UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination

Research Methodology

(Common Paper for all the Subjects)

Max. Marks: 50

Unit-I Research Aptitude

- Research: Meaning, Types, and Characteristics, Positivism and Post-positivistic approach to research.
- Methods of Research: Experimental, Descriptive, Historical, Qualitativeand Quantitative methods.
- Steps of Research.
- Thesis and Article writing: Format and styles of referencing.
- Application of ICT in research.
- Research ethics.

Unit-II Data Interpretation

- Sources, acquisition and classification of Data.
- Quantitative and Qualitative Data.
- Graphical representation (Bar-chart, Histograms, Pie-chart, Table-chart and Line-chart) and mapping of Data.
- Data Interpretation.
- Data and Governance.

Unit-III Information and Communication Technology (ICT)

- ICT: General abbreviations and terminology.
- Basics of Internet, Intranet, E-mail, Audio and Video-conferencing.
- Digital initiatives in higher education.
- ICT and Governance.

Unit-IV People, Development and Environment

- Development and environment: Millennium development and Sustainable development goals.
- Human and environment interaction: Anthropogenic activities and their impacts on environment.
- Environmental issues: Local, Regional and Global; Air pollution, Water pollution, Soil pollution, Noise pollution, Waste (solid, liquid, biomedical, hazardous, electronic), Climate change and its Socio-Economic and Political dimensions.
- Impacts of pollutants on human health.
- Natural and energy resources: Solar, Wind, Soil, Hydro, Geothermal, Biomass, Nuclear and Forests.
- Natural hazards and disasters: Mitigation strategies.

- Environmental Protection Act (1986), National Action Plan on Climate Change, International agreements/efforts -Montreal Protocol, Rio Summit, Convention on Biodiversity, Kyoto Protocol, Paris Agreement, International Solar Alliance.

Unit-V Higher Education System and Research Needs

- Institutions of higher learning and education in ancient India.
- Evolution of higher learning and research in Post-Independence India.
- Oriental, Conventional and Non-conventional learning programmes in India.
- Professional, Technical and Skill Based education.
- Value education and environmental education.
- Policies, Governance, and Administration.

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Syllabus for Ph.D. Entrance Examination

Subject: Accountancy and Business Statistics (ABST)

Max. Marks: 50

A- Financial Accounting

Introduction, meaning of Book-Keeping, Accounting and Accountancy, Distinction between Book-Keeping and Accounting, Accounting Process, Objectives of Accounting, Various users of accounting information, Limitations of Accounting, Accounting Terminologies, Accounting Concepts, Principles and Conventions. Accounting Standards (Indian Accounting Standards), International Financial Reporting Standards (IFRS), Recording of Transactions Secondary Books, Trial Balance and Rectification of Errors, Final Accounts with adjustment entries, Closing entries, Financial Statements. Bank Reconciliation Statement, Bills of Exchange, Partnership Accounts- Admission of a Partner, Retirement of a Partner, Death of a Partner, Piecemeal Distribution of Cash and Amalgamation of firms, Depreciation Accounting, Price Level Changes Accounting, Hire Purchase and Instalment Payment Methods, Voyage Accounts, Accounting from Incomplete Records, Accounting Methods for Non-Profit making organisations.

B - Corporate Accounting

Introduction to Company Accounts, Kinds of Companies, Formation of Companies, Share Capital, Issue of Shares, Under Subscription and Over Subscription, Issue of shares at premium and discount, Buy-back of shares and Treasury stock, Accounting treatment and Ledger Preparation, Issue of Bonus and Right shares, Consolidation and split of shares, Redemption of Preference shares and Issue and Redemption of debentures, Preparation of final accounts with calculation of Managerial Remuneration, Disposal of Company profits and Distribution of Dividend, Accounts of Banking and Insurance Companies, Valuation of Goodwill, Valuation of shares, Amalgamation of Companies, Internal and External Reconstruction of companies (including scheme of Reconstruction) Accounts of Holding and subsidiary companies Liquidation of a Company, Double Account system (Accounting for public utilities companies Problems of merger and acquisition. Accounting for agricultural forms, Government Accounting, corporate social Accounting Accounts of Solicitors, Accounts of Hospitals. Forensic Accounting, Accounting for tour and travel agencies, Basic financial and Accounting System for MFIS.

C - Cost Accounting

Concept of Cost and Cost Control, Cost Accounting methods (Job costing, Batch costing, Contract costing or Terminal costing, process costing including inter process profit, Single output or unit costing, Operating costing Operation costing, Multiple or composite costing, Departmental costing and uniform costing), Non- Integrated and Integrated cost accounting system. Marginal Costing and Break- Even Analysis, Decisions based on Marginal Costing techniques, Budgetary Control and Preparation of various types of Budgets, Standard Costing and Ascertainment of Material, Labour, Overhead and Sales Variances, Activity Based Costing. Transfer Pricing, Life Cycle Costing, Strategic Cost and Performance Evaluation,

Mechanic Accounting and E.D.P, Productivity Accounting and Implication of Computers for Cost Control and Cost reduction, Programmes and Planning, Employee's Participation in cost reduction programmes.

D - Management Accounting

Objectives and Scope of Management Accounting, Ratio Analysis, Preparation of Fund Flow Statement and Cash Flow Statement. Capital Structure- Theories and Decisions, Cost of Capital, Working Capital Management, Capital Budgeting and Expenditure Decisions, Dividend Decisions, Balance Score Card, Measurement and Performance - ROI, MVA, EVA and Risk Analysis. Value added Accounting, Human Resource Accounting, Responsibility Accounting, Operating and Financial leverages, Trading on Equity, Lease Financing, Inventory management.

E- Taxation:

Direct Tax

Income Tax Law and Rules with reference to assessment of Individuals, HUF, Firm, AOP and Companies, Assessment Procedure and types of Assessment, Advance payment of tax, Tax deduction at source, Refund of tax, Double taxation, Tax Avoidance and Tax Evasion. Introductory part of Tax Planning with special reference to salaried employees and individuals. Minimum Alternate Tax Net.

Indirect Tax

Custom duty - Role of custom in International Trade, Important Terms and definitions under the custom Act, 1962, Assessable value , Baggage, Bill of entry Dutiable goods, Duty Exporter, Foreign going Vessel, Aircraft goods, Import Manifest, Importer, prohibited goods, Shipping Bill, Stores, Bill of lading, Export manifest, Letter of credit, Kind of Duties, Prohibition of Export and Import of Goods and Provisions regarding notified and specified goods, Import of Goods- Free import and Restricted import, Types of Import- Import of cargo, Import of personal Baggage, Import of stores, Tax Liability and Valuation of goods, computation of custom duty. Appeals and revisions.

CGST/SGST

Important terms and definitions under Central Goods and Service Tax Act 2017 and State and Service Tax Act 2017. Basics of GST. Meaning and scope of Supply, Levy and collection of Tax. Time and value of supply of goods and/or Services, Input Tax Credit, Transitional Provisions, Registration under CGST/SGST Act. Filing of Returns and Assessment, Payment of Tax including payment of tax on reverse charge basis, Refund under the Act. Maintenance of Accounts and Records, Composition Scheme, Job work and its Procedure, Various Exemptions Under GST. Demand and recovery under
GST. Miscellaneous provisions. IGST-Scope of IGST, important terms and definitions for determining the place of supply and place of supply of goods and services, Zero rated supply.

F - Auditing:

Meaning, Objectives and Types of Audits, Internal Control, Vouching and Verification of Assets and Liabilities. Assurance and Audit standards, Audit Programme, Working Papers, Documentation, Audit Reports Audit of Companies Appointment, Removal, Rights, Duties and Liabilities of Auditor. Audit of Banks, Insurance Companies, Charitable Trust and Educational Institutions, Management Audit, Efficiency Audit, Cost Audit, EDP Audit, Environmental Audit, Social Audit, Performance Audit, Tax Audit and Audit of Accounting Information System.

G - Business Statistics and Operation Research:

Introduction, Definition and Functions of Statistics, Measures of Central Tendency, Dispersion, Skewness, Moments, Kurtosis, Sheppard's Correction and Conditions for applying it, Index Numbers, Analysis of Time Series, Interpolation and Extrapolation, Vital Statistics, Correlation and Regression Analysis, Multiple Regression, Association of Attributes, Statistical Decision Theory, Sampling, Test of Hypothesis, Sampling and Non-Sampling errors, Sampling distributions and Standard Error, Sampling Methods, Large and Small Sample Analysis, Sampling of Attributes and Variables, Test of Significance. Z-Test, T-Test, F-Test, Theoretical Frequency Distributions, Probability, Analysis of Variance and Design of Experiments. Linear Programming, Network Analysis-PERT and CPM, Game Theory, Replacement Theory. Statistical Quality control Discriminant Analysis.

