Propulsion – Pulse jet and Ram Jet Engines, Reciprocating and Rotary Compressors – Theory and Applications

5) Power Plant Engineering

Rankine and Brayton cycles with regeneration and reheat, Fuels and their properties, Flue gas analysis, Boilers, steam turbines and other power plant components like condensers, air ejectors, electrostatic precipitators and cooling towers – their theory and design, types and applications;

6) Renewable Sources of Energy

Solar Radiation, Solar Thermal Energy collection - Flat Plate and focusing collectors their materials and performance. Solar Thermal Energy Storage, Applications – heating, cooling and Power Generation; Solar Photovoltaic Conversion; Harnessing of Wind Energy, Bio-mass and Tidal Energy – Methods and Applications, Working principles of Fuel Cells.

7) Engineering Mechanics

Analysis of System of Forces, Friction, Centroid and Centre of Gravity, Dynamics; Stresses and Strains-Compound Stresses and Strains, Bending Moment and Shear Force Diagrams, Theory of Bending Stresses- Slope and deflection-Torsion, Thin and thick Cylinders, Spheres.

8) Engineering Materials

Basic Crystallography, Alloys and Phase diagrams, Heat Treatment, Ferrous and Non Ferrous Metals, Non metallic materials, Basics of Nano-materials, Mechanical Properties and Testing, Corrosion prevention and control

9) Mechanisms and Machines

Types of Kinematics Pair, Mobility, Inversions, Kinematic Analysis, Velocity and Acceleration Analysis of Planar Mechanisms, CAMs with uniform acceleration and retardation, cycloidal motion, oscillating followers; Vibrations – Free and forced vibration of undamped and damped SDOF systems, Transmissibility Ratio, Vibration Isolation, Critical Speed of Shafts. Gears – Geometry of tooth profiles, Law of gearing, Involute profile, Interference, Helical, Spiral and Worm Gears, Gear Trains- Simple, compound and Epicyclic; Dynamic Analysis – Slider – crank mechanisms, turning moment computations, balancing of Revolving & Reciprocating masses, Gyroscopes – Effect of Gyroscopic couple on automobiles, ships and aircrafts, Governors.

10) Design of Machine Elements

Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as riveted, welded and bolted joints. Shafts, Spur gears, rolling and sliding contact bearings, Brakes and clutches, flywheels.

11) Manufacturing ,Industrial and Maintenance Engineering

Metal casting-Metal forming, Metal Joining, Machining and machine tool operations, Limits, fits and tolerances, Metrology and inspection, computer Integrated manufacturing, FMS, Production planning and Control, Inventory control and operations research - CPM/PERT.

Failure concepts and characteristics-Reliability, Failure analysis, Machine Vibration, Data acquisition, Fault Detection, Vibration Monitoring, Field Balancing of Rotors, Noise Monitoring, Wear and Debris Analysis, Signature Analysis, NDT Techniques in Condition Monitoring.

12) Mechatronics and Robotics

Microprocessors and Microcontrollers: Architecture, programming, I/O, Computer interfacing, Programmable logic controller. Sensors and actuators, Piezoelectric accelerometer, Hall effect sensor, Optical Encoder, Resolver, Inductosyn, Pneumatic and Hydraulic actuators, stepper motor, Control Systems- Mathematical modeling of Physical systems, control signals, controllability and observability. Robotics, Robot Classification, Robot Specification, notation; Direct and Inverse Kinematics; Homogeneous Coordinates and Arm Equation of four Axis SCARA Robot.

MICROBIOLOGY

1) Microbial Taxonomy and Diversity

Microbial World, Concepts and Scope, Classifying and Naming Microorganisms, ICNB Rules, Major Characteristics used to Classify Microorganisms, Importance and Conservation of Microbial Diversity, Metagenomics, In situ Conservation and Ex situ Conservation, Role of Culture collection centers in conservation.

2) Microbial Physiology

Microbial Energetics, Microbial enzymes, Metabolism of Carbohydrate, Alternate pathways of Carbohydrate Metabolism, Gluconeogenesis, Utilization of sugars other than glucose, Lipid metabolism, Nitrogen metabolism,

Nucleic acid metabolism, Photosynthetic bacteria, Autotrophic Mechanisms in bacteria, Microbial Stress Responses to different conditions.