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Syllabus for Ph.D. Entrance Examination

Subject: Botany

Max. Marks: 50

1 Archaebacteria, eubacteria and cyanobacteria - ultra-structure and reproduction; L-Form Bacteria, Prions, Viroids, Virusoids; Characteristics and ultrastructure of virions; Mycoplasma, Spiroplasma and Phytoplasma - General characters and role in causing plant diseases; Microbiology of water, air and soil.

2 General account of diseases caused by plant pathogens; molecular basis of host parasite interaction, pathogen attack and defense mechanism; etiology of red rot of sugarcane, rust of wheat, covered smut of wheat, loose smut of wheat, green ear disease of bajra, leaf spot and smut of jowar, ergot and smut of bajra, root knot and rot diseases of vegetables; disease control and the role of information technology in disease management.

3 Algae of diversified habitats (Terrestrial, Fresh water, Marine); Thallus organization, cell structure and reproduction in different classes/groups; Criteria of classification of algae; Economic importance of algae.

4 General characteristics of different classes/groups of fungi, cell ultrastructure, cell wall composition, reproduction, heterothallism, para sexuality, recent trends in classification, economic importance of fungi; General account and economic importance of mycorrhiza and lichens.

5 General characters, structure, reproduction, evolution and inter-relationships of bryophytes, pteridophytes and gymnosperms. Evolution of stele, heterospory and seed habit; Principles of palaeobotany.

6 Taxonomic hierarchy, principles of nomenclature, taxonomic tools, important systems of classification (Bentham and Hooker; Engler and Prantl; Hutchinson and Takhtajan). Role of morphology, anatomy, embryology, palynology, cytology, phytochemistry, genome analysis and nucleic acid hybridization in taxonomy. Taxonomy of some selected families (Leguminosae, Cucurbitaceae, Asteraceae, Asclepiadaceae, Solanaceae, Euphorbiaceae and Poaceae). Phylogeny of angiosperms.

7 General concepts of plant morphology, origin and evolution of flower - Primitive living angiosperms, foliar stamens, open carpels. Plant anatomy –types of tissue; Organization of root and shoot apical meristems; Secondary growth (normal and anomalous) and Anomalous primary structures of root and stem.

8 Development of male and female gametophytes, pollination, pollen pistil interaction, fertilization, endosperm development and embryogenesis**;** seed development and fruit formation; polyembryony, apomixis, embryo culture**;** biochemistry and molecular biology of fruit maturation.

9 Basic concepts of ecology, ecological factors affecting the plants. Principle of limiting factors; population characteristics, population interaction, r and K selection, genecology and range extensions, community characteristics, community classification, continuum concept, ecological niche, plant succession in various habitats, concept of climax. Structure and function of ecosystem, energy flow and

biogeochemical cycles (N, P, C, S), primary production, plant indicators, major biomes of the world. Phytogeographical regions of India, vegetation of Rajasthan. Ecosystem services.

10 Environmental pollution- air, water, noise and soil; Greenhouse effect, Ozone layer depletion, Acid rain; Concept of biodiversity with special reference to India, Hot spots, Rare, Endangered and Endemic plant species of Rajasthan, strategies for conservation of the flora. Bio-monitoring. Environmental Impact Assessment.

11 Plant civilization, centers of diversity/origin of crop plants, gene diversity Utilization, cultivation and improvement of food plants (rice, wheat, bajra, pulses, green-gram, moth and beans)**,** Oil seeds (mustard, soybean and ground nut), drugs (*Rauvolfia, Ephedra, Papaver, Atropa, Cinchona and Withania*), fibre (cotton, jute and coir) and plants of industrial value (Tobacco, sugarcane, tea and coffee). Ethnobotany, under-exploited plants of potential medicinal and food value with special reference to Rajasthan.

12 Bright field Microscopy, Electron microscopy (TEM & SEM), Confocal microscopy, phase contrast microscopy; Fixation (of lower and higher plant groups) and staining techniques (for bright field microscopy, cytology and bacterial staining); Chromatography, Electrophoresis, ELISA, Spectrophotometry, centrifugation.

13 Plant-water relation, membrane transport and translocation of water and solutes.

14 Enzymes– General characteristics, Classification, mechanism of action, kinetics of enzymatic catalysis, regulation of enzyme activity, active sites, coenzymes, activators and inhibitors, isozymes.

15 Photosynthesis- Pigments, photophosphorylation, Mechanism of photosynthesis, photorespiration, photosynthesis in C_4 plants, CAM.

16 Nitrogen fixation and Nitrogen metabolism. Fatty acid metabolism. Signal transduction: overview, receptors and G-proteins, phospholipid signaling, second messengers, two-component sensor-regulator system in bacteria and plants.

17 Respiration- Glycolysis, TCA cycle, Oxidative phosphorylation, Glycogen breakdown, inter conversion of hexoses and pentoses.

18 Seed dormancy and germination. Concept of growth and development. Physiological effects and mechanism of action of auxins, gibberellins, cytokinins, ethylene, abscisic acid and jasmonic acid. Plant rhythms and biological clock. Secondary metabolites. Plant responses to biotic and abiotic stresses. Physiology of flowering- Photoperiodism and Vernalization.

19 Ultrastructure of prokaryotic and eukaryotic cells; Cell membrane- structure and function; Cell organelles-structure and functions; Ultrastructure of nucleus; DNA: Structure, A, B and Z forms, replication, damage and repair; Cells cycle; Structure of chromatin and its organization; Special types of chromosomes; Banding patterns; Chromosomal aberrations and numerical chromosome abnormalities.

20 Genetics of prokaryotes and eukaryotic organelles; Mapping of bacteriophage genome; Genetic transformation, Conjugation and Transduction in bacteria; Cytoplasmic male sterility. Mendelism, Allelic and non-allelic gene interactions.

21 Techniques in cell biology-*in situ* hybridization, FISH, GISH. Genetic code, transcription and translation, RNA processing; Teminism; Regulation of gene expression in prokaryotes and eukaryotes; Genetic mapping; Independent assortment and crossing over, molecular mechanism of recombination, genetic markers. Mutations, molecular basis of spontaneous and induced mutations and their role in evolution. Principles of plant breeding, important conventional methods of self and cross pollinated and vegetatively propagated crops; Mutation breeding.

22 Basic concepts, principles and scope of Biotechnology, plant cell and tissue culture. Concept of totipotency; Micropropagation by axillary bud proliferation and adventitious shoot bud differentiation; Embryogenesis and organogenesis; Somatic hybridization, protoplast- isolation, fusion and culture; Artificial seeds; Somaclones and somatic hybrids; *in-vitro* production of secondary metabolites and bioactive compounds.

23 Recombinant DNA Technology: Restriction enzymes, Gene cloning- principles and techniques; construction of gene library (genome and cDNA library); DNA sequencing, polymerase chain reaction, RT-PCR, DNA finger printing. Genetic engineering of plants: Aims and strategies for development of transgenics, Methods of gene transfer in plants, intellectual property rights and possible ecological risks and ethical concerns. Microbial genetic manipulation. Structural and functional genomics, microarray, genome sequencing projects (with special reference to rice, wheat, chick pea and tomato) and proteomics.

24 Principles and practices of statistical methods in biological research, samples and population, Data collection and processing in research; Basic statistics (averages, statistics of dispersion, coefficient of variation, standard error and deviation); Confidence limits, Probability, Distribution (Binomial, Poisson and Normal), Tests of statistical significance, Simple Correlation and Regression, Analysis of Variance.

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Syllabus for Ph.D. Entrance Examination

Subject: Business Administration

Max. Marks: 50

I. HUMAN RESOURCE MANAGEMENT (HRM) AND BUSINESS MANAGEMENT

- Human resource management: Concept, role and functions of HRM; Human resource planning; Recruitment and selection; Training and development; Succession planning
- Compensation management: Job evaluation; Incentives and fringe benefits
- Performance appraisal including 360-degree performance appraisal
- Collective bargaining and workers' participation in management
- Personality: Perception; Attitudes; Emotions; Group dynamics; Power and politics; Conflict and negotiation; Stress management
- Organizational Culture: Organizational development and organizational change
- Indian Ethos and Values, Application of yoga in management, Meditation, Career Planning
- Ethical Issues in HRM: Ethical Issues, approaches, Total Quality Management (TQM).
- Principles and functions of management
- Organization structure: Formal and informal organizations; Span of control
- Responsibility and authority: Delegation of authority and decentralization
- Motivation and leadership: Concept and theories
- Corporate governance and business ethics

II. MARKETING MANAGEMENT

- Marketing: Concept and approaches; Marketing channels; Marketing mix; Strategic marketing planning; Market segmentation, targeting and positioning
- Product decisions: Concept; Product line; Product mix decisions; Product life cycle; New product development
- Pricing decisions: Factors affecting price determination; Pricing policies and strategies
- Promotion decisions: Role of promotion in marketing; Promotion methods - Advertising; Personal selling; Publicity; Sales promotion tools and techniques; Promotion mix
- Distribution decisions: Channels of distribution; Channel management
- Consumer Behaviour; Consumer buying process; factors influencing consumer buying decisions, Consumer Relationship Management (CRM).
- Service marketing.
- International Marketing, Corporate Social Responsibility.
- Tourism Marketing.
- Strategy: Business Policy, Corporate Governance.
- E-Commerce, Mobile Commerce, E-Governance.

- Trends in marketing: Social marketing; Online marketing; Green marketing; Direct marketing; Rural marketing; Digital Marketing, Social Media Marketing.
- Logistics management, Supply Chain Management.
- Entrepreneurship Management.

III. LEGAL ASPECTS OF BUSINESS

- The RTI Act, 2005: Objectives and main provisions
- Intellectual Property Rights (IPRs): Patents, trademarks and copyrights; Emerging issues in intellectual property
- Goods and Services Tax Act, 2017 (GST): Objectives and main provisions; Benefits of GST; Implementation mechanism; Working of dual GST.
- The Consumer Protection Act 2019.
- Indian Contract Act, 1872: Elements of a valid contract; Capacity of parties; Free consent; Discharge of a contract; Breach of contract and remedies against breach; Quasi contracts;
- Special contracts: Contracts of indemnity and guarantee; contracts of bailment and pledge; Contracts of agency
- The Sale of Goods Act, 1930: Sale and agreement to sell; Doctrine of Caveat Emptor; Rights of unpaid seller and rights of buyer
- The Negotiable Instruments Act, 1881: Types of negotiable instruments; Negotiation and assignment; Dishonour and discharge of negotiable instruments
- The Companies Act, 2013: Nature and kinds of companies; Company formation; Management, meetings and winding up of a joint stock company
- Limited Liability Partnership: Structure and procedure of formation of LLP in India
- The Competition Act, 2002: Objectives and main provisions
- The Information Technology Act, 2000: Objectives and main provisions; Cybercrimes and penalties.

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Syllabus for Ph.D. Entrance Examination
Subject: Chemistry

Max. Marks: 50

1. **Chemical Periodicity:** Periodic Table, Electronic Configuration of Various Group Elements. Periodicity in properties of s, p, d and f - block elements and their trends.

2. **Chemical Bonding**: Concept of hybridization, VBT, LCAO, MOT of homo and heteronuclear diatomic and polyatomic molecules, Coulson diagrams, Valance Shell Election Pair Repulsion Theory, Hydrogen bonding, Fajan's Rule and Polarity in Covalent Compounds.

3. **Transition Metal Chemistry:** Properties with special reference to variable oxidation state, magnetic, colour and complexation behaviour. Metal to Ligand and Ligand to Metal charge transfer spectra, Metal atom clusters, Nomenclature and Isomerism in co-ordination compounds, Ligand field theory, high spin and low spin complexes, CFT, CFSE and Jahn-Teller effect.

4. **Green Chemistry and Nano Chemistry:** Principles of Green Chemistry and Sustainable Development, Green Reagents and Green Synthesis. Introduction to Nano particles, Nano Science and Nano Technology. Optical and Magnetic properties of Nano material. Characterization of Nano materials by TEM, SEM, SPMT, AFM, X-Ray Diffraction and ASCA.

5. **Environmental Chemistry:** Air Pollution: Pollution due to SO_X, NO_X, Ozone Depletion and Green House Effect, photochemical smog, reaction of hydroxyl radical with CH_4, SO_X and NO_X. Water Pollution: International Standards of drinking water, water quality parameters COD, BOD, TDS, pH etc., Treatment of potable and sewage waste water. Soil: Types of soil, soil profile and analysis of physical and chemical parameters.

6. **Nomenclature of Organic Compounds**: Common and IUPAC nomenclature of Aliphatic, Aromatic, Heteroaromatic, Bicyclo Compounds and Spiranes.

7. **Isomerism:** Structural Isomerism, Stereoisomerism both geometrical and optical for the E/Z and R/S systems, respectively. Conformational analysis of alkanes and cycloalkanes, Asymmetric Synthesis, Stereo-selective and Stereo-specific reactions.

8. **Basic principles of Organic Chemistry and Reaction Mechanism:** Inductive, Electromeric, Mesomeric, Hyperconjugative and Resonance effects. Reactive Intermediate species *i.e.* carbocation (classical and non-classical), Carbanion, Carbene, free Radicals, Nitrene and Benzyne. Types of reagents- electrophiles and nucleophiles. Basic reaction mechanism- Addition, Substitution, Elimination and Rearrangements.

9. **Name Reactions and Mechanisms:** Aldol, Benzoin, Cannizzaro's, Perkin's, Stobbe, Dieckmann Condensation, Pinacole-Pinacolone, Wagner Meerwein, Hoffmann, Schmidt, Lossen, Curtius, Beckmann, Fries, Baeyer-Villiger, Wittig, Reformatsky Rearrangements.

10. **Aromatics Heteroaromatics, Annulenes and Heteroannulenes:** Basics of Aromaticity and anti-aromaticity. Synthesis and reactions of anthracene, phenanthrene, biphenyl, furan, thiophene, pyrrole, pyridine, quinoline, isoquinoline and indole. UV-Vis, IR, NMR and Mass spectroscopy of organic compounds.

11. **(a) Chemical Kinetics:** Ionic Reactions, Kinetic salt effect, Steady State Kinetics, Kinetic and Thermodynamic, Control of reactions, Dynamic chain, photochemical reaction, acid base and enzyme catalysis, fast reaction: study by stop flow method.
    (b) Acid-bases and Non-aqueous Solvents: Basic theories, HSAB concept. Non aqueous solvents: DMSO, THF and Liquid NH_3 their reactions and solvent action.

12. **Electrochemistry:** Electrochemistry and Ionic Equilibrium, Theory of strong and weak electrolytes, pH, Buffer and Buffer action, Electrolysis and electrolytic Cell, Electrochemical cells and reactions, Nernst equation, emf measurement, Calculation of Gibbs free energy and equilibrium constants. Primary and Secondary cells, fuel cell, corrosion and its prevention.

13. **Nuclear and Radio Chemistry:** Nuclear Models, Radioactive decay, mass defect, binding energy, fission and fusion, Isotopes, Isobars, Isodiaphers and application of Isotopes in medicinal Sciences.

14. **Solution and Colligative Properties:** Types of Solutions, Concentration measurement methods. Normality, Molarity, Molality etc. Raoult's law (deviation from ideal behaviour), Nernst law, Henry's law, Relative lowering of Vapour Pressure, Elevation in Boiling Point, Depression in Freezing Point, Osmosis and Osmotic Pressure.

15. **Thermodynamics:** First law: relation between C_p and C_v, enthalpies of physical and chemical changes, temperature dependence of enthalpies, Joules Law, Joule-Thomson coefficient, Second law of entropy, Criteria of Spontaneity, Gibbs and Helmholtz functions, evaluation of entropy and Gibb's function, Gibbs-Helmholtz equation, Maxwell relations. Thermodynamics of ideal and non-ideal gases and solutions. Third Law of Thermodynamics.
16. **Chemistry of Non-Transition and Inner Transition Elements**:
    1. Preparation, properties and bonding in diborane and higher boranes, polyhedral borane anions and carboranes, borazines, borane nitrile. Silicones and silicates, phosphonitrilic compounds, Interhalogen Xenon compounds.
    2. Lanthanides and actinides Contraction, oxidation states, super heavy elements, analytical and Medicinal applications.