3) Microbial Genetics

Generalized reproductive cycles of microbes: Viruses, Bacteria, Neurospora, Saccharomyces, Chlamydomonas and Acetabularia. Viral Genetics: Phage Phenotypes, Phenotypic Mixing, Bacterial Genetics: Bacterial Transformation, Bacterial Conjugation, Hfr conjugation. Transduction: Generalized and specialized transduction, Mutation and mutagenesis, Fungal and algal genetics.

4) Immunology

Immunity, Innate immunity: physical, biochemical and genetic factors involved in governing innate immunity, Acquired immunity, humoral or antibody mediated immunity, cell mediated immunity. Immunological disorders: Hypersensitivity Type I to Type IV, Immunodeficiency diseases; AIDS and other acquired or secondary immunodeficiencies, HIV – 1 and associated opportunistic infections, autoimmune diseases, Antigens and Antibodies, Immunogenicity versus Antigenicity, Factors that influence immunogenicity Antigen processing and presentation, properties of antigen, Super antigen, Hapten; Haptens and the study of antigenicity Microbes as antigen Antigen recognition and MHC molecules. Antibodies – structure and function, clonal selection, antibody diversity, monoclonal antibodies and its clinical applications, Antibody engineering (Construction of monoclonal antibodies Lymphoma and other diseases by genetically engineered antibodies.

5) Environmental Microbiology

Microbiology of air, water and soil, Sources of water pollution, Biological indicators of water pollution, Water and air borne diseases. Determination of potable quality of water, Microbes in extreme environment and their survival mechanisms, Microbes in the degradation of wastes, Microbial degradation of pesticides, Xenobiotics, bioremediation - advantages and disadvantages, Geomicrobiology: Microbes in metal extraction, mineral leaching and mining.

6) Food Microbiology

Concepts and scope, Detection of food-borne microorganisms, Microbial spoilage of foods, Food poisoning and intoxication, Food borne diseases, Food preservation, Microbial indicators of food safety and quality, Food laws and standards.

7) Agricultural Microbiology

Introduction to Agricultural Microbiology, Plant pathology, Diagnosis of plant diseases, Parasitism and disease development, Entry of pathogens to the host, Effect on physiology of host, Plant disease epidemiology, Environment and Plant diseases, Defense Mechanism of Plant Disease, Plant Diseases and their management, Host pathogen interaction, Biofertilizer, PGPR, Biopesticides.

8) Medical Microbiology

Milestones in the development of Medical Microbiology, Microbial Infections, Urinary tract infections, Sexually transmissible infection, Oral cavity and respiratory infection, Gastrointestine infection, Nosocomial infections, General concepts for specimen collection and handling of specimen, Epidemiology, Pathogenesis, Spectrum of disease, Laboratory diagnosis and Prevention. Diseases caused by Viruses, Bacteria, Fungi, Chlamydiae, Protozoa and emerging diseases,

9) Industrial Microbiology

Concepts and Scope of industrial Microbiology, Fermentation, Development of inocula, Fermenters, Batch and Continuous fermentation, Industrially important microorganisms, strain improvement and preservation, Media for industrial fermentation, sterilization, upstream processing, downstream processing, Industrial production of energy fuels (solvents), organic acids, enzymes (amino acids), food additives, Health care products (antibiotics, vitamins), probiotics, biomass production (SCP), hydrocarbons, recombinant proteins, quality control of fermented products, IPR, Patents, Biosafety and Entrepreneurship.

10) Molecular Biology and Genetic Engineering

Concept and scope of Molecular Biology and Genetic engineering, Microbes in Molecular Biology, DNA as Genetic material, DNA replication, Differences in prokaryotic and eukaryotic DNA replication, Protein synthesis, Gene

expression, Regulation of gene expression in prokaryotes, eukaryotes and bacteriophages, Gene silencing, Importance of gene cloning and future perspectives, Enzymes in genetic engineering, Cloning vectors, Applications of Genetic Engineering, Antisense technology, Safety of DNA technology, Restriction and regulation for the release of GMOs into Environment, Ethical, Legal, Social and Environmental Issues related to DNA technology.