17. **Organometallic Compounds**: Synthesis, structure, bonding, reactions and reactivity, Applications in homogeneous catalysis. Cage and Cluster Compounds.

18. **Bioinorganic and Supra Molecular Chemistry:** Iron storage and transport, oxygen carriers and transport, electron transfer reactions, Metalloenzymes; Zinc, Iron and Copper enzymes, Vitamin B_{12} Co-enzyme. Metal deficiency and disease.
    Supra molecular reactions and Catalysis, supra molecular devices.

19. **Group Theory**: Symmetry elements and operations, point groups, Mulliken symbols, GMT and characteristic Table, Great Orthogonality Theorem and application hybridization and vibrational Spectroscopy. Concepts of inorganic ESR, Mass and IR Spectroscopy.

20. **Statistical Data Analysis and Analytical Technique:** Mean, Mode, Median, Standard Deviation, Regression analysis and Correlation principles and applications of AAS, DTA, TGA. Partition and adsorption chromatography.

21. **Pericyclic Reactions:** Molecular orbital theory, symmetry, Frontier orbitals of ethylene, buta-1,3-diene, hexa-1,3,5-triene. Classification of pericyclic reactions. Woodward Hoffmann correlation diagrams. electrocyclic and cycloaddition reactions and sigmatropic rearrangements, e.g. Cope, Claisen, Aza-Cope, Sommlet-Hauser rearrangements.

22. **Organic Transformation and Reagents:** Functional group interconversions, oxidative and reductive processes. Common catalyst and reagents (organic, inorganic organometallic and enzymatic like $LiAlH_4$, $NaBH_4$, iodobenzene diacetate, thallium (III) nitrate, RuO_4, OsO_4, CH_3Li, $(CH_3)_2Hg$, $(CH_3)_2Zn$, etc.

23. **Synthetic Application of Organometallics and Reactive Methylene Compounds:** Grignard reagent, Organo-lithium compounds, Acetoacetic ester and Malonic ester. Their Synthesis, identification, estimation and important applications in the Synthesis of organic compounds.

24. **Organic Photochemistry**: Jablonski diagram, photochemistry of alkenes, carbonyl compounds and aromatic compounds, photodegradation of polymers, singlet molecular oxygen reactions. Paterno-Buchi reaction, Norrish Type I and Type-II reactions and Barton reaction.

25. **Natural Products and Medicinal Chemistry:** Classification and structure of Carbohydrates, proteins, nucleic acids and fatty acids. Classification, Nomenclature and isolation techniques of Terpenoids, Carotenoids, Alkaloids and terpenes. Drug design and introduction to pharmacodynamics, Some Cardio Vascular Psychotic and Antipsychotic drugs.

26. **Quantum Chemistry**: Basic principles and application of quantum mechanics. Schrodinger equation, hydrogen atom, hydrogen molecule ion and angular momentum. Variational and Perturbational method, term symbols and spectroscopic status. Huckel molecular orbital theory, atomic structure and its theoretical treatment.

27. **Solid State**: Types of solids, Bravis lattices, determination of unit cell parameters, defects in solids- Frenkel, Schottky, Point, Line and Plane defects.
    Structural classification of binary and ternary compounds, diffraction techniques,

bonding, thermal, electrical and magnetic properties. Insulators, Semiconductors and Super conductors.

28. **Statistical Thermodynamics and Phase equilibria**: Boltzmann distribution law, kinetic theory of gases, partition function: vibrational, rotational, translational and electronic properties and applications of partition functions and the relation with thermodynamic quantities. Basic principles of phase equilibria.

29. **Physical Chemistry of Polymers**: Molecular weight determination of polymers: Number average and Weight average molecular weights, End-group analysis, Sedimentation, Light scattering and Viscosity methods. Stereochemistry and mechanism of polymerization. Crystallization and melting of polymers. Relation between T_m and T_g.

30. **Colloids and Surface Chemistry:** Absorption and Adsorption, Adsorption isotherms and surface area analysis, Types and properties of colloids, Micelles, Micelle action and Critical Micelle Concentration. Applications of colloids.

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Syllabus for Ph.D. Entrance Examination
Subject: Computer Science and Applications

Max. Marks: 50

Unit - 1: Discrete Structures and Optimization

Mathematical Logic: Propositional and Predicate Logic, Propositional Equivalences, Normal Forms, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference.

Sets and Relations: Set Operations, Representation and Properties of Relations, Equivalence Relations, Partially Ordering.

Counting, Mathematical Induction and Discrete Probability: Basics of Counting, Pigeonhole Principle, Permutations and Combinations, Inclusion- Exclusion Principle, Mathematical Induction, Probability, Bayes' Theorem.

Group Theory: Groups, Subgroups, Semi Groups, Product and Quotients of Algebraic Structures, Isomorphism, Homomorphism, Automorphism, Rings, Integral Domains, Fields, Applications of Group Theory.

Graph Theory: Simple Graph, Multigraph, Weighted Graph, Paths and Circuits, Shortest Paths in Weighted Graphs, Eulerian Paths and Circuits, Hamiltonian Paths and Circuits, Planner graph, Graph Coloring, Bipartite Graphs, Trees and Rooted Trees, Prefix Codes, Tree Traversals, Spanning Trees and Cut-Sets.

Boolean Algebra: Boolean Functions and its Representation, Simplifications of Boolean Functions.

Optimization: Linear Programming - Mathematical Model, Graphical Solution, Simplex and Dual Simplex Method, Sensitive Analysis; Integer Programming, Transportation and Assignment Models, PERT-CPM: Diagram Representation, Critical Path Calculations, Resource Levelling, Cost Consideration in Project Scheduling.

Unit - 2: Computer System Architecture

Digital Logic Circuits and Components: Digital Computers, Logic Gates, Boolean Algebra, Map Simplifications, Combinational Circuits, Flip-Flops, Sequential Circuits, Integrated Circuits, Decoders, Multiplexers, Registers and Counters, Memory Unit.

Data Representation: Data Types, Number Systems and Conversion, Complements, Fixed Point Representation, Floating Point Representation, Error Detection Codes, Computer Arithmetic - Addition, Subtraction, Multiplication and Division Algorithms.

Register Transfer and Microoperations: Register Transfer Language, Bus and Memory Transfers, Arithmetic, Logic and Shift Microoperations.

Basic Computer Organization and Design: Stored Program Organization and Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output, Interrupt.

Programming the Basic Computer: Machine Language, Assembly Language, Assembler, Program Loops, Subroutines, Input-Output Programming.

Microprogrammed Control: Control Memory, Address Sequencing, Design of Control Unit.

Central Processing Unit: General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, RISC Computer, CISC Computer.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline,

Instruction Pipeline, Vector Processing Array Processors.
Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA, Serial Communication.
Memory Hierarchy: Main Memory, Auxillary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.
Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Cache Coherence, Multicore Processors.

Unit - 3: Programming Languages and Computer Graphics
Language Design and Translation Issues: Programming Language Concepts, Paradigms and Models, Programming Environments, Virtual Computers and Binding Times, Programming Language Syntax, Stages in Translation, Formal Transition Models.
Elementary Data Types: Properties of Types and Objects; Scalar and Composite Data Types.
Programming in C: Tokens, Identifiers, Data Types, Sequence Control, Subprogram Control, Arrays, Structures, Union, String, Pointers, Functions, File Handling, Command Line Argumaents, Preprocessors.
Object Oriented Programming: Class, Object, Instantiation, Inheritance, Encapsulation, Abstract Class, Polymorphism.
Programming in C++: Tokens, Identifiers, Variables and Constants; Data types, Operators, Control statements, Functions Parameter Passing, Virtual Functions, Class and Objects; Constructors and Destructors; Overloading, Inheritance, Templates, Exception and Event Handling; Streams and Files; Multifile Programs.
Web Programming: HTML, DHTML, XML, Scripting, Java, Servlets, Applets.
Computer Graphics: Video-Display Devices, Raster-Scan and Random-Scan Systems; Graphics Monitors, Input Devices, Points and Lines; Line Drawing Algorithms, Mid-Point Circle and Ellipse Algorithms; Scan Line Polygon Fill Algorithm, Boundary-Fill and Flood-Fill.
2-D Geometrical Transforms and Viewing: Translation, Scaling, Rotation, Reflection and Shear Transformations; Matrix Representations and Homogeneous Coordinates; Composite Transforms, Transformations Between Coordinate Systems, Viewing Pipeline, Viewing Coordinate Reference Frame, Window to View-Port Coordinate Transformation, Viewing Functions, Line and Polygon Clipping Algorithms.
3-D Object Representation, Geometric Transformations and Viewing: Polygon Surfaces, Quadric Surfaces, Spline Representation, Bezier and B-Spline Curves; Bezier and B-Spline Surfaces; Illumination Models, Polygon Rendering Methods, Viewing Pipeline and Coordinates; General Projection Transforms and Cipping.

Unit – 4: Database Management Systems
Database System Concepts and Architecture: Data Models, Schemas, and Instances; Three-Schema Architecture and Data Independence; Database Languages and Interfaces; Centralized and Client/Server Architectures for DBMS.
Data Modeling: Entity-Relationship Diagram, Relational Model - Constraints, Languages, Design, and Programming, Relational Database Schemas, Update Operations and Dealing with Constraint Violations; Relational Algebra and Relational Calculus; Codd Rules.
SQL: Data Definition and Data Types; Constraints, Queries, Insert, Delete, and Update Statements; Views, Stored Procedures and Functions; Database Triggers, SQL Injection.
Normalization for Relational Databases: Functional Dependencies and Normalization; Algorithms for Query Processing and Optimization; Transaction Processing, Concurrency Control Techniques, Database Recovery Techniques, Object and Object-Relational

Databases; Database Security and Authorization.
Enhanced Data Models: Temporal Database Concepts, Multimedia Databases, Deductive Databases, XML and Internet Databases; Mobile Databases, Geographic Information Systems, Genome Data Management, Distributed Databases and Client-Server Architectures.
Data Warehousing and Data Mining: Data Modeling for Data Warehouses, Concept Hierarchy, OLAP and OLTP; Association Rules, Classification, Clustering, Regression, Support Vector Machine, K-Nearest Neighbour, Hidden Markov Model, Summarization, Dependency Modeling, Link Analysis, Sequencing Analysis, Social Network Analysis.
Big Data Systems: Big Data Characteristics, Types of Big Data, Big Data Architecture, Introduction to Map-Reduce and Hadoop; Distributed File System, HDFS.
NOSQL: NOSQL and Query Optimization; Different NOSQL Products, Querying and Managing NOSQL; Indexing and Ordering Data Sets; NOSQL in Cloud.

Unit – 5: System Software and Operating System
System Software: Machine, Assembly and High-Level Languages; Compilers and Interpreters; Loading, Linking and Relocation; Macros, Debuggers.
Basics of Operating Systems: Operating System Structure, Operations and Services; System Calls, Operating-System Design and Implementation; System Boot.
Process Management: Process Scheduling and Operations; Interprocess Communication, Communication in Client–Server Systems, Process Synchronization, Critical-Section Problem, Peterson's Solution, Semaphores, Synchronization.
Threads: Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues.
CPU Scheduling: Scheduling Criteria and Algorithms; Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling.
Deadlocks: Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Avoidance and Detection; Recovery from Deadlock.
Memory Management: Contiguous Memory Allocation, Swapping, Paging, Segmentation, Demand Paging, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped Files.
Storage Management: Mass-Storage Structure, Disk Structure, Scheduling and Management, RAID Structure.
File and Input/Output Systems: Access Methods, Directory and Disk Structure; File-System Mounting, File Sharing, File-System Structure and Implementation; Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance; Recovery, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Requests to Hardware Operations.
Security: Protection, Access Matrix, Access Control, Revocation of Access Rights, Program Threats, System and Network Threats; Cryptography as a Security Tool, User Authentication, Implementing Security Defenses.
Virtual Machines: Types of Virtual Machines and Implementations; Virtualization.
Linux Operating Systems: Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File Systems, Input and Output; Interprocess Communication, Network Structure.
Windows Operating Systems: Design Principles, System Components, Terminal Services and Fast User Switching; File System, Networking.
Distributed Systems: Types of Networks based Operating Systems, Network Structure, Communication Structure and Protocols; Robustness, Design Issues, Distributed File Systems.

Unit – 6: Software Engineering

Software Process Models: Software Process, Generic Process Model – Framework Activity, Task Set and Process Patterns; Process Lifecycle, Prescriptive Process Models, Project Management, Component Based Development, Aspect-Oriented Software Development, Formal Methods, Agile Process Models – Extreme Programming (XP), Adptive Software Development, Scrum, Dynamic System Development Model, Feature Driven Development, Crystal, Web Engineering**.**
Software Requirements: Functional and Non-Functional Requirements; Eliciting Requirements, Developing Use Cases, Requirement Analysis and Modelling; Requirements Review, Software Requirment and Specification (SRS) Document.
Software Design: Abstraction, Architecture, Patterns, Separation of Concerns, Modularity, Information Hiding, Functional Independence, Cohesion and Coupling; Object-Oriented Design, Data Design, Architectural Design, User Interface Design, Component Level Design.
Software Quality: McCall's Quality Factors, ISO 9126 Quality Factors, Quality Control, Quality Assurance, Risk Management, Risk Mitigation, Monitoring and Management (RMMM); Software Reliability.
Estimation and Scheduling of Software Projects: Software Sizing, LOC and FP based Estimations; Estimating Cost and Effort; Estimation Models, Constructive Cost Model (COCOMO), Project Scheduling and Staffing; Time-line Charts.
Software Testing: Verification and Validation; Error, Fault, Bug and Failure; Unit and Integration Tesing; White-box and Black-box Testing; Basis Path Testing, Control Structure Testing, Deriving Test Cases, Alpha and Beta Testing; Regression Testing, Performance Testing, Stress Testing.
Software Configuration Management: Change Control and Version Control; Software Reuse, Software Re-engineering, Reverse Engineering.

Unit – 7: Data Structures and Algorithms
Data Structures: Arrays and their Applications; Sparse Matrix, Stacks, Queues, Priority Queues, Linked Lists, Trees, Forest, Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree, B Tree, B+ Tree, B* Tree, Data Structure for Sets, Graphs, Sorting and Searching Algorithms; Hashing.
Performance Analysis of Algorithms and Recurrences: Time and Space Complexities; Asymptotic Notation, Recurrence Relations.
Design Techniques: Divide and Conquer; Dynamic Programming, Greedy Algorithms, Backtracking, Branch and Bound.
Lower Bound Theory: Comparison Trees, Lower Bounds through Reductions.
Graph Algorithms: Breadth-First Search, Depth-First Search, Shortest Paths, Maximum Flow, Minimum Spanning Trees.
Complexity Theory: P and NP Class Problems; NP-completeness and Reducibility.
Selected Topics: Number Theoretic Algorithms, Polynomial Arithmetic, Fast Fourier Transform, String Matching Algorithms.
Advanced Algorithms: Parallel Algorithms for Sorting, Searching and Merging, Approximation Algorithms, Randomized Algorithms.

Unit – 8: Theory of Computation and Compilers
Theory of Computation: Formal Language, Non-Computational Problems, Diagonal Argument, Russels's Paradox.
Regular Language Models: Deterministic Finite Automaton (DFA), Non-Deterministic Finite Automaton (NDFA), Equivalence of DFA and NDFA, Regular Languages, Regular Grammars, Regular Expressions, Properties of Regular Language, Pumping Lemma, Non-Regular Languages, Lexical Analysis.

Context Free Language: Pushdown Automaton (PDA), Non-Deterministic Pushdown Automaton (NPDA), Context Free Grammar, Chomsky Normal Form, Greibach Normal Form, Ambiguity, Parse Tree Representation of Derivation Trees, Equivalence of PDA's and Context Free Grammars; Properties of Context Free Language.
Turing Machines (TM): Standard Turing Machine and its Variations; Universal Turing Machines, Models of Computation and Church-Turing Thesis; Recursive and Recursively-Enumerable Languages; Context-Sensitive Languages, Unrestricted Grammars, Chomsky Hierarchy of Languages, Construction of TM for Simple Problems.
Unsolvable Problems and Computational Complexity: Unsolvable Problem, Halting Problem, Post Correspondence Problem, Unsolvable Problems for Context-Free Languages, Measuring and Classifying Complexity, Tractable and Intractable Problems.
Syntax Analysis: Associativity, Precedence, Grammar Transformations, Top-Down Parsing, Recursive Descent Predictive Parsing, LL (1) Parsing, Bottom-up Parsing, LR Parser, LALR (1) Parser.
Semantic Analysis: Attribute Grammar, Syntax Directed Definitions, Inherited and Synthesized Attributes; Dependency Graph, Evaluation Order, S-attributed and L-attributed Definitions; Type-Checking.
Run Time System: Storage Organization, Activation Tree, Activation Record, Stack Allocation of Activation Records, Parameter Passing Mechanisms, Symbol Table.
Intermediate Code Generation: Intermediate Representations, Translation of Declarations, Assignments, Control Flow, Boolean Expressions and Procedure Calls.
Code Generation and Code Optimization: Control-flow, Data-flow Analysis, Local Optimization, Global Optimization, Loop Optimization, Peep-Hole Optimization, Instruction Scheduling.