PHYSICS

- 1) **Mathematical Physics:** Dimensional analysis, Vector algebra and vector calculus, Linear algebra, Matrices, Linear differential equations, Elementary probability theory, Binomial, Poisson and normal distributions, Fourier series, Fourier and Laplace transforms, Elements of complex analysis.
- 2) **Classical Mechanics:** Newton's law, central forces, Kepler's law and planetary motion, Lagrange and Hamilton's formalisms, Special theory of relativity – Lorentz transformations, time dilation, Length contraction, Relativistic kinematics, Variation of mass with velocity, Mass – Energy equivalence, Relation between energy and momentum.
- 3) **Electromagnetic Theory & Acoustic wave:** Gauss's Law and its applications, Laplace and Poisson equations, Magnetostatics : Bio-Savart's law, Ampere's theorem, Electromagnetic induction, Faraday's law, Maxwell's equations, Scalar and vector potentials, Electromagnetic waves and their reflection , Refraction, Interference, diffraction,polarization,Poynting vector, Energy and momentum ;electromagnetic waves, acoustics, acoustical holography, acoustic radiation, acoustic transmission.
- 4) **Quantum Mechanics:** Physical basis of quantum mechanics, Wave – Particle duality, De-Broglie hypothesis, Wave packet and group velocity, , Heisenberg's uncertainty principle, Schrodinger equation (time dependent and time independent), Eigen value problems such as particle- in- a- box, Harmonic oscillator etc.
- 5) **Thermodynamics and Statistical Physics:** Law of thermodynamics and their consequences, Macro state and microstates, Phase space, Probability ensembles, Partition function, Free energy, Calculation of thermodynamic quantities, Classical and quantum statistics, Degenerate Fermi gas, Black body radiation and Planck's distribution law, Bose- Einstein condensation, First and second order phase transitions.
- 6) **Atomic and Molecular Physics:** Quantum states of an electron in an atom, Electron spin, Spectra of one-and manyelectron atoms, Relativistic corrections for energy levels of hydrogen, Hyperfine structure and isotopic shift, Width of spectral lines, LS & JJ coupling, Zeeman, Paschen Back and Stark effect, X-ray spectroscopy, Electron spin resonance, Nuclear magnetic resonance, lasers.
- 7) **Solid State Physics:** Atomic structure and bonding in materials. Crystal structure of materials, unit cell and space lattices, Miller indices of planes and directions, Concept of amorphous, Single and polycrystalline structures and their effect on properties of materials, Crystal growth techniques, Free electron theory, Band theory of solids; metals, semiconductors and insulators, Hall effect, superconductivity, Fermi level, energy gap.
- 8) **Nuclear and Particle Physics:** Basic nuclear properties, Size, Shape, Charge distribution, Spin and Parity, Mass defect, Binding energy, semi-empirical mass formula, Liquid drop model, Nature of nuclear force, Nuclear shell model, Alpha decay, Beta decay, Gama decay, Laws of radioactivity, Nuclear reactions, Compound nuclei and direct reactions, Controlled and uncontrolled chain reaction, critical mass, fission and fusion, Nuclear reactor, Elementary particles.
- 9) **Electronics:** Semiconductor devices & physics P-N-Jn.depletion region, barrier potential, Transistors, Bipolar junction Transistors, Field effect transistors, UJT,SCR, Rectifier circuits, , Logic gates and symbols, Boolean algebra & Karnaugh map, DeMorgan's theorem, Basic digital logic circuits, Optoelectronic devices including solar cells; photonic devices; Photo detectors and LEDs, Digital techniques and applications (Registers Counters, Comparators and similar circuits); ICs; modulation & demodulation, AM,PM,FM;A/D and D/A convertors; Sensors.