Unit – 9: Data Communication and Computer Networks
Data Communication: Components of a Data Communication System, Simplex, Half-Duplex and Duplex Modes of Communication; Analog and Digital Signals; Noiseless and Noisy Channels; Bandwidth, Throughput and Latency; Digital and Analog Transmission; Data Encoding and Modulation Techniques; Broadband and Baseband Transmission; Multiplexing, Transmission Media, Transmission Errors, Error Handling Mechanisms.
Computer Networks: Network Topologies, Local Area Networks, Metropolitan Area Networks, Wide Area Network, Wireless Networks, Internet.
Network Models: Layered Architecture, OSI Reference Model and its Protocols; TCP/IP Protocol Suite, Physical, Logical, Port and Specific Addresses; Switching Techniques.
Functions of OSI and TCP/IP Layers: Framing, Error Detection and Correction; Flow and Error Control; Sliding Window Protocol, HDLC, Multiple Access – CSMA/CD, CSMA/CA, Reservation, Polling, Token Passing, FDMA, CDMA, TDMA, Network Devices, Backbone Networks, Virtual LANs.
IPv4 Structure and Address Space; Classful and Classless Addressing; Datagram, Fragmentation and Checksum; IPv6 Packet Format, Mapping Logical to Physical Address (ARP), Direct and Indirect Network Layer Delivery; Routing Algorithms, TCP, UDP and SCTP Protocols; Flow Control, Error Control and Congestion Control in TCP and SCTP.
World Wide Web (WWW): Uniform Resource Locator (URL), Domain Name Service (DNS), Resolution - Mapping Names to Addresses and Addresses to Names; Electronic Mail Architecture, SMTP, POP and IMAP; TELNET and FTP.
Network Security: Malwares, Cryptography and Steganography; Secret-Key Algorithms, Public-Key Algorithms, Digital Signature, Virtual Private Networks, Firewalls.
Mobile Technology: GSM and CDMA; Services and Architecture of GSM and Mobile Computing; Middleware and Gateway for Mobile Computing; Mobile IP and Mobile Communication Protocol; Communication Satellites, Wireless Networks and Topologies;

Cellular Topology, Mobile Adhoc Networks, Wireless Transmission and Wireless LANs; Wireless Geolocation Systems, GPRS and SMS.
Cloud Computing and IoT: SaaS, PaaS, IaaS, Public and Private Cloud; Virtualization, Virtual Server, Cloud Storage, Database Storage, Resource Management, Service Level Agreement, Basics of IoT.

Unit – 10: Artificial Intelligence (AI)
Approaches to AI: Turing Test and Rational Agent Approaches; State Space Representation of Problems, Heuristic Search Techniques, Game Playing, Min-Max Search, Alpha Beta Cutoff Procedures.
Knowledge Representation: Logic, Semantic Networks, Frames, Rules, Scripts, Conceptual Dependency and Ontologies; Expert Systems, Handling Uncertainty in Knowledge.
Planning: Components of a Planning System, Linear and Non-Linear Planning; Goal Stack Planning, Hierarchical Planning, STRIPS, Partial Order Planning.
Natural Language Processing: Grammar and Language; Parsing Techniques, Semantic Analysis and Prgamatics.
Multi Agent Systems: Agents and Objects; Agents and Expert Systems; Generic Structure of Multiagent System, Semantic Web, Agent Communication, Knowledge Sharing using Ontologies, Agent Development Tools.
Fuzzy Sets: Notion of Fuzziness, Membership Functions, Fuzzification and Defuzzification; Operations on Fuzzy Sets, Fuzzy Functions and Linguistic Variables; Fuzzy Relations, Fuzzy Rules and Fuzzy Inference; Fuzzy Control System and Fuzzy Rule Based Systems.
Genetic Algorithms (GA): Encoding Strategies, Genetic Operators, Fitness Functions and GA Cycle; Problem Solving using GA.
Artificial Neural Networks (ANN): Supervised, Unsupervised and Reinforcement Learning; Single Perceptron, Multi-Layer Perceptron, Self-Organizing Maps, Hopfield Network.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Drawing and Painting

Max. Marks: 50

Unit-I

1. Meaning, Origin & Development and Classification of Arts.
2. Various form of Visual Art and their inter-relationship with other mode of creative expression, e.g. Performing Art and Literature.
3. Material and Method: Application of materials, Support in Painting (Canvas, Paper, Wall Surface, Panels, Mix Media), Oil Painting and its techniques- Traditional and Non- Traditional Techniques of Wall Painting- Traditional (Fresco*, Secco and Buono*) and Modern.
4. Water Color Painting, Wash technique, Pastal and Crayon, Acrylic color, color preparation and technical aspect of pigment, color theory and color harmony.
5. Nature and Function of Art in the Society.

Folk Art Tradition: Rajasthan *(Mandna, Pichhwai, Phad and Kavad Painting);* Odisa and Bengal (*Pata chitra*), Bihar (*Madhubani painting*), Gujrat (*Pithora painting*) and Maharashtra (*Warli painting*).

Unit – II

History of Indian Art -

1. Pre-historic Painting in India, Indus Valley Civilization, Wall Painting of Jogimara, Ajanta, Bagh, Badami and Sittanavasal.
2. Manuscript painting tradition of pala and western India.
3. Tradition of Miniature Painting: Mughal, Rajasthani, Pahari (Basoli and Guler-Kangra) and Deccan painting (Ahmednagar, Bijapur and Golconda).
4. A comprehensive study of early Indian sculptors from Indus Valley to Gupta period- Maurya, Shung, Satavahana, Kushan and Gupta Dynasty.

Unit – III

Artist of Rajasthan -

Ramgopal Vijayvargia, Kripal Singh Shekhawat, Goverdhan Lal Joshi, Bhoor Singh Shekhawat, Devki Nandan Sharma, Parmanand Choyal, Bhawani Charan Gue, Dwarka Prasad Sharma, Ram Jaiswal, Suresh Sharma, Mohan Sharma, Jyoti Swaroop, R.V. Sakhalkar, C.S. Mehta, Bhawani Shankar Sharma, Sumahendra Sharma, Shail Choyal, Nathulal Verma, Vidhyasagar Upadhyay, Samander Singh Khangarot.

Unit – IV

Major Phases in Western Painting- Prehistoric Painting (France and Spain), Egyptian, Aegean Art, Greek Art and Roman Art, Byzantine, Gothic, Renaissance, Baroque and Rococo style of Painting.

Unit – V

Eastern Concept of Beauty- Concept of Beauty in Veda and Upnishads, Pandit

Yashodhara's Theory of Shadanga, Vishnu Dharmottar Purana, Concept of Ras-Sutra in Natya Shastra and its commentaries. Theory of Rasa, Sadharanikarana of Bharat Muni, Bhatt Lolatt, Shankuk, Bhattnayak, Abhinav Gupt, Contribution of Rabindra Nath Tagore and A.K. Coomarswami towards Indian Aesthetics.

Unit – VI

Fundamental Elements of Visual Art (Line, Form, Colour, Tone, Texture, Space, Shape, Perspective, Design etc).

Principles of Composition – Unity, Harmony, Balance, Emphasis or Dominance, Rhythm, Proportion, Contrast and foreshortening, etc.

Creative Process: (Observation Perception. Imagination, Expression).

Six Canons of Painting- In Indian and Chinese Painting.

Unit –VII

Major Trends in Indian Art- Company school of Painting, Advent of Modernism with Raja Ravi Verma.

Bengal School: Abanindranath Tagore and his Disciples, Nandlal Bos and his Disciples.

Breakthrough in Indian Painting: Contribution of Amrita Shergil, Progressive Artist Group- Bombay and Calcutta Group-Calcutta, Shilpi Chakra-Delhi, Chola Mandal-Madras and Baroda School- Baroda.

Famous Artists and Sculptors of India-

Painters- Abanindranath Tagore, Rabindra Nath Tagore, Nandlal Bose, Jamini Roy, E.B. Havell, Asit Kumar Haldar, Amrita Shergil, K.K. Hebbar, N.S. Bendre, M.F. Hussain, F.N. Suza, S.H Raza, K.H. Ara, K.G. Subramanyam, Satish Gujral, J. Swaminathan, Tyeb Mehta.

Sculptors - Pradosh Das Gupta, Debi Prasad Roy Chaudhury, Ramkinkar Baij, Dhanraj Bhagat, Shankho Choudhari, Himmat Shah, Nagji Patel, Usha Rani Hooja, Annish Kapoor.

Unit – VIII

Indian Temples Architecture and Sculptures- Ellora, Elephanta, Mahabalipuram, Konark Temple, Khajuraho Temples and Meenakshi Temple.

Temple Sculptures of Rajasthan- Kiradu Temples-Barmer, Harsh Temple-Sikar, Ambika Temple-Jagat (Udaipur), Arthuna-Banswara, Delwara-Sirohi, Ranakpur-Pali, Abhaneri- Dausa.

Unit – IX

History of Western Modern Art- Neo-Classicism, Romanticism, Realism. Impressionism, Neo-Impressionism, Post-Impressionism.

Fauvism, Cubism, Expressionism.

Futurism, Constructivism, Metaphysical Painting. Dadaism, Surrealism, Abstract Art.

Op- Art, Pop- Art, Action Painting Minimal art and Post- Modern Trends, etc.

Unit – X

Western Concept of Beauty - Relevance of study of Aesthetics in Drawing and Painting. Theory of Imitation and Representation, Catharsis (Plato, Aristotle), Aesthetical view of Augustine, Baumgarten, Hegel, Schelling, Emanuel Kant, Sigmund Freud, Leo Tolstoy, Benedetto Croce, George Santayana, Susanne Langer, I.A. Richards, Roger Fry and Clive Bell.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Economic Administration and Financial Management (EAFM)

Max. Marks: 50

Unit – I Theory of Economics & Growth:

- Concept, Nature and Scope of Micro and Macro Economics.
- Consumer Behaviour, Demand Analysis, Indifference Curve Analysis.
- Pricing under Various Market Conditions.
- Production Function and Theories of Production.
- Theory of Distribution - Theory of Rent, Wage, Profit and Interest.
- National Income- Concept, Methods, Components, Importance and Limitations.
- Consumption and Investment Function.
- Concept of Economic Growth and Development, Concept of Knowledge Economy (K-Economy).

Unit – II Indian Economy:

- Problems of Indian Economy- Poverty, Population and Unemployment.
- Industrial and Agricultural Development, Industrial Policy.
- Privatisation and Globalisation.
- Public Private Partnership in Infrastructure Management.
- NITI Aayog.
- Rural Development in India.
- Cooperative Movement in India.
- Demonetisation and its Impact on Indian Economy.

Unit – III Public Finance:

- Nature, Concept, Features and Importance of Public Finance.
- Cannons of Taxation.
- Direct and Indirect Taxes, Goods and Services Tax (GST).
- Impact and Incidence of Tax, Tax Evasion and Tax Avoidance.
- Theory of Maximum Social Advantage.
- Public Revenue, Public Expenditure, Public Debt and Deficit Financing.
- Union (Central) Budget: its Components and Major Challenges.
- Business Cycles: Concepts, Causes and Phases.

Unit – IV Monetary Economics:

- Concept, Scope, Importance and Components of Money.
- Determinants of Demand for Money and Supply of Money.
- Monetary Policy – Concept, Objectives and Limitations.
- Techniques of Monetary Control.

- Monetary Policy in India.
- Inflation and Deflation – Concept, Kinds, Causes, Effects and Remedies.
- Money and Capital Market in India.
- Multiplier and Accelerator.

Unit – V Economy of Rajasthan:

- Basic Features of Economy of Rajasthan.
- Economic Problems in Rajasthan.
- Agriculture – Problems, Prospects and Challenges.
- Industries – Problems, Prospects and Challenges.
- Tourism Development in Rajasthan.
- Economic Planning in Rajasthan.
- Special Area Development Programmes in Rajasthan.
- Environment Pollution and the Problems of Sustainable Development.

Unit – VI Banking and Financial Institutions:

- Banks: Types, Functions and Importance.
- Reserve Bank of India, NABARD, Rural Banking.
- Banking Sector Reforms in India.
- E-Banking.
- Development Banking: IDBI, IFCI, SFCs, UTI, SIDBI.
- Challenges before Commercial Banks in 21st Century.
- Problems of Banking Sector in India.
- Financial Sector Reforms in India.

Unit –VII International Finance and Foreign Exchange:

- Nature and Scope of International Finance.
- Foreign Direct Investment and Foreign Institutional Investors.
- International Capital Markets, GDRs and ADRs.
- Balance of Payment & Balance of Trade.
- W.T.O. and India.
- International Financial Institutions- IMF, IBRD, ADB, EXIM BANK and ECGC.
- Foreign Exchange Rate - Mechanism, Risk and its Management.
- Convertibility of Rupee, Devaluation of Currency.

Unit – VIII Security Analysis and Portfolio Management:

- Management of Securities.
- Investment Spectrum.
- Primary and Secondary Market Operations.
- Credit Ratings in India.
- Government Securities Market.
- Theories of Portfolio Management.
- Mutual Funds, Investors' Protection.
- Regulation of Capital Market.
- Securities and Exchange Board of India (SEBI): Objectives, Functions and Role.

Unit – IX Financial Management:

- Meaning, Nature and Scope of Financial Management, Concept of Financial Technology (FinTech).
- Capital Budgeting – Concept, Techniques and Importance.
- Cost of Capital.
- Capital Structure, Leverage.
- Ratio Analysis.
- Fund Flow and Cash Flow Analysis.
- Working Capital Management.
- Marginal Cost Analysis, Dividend Policy, Bonus Issue.

Unit – X Quantitative Techniques:

- Correlation and Regression for Business Decisions.
- Probability – Basic Concepts, Different Approaches.
- Index Numbers, Time Series Analysis.
- Hypothesis: Definition, Types, Objectives, Steps in Hypothesis Testing.
- Sampling, Probability and Non-Probability Sampling, Sampling Methods.
- Chi-Square Test, Goodness of Fit.
- ANOVA (Analysis of Variance).
- Linear Programming, Queuing Theory, Game Theory, PERT and CPM

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Economics

Max. Marks: 50

UNIT - I: Microeconomics

Consumer Behaviour- Cardinal utility analysis, Nature of utility functions, Demand theory: Market Demand Curve, Elasticity of demand, ordinary and compensated demand curves, Network externalities- Bandwagon, Snob and Veblen effect. Indifference curve analysis, Goods, bads and neutrals. Normal, inferior and Giffen goods, Consumer's Price effect, income and substitution effects, Slutsky theorem. Analysis of consumer behavior under risk and uncertainty, Asymmetric information. Behavioral Economics.

Law of Variable Proportions, Isoquant, Ridge lines. Optimum factor combination, Expansion path, short run and long run production functions, Cost functions and Curves. Cost concepts and cost curves. Short run and long run cost curves. Modern theory of cost. Elasticity of substitution. Euler's theorem. Production function- Cobb Douglas and CES, Technical progress, Economies of scale and Learning curve analysis.

Determination of price and output under different market structures. Factor pricing analysis. Peak load pricing. Game theory: Cooperative and non-cooperative games, Sequential games, Dominant strategy and Nash Equilibrium. Welfare economics - Pareto optimality, Market failure and externalities, new welfare economics, Social Welfare Function, First and Second Theorem of Welfare economics, Theory of second best. Arrow's Impossibility Theorem.

UNIT - II: Macroeconomics

National income - concepts and measurement, flaws in conventional system of National Income Accounts, Latest changes in national income accounts in India. Green Accounting, Consumption hypotheses - absolute, relative, life-cycle and permanent income hypotheses. Classical, Keynesian and Post- Keynesian theories of determination of income and output. Phillips curve Controversy, Post Keynesian Theories of demand for Money: Baumol, Tobin, Friedman, Patinkin and Real balance effect. Investment function: Neoclassical theory, Accelerator theory,Tobin's Q theory.