ZOOLOGY

- 1) **Non-Chordata and Chordata :** A general survey, classification and relationship of the various phyla. Protozoa : Study of the structure, bionomics and life history of 'Jerboalla, Paramecium, Monocystic, malarial parasite, Typanosoma. Protozoa & disease. Perifera : Sycon. Coelenterate: Structure and life history of Obelia and Aurelia. Sea anemones, Corals, Aleyonium. Helminths, Structure and life history of planaria. Fasciola. Taccenia. Ascaris, Medical importance of Nematodes. Annelida, Neries , earthworm and leech Arthropoda, Palaemon , Scorpion, Cockroach, Mollusca. Unio and Pita, Pearl Formation Modifications of nervous system. Echinodermata , Asterias and its larva. General organisation and characters, outline classification and inter- relationships of proto - chordata. Pisces, Amphibia , Reptilia, Aves and Mammalia. Neoteny and retrogressive metamorphosis. A general study of comparative account of the various systems of vertebrates. Locomotion and respiration in fishes, structure and affinities of Dipnoi. Structural peculiarities of Amphibia. Poisonous and non- poisonous snakes of India, Aerial adaptations of birds. Structural peculiarities and affinities distribution relation of prototheria and Metatheria
- 2) **Ecology and Economic Zoology:** Environment: Abiotic factors and their role; Biotic factors -Inter and Intra-specific relations. Ecosystem, Biogeo-Chemical cycles. Adaptation in fresh water, marine and terrestrial habitats. Pollution in air, water and land. Wild life in India and its conservation.
- 3) **Economic Zoology:** Parasitism, Commensalism and Host parasite relationship. Parasitic protozoan's and helminthes of man. Beneficial and harmful insects.
- 4) **Cell Biology** -Structure and function of cell and cytoplasmic constituents : structure of nucleus , plasma membrane, mitochondria, Golgi-bodies, endoplasmic reticulum and ribosome's , cell division, mitosis and meiosis. Gene structure and function: Watson-Crick models of DNA, sex-chromosomes and sex -determination.
- 5) **Genetics** - Mendelian laws of inheritance, linkage and crossing over, mutation and evolution, cytoplasmic inheritance genes and diseases.
- 6) **Evolution and Systematics** - Origin of life, History of evolutionary thought. Lamarck and his works, Darwin and his works, Sources and nature of organic variation. Natural selection, Isolation. Concept of species and sub-species, principles of classification, zoological nomenclature and international code. Fossils, geological eras, distribution of animal's zoogeographical realms of the world.
- 7) **Biochemistry** -Structure of carbohydrates, lipids, amino-acids, proteins and nucleic acids, glycolysis and Krebs cycle, oxidation and reduction. Oxidative phosphorylation, energy conservation and release, ATP, cholesterol. Enzymes and coenzymes, Hormones and their functions.
- 8) **Physiology with special reference to mammals:** Composition of blood, blood groups in man , coagulation, oxygen and carbon dioxide transport, nephron and urine formation, mechanism of conduction along axon and across synapse ,neurotransmitters, Vision, Hearing and other receptors, mechanism of contraction of skeletal muscle, role, of salivary gland, liver, pancreas and intestinal glands indigestion. Absorption of digested food, roles of pituitary, thyroid, parathyroid, pancreas, adrenal testis, ovary and pineal body.
- 9) **Embryology:** Gametogenesis, fertilization, types of eggs, cleavage, development up to gastrulation in Branchiostoma, frog and chick, Metamorphosis in frog; Formation and fate of extra embryonic membranes in chick; formation of amnion, allantois and classification of placenta in mammals, function, of placenta in mammals.

CIVIL ENGINEERING

1) Structural Engineering

Mechanics: Bending moment and shear force, simple stress and strain relationship, principal stresses, stress transformation, Mohr's circle. Simple bending theory, bending and shear stresses, combined and direct bending stresses, unsymmetrical bending, shear centre. Construction materials, Analysis of determinate and indeterminate structures, Static and kinematic indeterminacy, Design of concrete and steel structures, Finite element method

2) Geotechnical Engineering

Soil Mechanics: Origin of soils, soil classification, three-phase system, fundamental definitions, relationship and interrelationships, permeability & seepage, effective stress principle, consolidation, compaction, shear strength. Foundation Engineering: Sub-surface investigations- scope, drilling bore holes, sampling, penetration tests, and plate load test. Earth pressure theories, effect of water table, layered soils. Stability of slopes-infinite slopes, finite slopes. Foundation types-foundation design requirements. Shallow foundations-bearing capacity, effect of shape, water table and other factors, stress distribution, settlement analysis in sands & clays. Deep foundations pile types, dynamic & static formulae, load capacity of piles in sands & clays, negative skin friction. Machine foundation

3) Environmental Engineering

Water requirements: Quality standards, basic unit processes and operations for water treatment. Drinking water standards, water requirements, distribution of water. Sewage and sewerage treatment, quantity and characteristics of wastewater. Primary, secondary and tertiary treatment of wastewater, sludge disposal, effluent discharge standards. Domestic wastewater treatment processes, quantity of characteristics of domestic wastewater, primary and secondary treatment, sludge disposal. Air Pollution and Noise Pollution: Types of pollutants, their sources and impacts, air pollution meteorology, air pollution control, air quality standards and limits. Impacts of noise, permissible limits of noise pollution, measurement of noise and control of noise pollution. Municipal Solid Wastes: Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).

4) Water Resources Engineering

Fluid Mechanics and Hydraulics: Properties of fluids, principle of conservation of mass, momentum, energy and corresponding equations, potential flow, applications of momentum and Bernoulli's equation, laminar and turbulent flow, flow in pipes, pipe networks. Concept of boundary layer and its growth. Uniform flow, critical flow and gradually varied flow in channels, specific energy concept, hydraulic jump. Forces on immersed bodies, flow measurements in channels, tanks and pipes. Dimensional analysis and hydraulic modeling. Kinematics of flow, velocity triangles and specific speed of pumps and turbines.

Hydrology: Hydrologic cycle, rainfall, evaporation, infiltration, stage discharge relationships, unit hydrographs, flood estimation, reservoir capacity, reservoir and channel routing. Well hydraulics.

Irrigation: Duty, delta, estimation of evapo-transpiration. Crop water requirements. Design of: lined and unlined canals, waterways, head works, gravity dams and spillways. Design of weirs on permeable foundation. Types of irrigation system, irrigation methods. Water logging and drainage

5) Transportation Engineering

Highway Planning: Geometric design of highways, testing and specifications of paving materials, design of flexible and rigid pavements. Traffic Engineering: Traffic characteristics, theory of traffic flow, intersection design, traffic signs and signal design, highway capacity. Surveying: Importance of surveying, principles and classifications, mapping concepts, coordinate system, map projections, measurements of distance and directions, leveling, theodolite traversing, plane table surveying, Electronic Distance measurement errors and adjustments, curves.

6) Construction Engineering & Management

Fundamentals of Engineering mechanics and solid mechanics. Modern Construction Materials; Concrete Technology, Construction equipment and management, Construction planning, scheduling techniques, Cost and Quality control. Resource Management in Construction; Construction contracts.

POLITICAL SCIENCE

1) Political Theory

Concepts Liberty, Equality, Justice, Rights, Democracy, Power, Citizenship, Political Traditions Liberalism Conservatism Socialism, Marxism Feminism Ecologism

2) Political Thought

Confucius, Plato, Aristotle, Machiavelli, Hobbes, Locke, Rousseau, Hegel, Mary Wollstonecraft, John Stuart Mill, Karl Marx,

3) Indian Political Thought

Dharmashastra, Kautilya, Aggannasutta, Barani, Kabir, Pandita Ramabai, Bal Gangadhar Tilak, Swami Vivekanand, Rabindranath Tagore, M.K Gandhi, Sri Aurobindo, Periyar E. V. Ramasamy, Muhammad Iqbal, M.N.Roy, V D Savarkar, Dr. B.R.Ambedkar, J L Nehru, Ram Manohar Lohia, Jaya Prakash Narayan, Deendayal Upadhyaya

4) Comparative Political Analysis

Approaches: Institutional, Political Culture, Political Economy and New Institutionalism; Comparative Methods

Colonialism and decolonization: forms of colonialism, anti-colonial struggles and decolonization

State theory: debate over the nature of state in capitalist and socialist societies; post-colonial state; welfare state; globalization and nations-states

Political regimes: democratic and non-democratic regimes

Constitutions and Constitutionalism: forms of constitutions, rule of law, judicial independence and liberal constitutionalism; emergency powers and crisis of constitutionalism.

Democratisation: democratic transition and consolidation.

Development: Underdevelopment, Dependency, Modernization, World Systems Theory, development and democracy.

Structures of Power: ruling class, power elites, democratic elitism

5) International Relations

Concepts: State, state system and non-state actors, Power, Sovereignty, Security: traditional and non- traditional.

Conflict and Peace: Changing Nature of Warfare; Weapons of mass destruction; deterrence; conflict resolution, conflict transformation.

Contemporary Challenges: International terrorism, Climate change and Environmental Concerns, Human Rights, Migration and Refugees; Poverty and Development; Role of Religion, Culture and Identity Politics.

6) India's Foreign Policy

Perspectives on India's Foreign Policy: India's Identity as postcolonial, development, rising power and as emerging political economy Continuity and change in India's Foreign Policy: Principles and determinants; Non-Alignment movement: historical background and relevance of Non Aligned Movement; India's Nuclear Policy India's relations with major powers: USA, USSR/Russia, People's Republic of China India's Engagement with multipolar world: India's relations with European Union, BRICS, ASEAN, Shanghai Cooperation Organisation, African Union, Southern African Development Community, Gulf Cooperation Council India's relations with neighbourhood: SAARC, Gujaral doctrine, Look East / Act East, Look West. India's Negotiation Strategies in International Regimes: The United Nations, World Trade Organisation, International Monetary Fund, Intergovernmental Panel on Climate Change

7) Political Institutions in India

Making of the Indian Constitution: Colonialism heritage and the contribution Indian National Movement to the making of the Indian Constitution

Philosophy of the Constitution: Preamble, Fundamental Rights, Directive Principles

Union Executive: President, Prime Minister and Council of Ministers

Union Parliament: Structure, Role and Functioning, Parliamentary Committees

Judiciary: Supreme Court, High Court, Judicial Review, Judicial Activism, Judicial Reform.

Executive and Legislature in the States: Governor, Chief Minister, State Legislature

Electoral Process and Election Commission of India: Conduct of Elections, Rules, Electoral Reforms.

Local Government Institutions: Functioning and reforms.

Constitutional and Statutory Bodies: Comptroller and Auditor General, National Commission for Scheduled Castes, National Commission for Scheduled Tribes, National Commission for Human Rights, National Commission for Women, National Commission for Minorities.

8) Political Processes in India

State, Economy and Development: Nature of Indian State, Development Planning model, New Economic Policy, Growth and Human Development.

Process of globalisation: social and economic implications. Identity Politics: Religion, Tribe, Caste, Region, Language. Social Movements: Dalit, Tribal, Women, Farmers, labour

Civil Society Groups: Non-Party Social Formations, Non-Governmental Organisations, Social Action Groups.

SOCIOLOGY

1) Sociological Theory

Classical Sociological Traditions

Emile Durkheim
Max Weber
Karl Marx

Structure- Functionalism and Structuralism

Talcott Parsons
Robert K. Merton

Indian Thinkers

M.K. Gandhi
B.R. Ambedkar
Radha Kamal Mukherjee
G. S. Ghurye
M.N. Srinivas
Irawati Karve

2) Basic Concepts and Institutions

Sociological Concepts

Social Structure
Culture
Status and Role
Community
Values, Norms and Rules
Bureaucracy, Power and Authority

Social Institutions

Marriage, Family and Kinship
Religion
Law and Customs

Social Stratification

Social Difference, Hierarchy, Inequality and Marginalization
Caste and Class
Gender, Sexuality and Disability
Race, Tribe and Ethnicity

Social Change and Processes

Evolution and Diffusion
Modernization and Development
Social Mobility

3) Rural and Urban Transformations

Caste-Tribe Settlements
Agrarian Social Structure and Emergent Class Relations
Land Ownership and Agrarian Relations
Urbanism, Urbanity and Urbanization
Neighbourhood, Slums and Ethnic Enclaves

4) Economy and Society

Mode of Production Debates
Property and Property Relations
Models of Economic Development
Poverty and Exclusion
Changing Nature of Labour Relations
Gender and Labour Process

- Digital Economy, E-Commerce
- Global Business and Corporates
- Tourism
- Consumption
- 5) **Environment and Society**
 - Social and Cultural Ecology: Diverse Forms
 - Technological Change, Agriculture and Biodiversity
 - Indigenous Knowledge Systems and Ethno-Medicine
 - Forest Policies, Adivasis and Exclusion
 - Development, Displacement and Rehabilitation
 - Environmental Pollution, Public Health and Disability
- 6) **Science, Technology and Society**
 - History of Technological Development
 - Virtual Community
 - Media: Print and Electronic, Visual and Social Media
 - E-Governance and Surveillance Society
 - Technology and Emerging Political Processes
 - State Policy, Digital Divide and Inclusion
 - Cyber Crime
- 7) **Culture and Symbolic Transformations**
 - Signs and Symbols
 - Rituals, Beliefs and Practices
 - Changing Material Culture
 - Commodification of Rituals
 - Communalism and Secularism
 - Ethics and Morality
 - Religion and Economy
 - Culture and Environment

HISTORY

- 1) **Negotiating the Sources:** Archaeological sources: Exploration, Excavation, Epigraphy and Numismatics. Dating of Archaeological Sites. Literary Sources: Indigenous Literature: Primary and Secondary: problem of dating Religious and Secular Literature, Myths, Legends, etc. Foreign Accounts: Greek, Chinese and Arabic. Indus/Harappa Civilization: Origin, extent, major sites, settlement pattern, craft specialization, religion, society and polity, Decline of Indus Civilization, Internal and external trade, First urbanization in India. Vedic and later Vedic periods; Aryan debates, Political and Social Institutions, State Structure and Theories of State; Emergence of Varnas and Social Stratification, Religious and Philosophical Ideas. Introduction of Iron Technology, Megaliths of South India. Expansion of State system: Mahajanapadas, Monarchical and Republican States, Economic and Social Developments and Emergence of Second Urbanization in 6th century BCE; Emergence of heterodox sects- Jainism, Buddhism.
- 2) **From State to Empire:** Rise of Magadha, Greek invasion under Alexander and its effects, Mauryan expansion, Mauryan polity, society, economy, Asoka's Dhamma and its Nature, Decline and Disintegration of the Mauryan Empire, Mauryan art and architecture, Asokan edicts: language and script.
- 3) **Dissolution of Empire and Emergence of Regional Powers:** Indo-Greeks, Sungas, Satavahanas, Kushanas and Saka-Ksatrapas, Sangam literature, polity and society in South India as reflected in Sangam literature. Trade and commerce from 2nd century BCE to 3rd century CE, Trade with the Roman World, Gandhara, Mathura and Amaravati schools. Gupta Vakataka age: Polity and Society, Agrarian Economy, Land Grants, Land Revenue and Land Rights, Gupta Coins, Beginning of Temple Architecture, Emergence of Puranic Hinduism, Development of Sanskrit Language and Literature. Developments in Science Technology, Astronomy, Mathematics and Medicine. Harsha (Pushyabhuti Dynasty) Emergence of Regional Kingdoms: Kingdoms in Deccan: Chalukyas, Rashtrakutas, Kalyani Chalukyas, Kakatiyas, Hoysalas and Yadavas. Kingdoms in South India: Pallavas, Cholas, Pandyas,

Kingdoms in Eastern India: Palas and Senas of Bengal, Varmans of Kamarupa, Bhaumakaras and Somavamsis of Odisha. Kingdoms in North India: Gurjara-Pratiharas, Kalacuri-Chedis, Gahadavalas and Paramaras. Characteristics of Early Medieval India: Administration and Political Structure Legitimation of Kingship. Tamil Bhakti movement - Shankara, Madhava and Ramanujacharya. Arab contracts: Suleiman Ghaznavid conquests. Alberuni's Accounts.

- 4) **Source of Medieval Indian History:** Archaeological, Epigraphic and Numismatic sources, Material evidences and Monuments; Chronicles; Literary sources – Persian, Sanskrit and Regional languages; Daftar Khannas: Firmans, Bahis / Pothis / Akhbarat; Foreign Travellers' Accounts – Persian and Arabic.
Political Developments – The Delhi Sultanate – the Ghorids, the Turks, the Khaljis, the Tughlaqs, the Sayyids and the Lodis. Decline of Delhi Sultanate.
Foundation of the Mughal Empire – Babur, Humayun and the Suris ; Expansion and Consolidation from Akbar to Aurangzeb. Decline of the Mughal Empire. Later Mughals and Disintegration of the Mughal Empire. The Vijayanagara and the Bahmanis - Deccan Sultanate; Bijapur, Golkonda, Bidar, Berar and Ahmadnagar – Rise, Expansion and Disintegration; Eastern Gangas and Suryavamshi Gajapatis. Rise of the Marathas & the foundation of Swaraj by Shivaji ; its expansion under the Peshwas ; Mughal – Maratha relations, Maratha Confederacy, Causes of Decline.
- 5) **Administration & Economy:** Administration under the Sultanate, Nature of State – Theocratic and Theocentric, Central, Provincial and Local Administration, Law of succession.
Sher Shah's Administrative Reforms ; Mughal Administration – Central, Provincial and Local : Mansabdari and Jagirdari Systems.
Administrative System in the Deccan – The Vijayanagara State & Polity, Bahamani Administrative System; Maratha Administration – Ashta Pradhan. Agricultural Production and Irrigation System, Village Economy, Peasantry, Grants and Agricultural Loans, Urbanization and Demographic Structure.
- 6) **The Sufis** – Their Orders, Beliefs and Practices, the leading Sufi Saints, Social Synchronization. Bhakti Movement – Shaivism; Vaishnavism, Shaktism. The Saints of the Medieval Period – North and South – their impact on Socio- Political and Religious Life – Women Saints of Medieval India. The Sikh Movement – Guru Nanak Dev: his teachings and practices, Adi Granth; the Khalsa. Fine Arts – Major Schools of Painting – Mughal, Rajasthani, Pahari, Garhwali; Development of Music. Art and Architecture, Indo-Islamic Architecture, Mughal Architecture, Regional Styles. Indo-Arabic Architecture, Mughal Gardens, Maratha Forts, Shrines and Temples.
- 7) **Sources of Modern Indian History:** Archival Materials, Biographies and Memoirs, Newspapers, Oral Evidence, Creative Literature and Painting, Monuments, Coins.
Rise of British Power: European Traders in India in the 16th to 18th Centuries – Portuguese, Dutch, French and the British. Establishment and Expansion of British Dominion in India. British Relations with Principal Indian States – Bengal, Oudh, Hyderabad, Mysore, Carnatic and Punjab. Revolt of 1857, Causes, Nature and Impact. Administration of the Company and the Crown; Evolution of Central and Provincial Structure under East India Company. Local Self-Government. Constitutional Changes, 1909 –1935.
- 8) **Expansion and Commercialization of Agriculture,** Land Rights, Land Settlements, Rural Indebtedness, Landless Labour, Irrigation and Canal System. Decline of Industries – Changing Socio-Economic Conditions of Artisans; De-urbanisation; Economic Drain; World Wars and Economy. Monetary Policy, Banking, Currency and Exchange, Railways and Road Transport, Communications – Post & Telegraph.
Indian Renaissance – Socio-Religious Reforms; Emergence of Middle Class; Caste Associations and Caste Mobility.
- 9) **Rise of Indian Nationalism:** Social and Economic basis of Nationalism. Birth of Indian National Congress; Ideologies and Programmes of the Indian National Congress, 1885-1920: Early Nationalists, Assertive Nationalists and Revolutionaries. Swadeshi and Swaraj. Gandhian Mass Movements; Subas Chandra Bose and INA; Role of Middle Class in National Movement; Women Participation in National Movement.
Left Wing Politics. Depressed Class Movement. Communal Politics; Muslim League and Genesis of Pakistan. Towards Independence and Partition. India after Independence: Challenges of Partition; Integration of the Indian Princely States; Kashmir, Hyderabad & Junagarh.

B.R. Ambedkar – The making of the Indian Constitution, its Features. The Structure of Bureaucracy. New Education Policy. Economic Policies and the Planning process; Development, Displacement and Tribal Issues. Linguistic Reorganisation of States; Centre-State Relations. Foreign Policy Initiatives – Panchsheel; Dynamics of Indian Politics-Emergency; Liberalisation, Privatisation & Globalisation of Indian Economy.

10) Historical Method, Research, Methodology and Historiography: Scope and Importance of History

Objectivity and Bias in History Heuristics Operation, Criticism in History, Synthesis and Presentation History and its Auxiliary Sciences History a Science, Arts or a Social Science Causation and Imagination in History Significance of Regional History Recent Trends of Indian History Research Methodology Hypothesis in History Area of Proposed Research Sources – Data Collection, Primary / Secondary, Original and Transit Sources Trends in Historical Research Recent Indian Historiography Selection of Topic in History Notes Taking, References, Footnotes and Bibliography Thesis and Assignment Writing Plagiarism, Intellectual Dishonesty and History Writing Beginnings of Historical Writings – Greek, Roman and Church Historiography Renaissance and its Impact on History Writing Negative and Positive Schools of Historical Writing Berlin Revolution in History Writing – Von Ranke Marxist Philosophy of History – Scientific Materialism Cyclical Theory of History – Oswald Spengler Challenge and Response Theory – Arnold Joseph Toynbee Post – Modernism in History