Money supply and high-powered money. Money Multiplier The IS-LM model, the relative effectiveness of monetary and fiscal policies. Ricardian Equivalence.

Natural Rate of Unemployment- Adaptive Expectation. Trade Cycle Theories: Multiplier-Accelerator Interaction model, Kaldor model. Mundell -Fleming model. Monetarism: Monetarist-Fiscalist debate on Policy Activism. New classical approach to macroeconomics. Real Business Cycles, New Keynesian Macroeconomics- Sticky Price (Menu Cost) Model, Efficiency Wage Hypothesis.

UNIT-III: Economic Growth and Development

Economic development and growth. Climate change. Measurement and indicators of development: PQLI, HDI, HPI and GDI. Entitlement and capability approach. Growth-Distribution Trade-offs. Measurement of inequality- Lorenz curve and Gini Coefficient. Development and Growth models: Lewis, Fei-Ranis, Harrod-Domar, Solow, Kaldor. Endogeneous Growth, Uzawa-Lucas Model. Golden Rule of Capital Accumulation. Technological progress- Embodied and disembodied, technical progress- Hicks and Harrod, learning by doing. Cambridge criticism of Neo-classical Analysis of Growth. Economic function of market and state: Market failure and government failure. Project evaluation and

Cost-benefit analysis. Theory of Environment Regulation: Political Economy Model of Regulation, Pigovian taxes; Subsidies for Abatement of pollution, Property Rights and the Coasian Approach: bargain Solution. Quantitative regulation: Command and Control- Standard setting; Tradable pollution permits. Methods of environment valuation: Hedonic pricing, Contingent valuation and Travel cost method.
Substainable Development goals and their governance. Role of Multilateral Development Bodies, Causes and impact of Global financial crisis of 2008 and Euro Zone crisis.

UNIT - IV: Indian Economy

Economic Growth in India: Pattern and structure. Problems of Indian economy - poverty, unemployment, Inflation, regional disparities. Characteristics of Indian Population and Population Policy. Food security in India. Inclusive growth. Agriculture development and policies. Agriculture Credit in India: Kisan Credit Card, Micro Finance Programme- SHG and Bank Linkage Programme. National Agricultural Insurance Scheme. Industrial development and policies. Service Sector Growth. Economic Reforms in India, Financial sector reforms. RBI and monetary policy. Demonetization, Impact of covid-19 on Indian Economy. Global Economic recession and its impact on Indian economy. Foreign trade: Trends, Composition and Direction, India's Balance of Payment position in recent years, WTO: issues and its impacts on Indian economy. Evolution of Niti Aayog. Major flagship programmes of Indian Government.
Migration- policy issues, Globalization and trade policy.
Rural development programmes, Bilateral Trade agreement and their implications on India.

UNIT - V: Quantitative Techniques

Diagrammatical, Graphical & tabular representation of data, Measures of Central tendency, Dispersion, Skewness and Kurtosis, Simple Correlation, Partial and Multiple co-relation, Time Series. Components of Time Series, Regression Analysis, Probability- definition, theorems of addition and multiplication, conditional probability, Bayes Theorem. Binomial, Poisson and Normal distributions. Sampling techniques. Estimation: properties of good estimator, Point and Interval estimation, Types of errors, Level of significance and power of test. Hypothesis testing- Z, t, chi-square and F tests. Association of attributes, Analysis of Variance.
Matrices, Determinants, Differentiation, Simple and partial differentiation Integration- their applications in Economics. Indefinite and definite integration, Unconstrained and constrained optimization. Linear Programming, Game Theory, Input-Output analysis.

UNIT - VI: Public Economics and International Economics

Social, merit, mixed, club goods. Public expenditure- Wiseman-Peacock hypothesis, Leviathan Hypothesis, Niskanen Model, Public- Choice Theory, Public revenue - principle, effects. Taxation: incidence, impact and effects of taxation. Problem of double taxation. Elasticity and buoyancy of taxes. Problem of Tax Evasion and Parallel Economy in India. Tax reforms, GST and its implication for India. Issues of subsidies in India. Public debt -sources, burden, effects and its management. Centre-State financial relations, Fiscal policy: Neutral, Compensatory, and Functional Finance. Public Enterprises and Public Utilities. Concept of budget deficits.
Theories of international trade- comparative cost, opportunity costs. Heckscher-Ohlin theory, Factor Price Equalization Theorem. Terms of trade. Balance of payments. IMF and its functions, WTO and its Impact on Indian Economy, Free trade v/s Protected trade, Multiplier & Backwash effects, Price effects of Exchange rate changes- Elasticity approach & Absorption approach.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: English

Max. Marks: 50

Part 'A'-

(i) Critical Appreciation of a given poem or piece of prose.

(ii) English Language Usage and Grammar.

Spotting Errors

- Determiners & Articles
- Modal Auxiliaries
- Prepositions & Phrasal verbs
- Tenses and Sequence of Tenses
- Idiomatic Expressions

Basic sentence Patterns and Transformations

- Basic sentence patterns
- Complex Compound sentences
- Active/Passive
- Direct/Indirect
- Negative/Interrogative

Part 'B'- Literary Criticism

a) Classical (Western and Indian)
b) Renaissance
c) Elizabethan and Jacobean
d) Neo Classical
e) Pre-Romantic and Romantic
f) Victorian and Pre Raphaelite
g) Early Moderns till T.S. Eliot

Part 'C'- Critical Theory

a) New Criticism
b) Structuralism and Post Structuralism
c) Modernism and Post Modernism
d) Post Colonialism
e) Feminist Criticism
f) Psychoanalytical Criticism
g) New Historicism
h) Myth Criticism
i) Eco Criticism

Part 'D'- British Literature through the Ages-

(i) Renaissance
(ii) Elizabethan
(iii) Jacobean
(iv) Neo Classical
(v) Romantic
(vi) Victorian
(vii) Modern

Part 'E'- American and Non-British English Literature-

(i) American Literature from Sixteenth Century to the Present Day
(ii) Afro-American Literature
(iii) African Literature
(iv) New Literature (Caribbean, Canadian & Australian)

Part 'F'- Indian Writing in English-

(i) Colonial
(ii) Post-Colonial
(iii) Dalit
(iv) Diaspora

Part 'G'- Research Methodology-

- M.L.A Handbook (Latest Edition)

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Geography

Max. Marks: 50

PART: I- DEVELOPMENT OF GEOGRAPHICAL THOUGHT AND RESEARCH METHODOLOGY

Unit – I History of Geographic Thought:
Development of geographical knowledge during ancient and medieval period; Contributions of Greek, Roman and Arab geographers. Foundations of modern geography; Contributions of German, French, British and American schools. Development of geographical knowledge in India.
Conceptual and methodological developments during the 20th century with changing paradigms; determinism and possibilism, quantitative revolution and impact of positivism, behaviouralism, humanism, radicalism and welfare approach in geography. Concepts of chorological science, areal differentiation, system analysis and spatial organization.

Unit – II Research Methodology:
Meaning, types and significance of Research, Research approaches; deductive and inductive, Concept of qualitative and quantitative research, Identification of research problem, Research design, Types of data, Data collection; questionnaire and schedule, Research methodology and research methods, Bi-variate and multivariate analysis, Sampling fundamentals and sampling design, Data analysis, Interpretation and report-writing, Plagiarism, Research ethics, Citing of references.

PART: II- PHYSICAL GEOGRAPHY

Unit – III Geomorphology:
Fundamental Concepts of Geomorphology, Geological time scale, Processes of development of land forms; Endogenetic and exogenetic forces, Orogenesis and important phases of mountain building, Mountain building theories, Continental drift and plate tectonics, Denudation processes; weathering and erosion, Concept of geomorphic cycles; Davis and Penk, Landforms associated with fluvial, glacial, arid, coastal and karst cycles, Slope forms and concepts of slope evolution, Environmental and Applied geomorphology and Geomorphic hazards.

Unit – IV Climatology:
Composition and structure of atmosphere, Insolation, Heat budget, Distribution of temperature, atmospheric pressure and general circulation of winds; Monsoons and jet streams, Stability and instability of atmosphere, Air-masses and fronts, Temperate and tropical cyclones, Types and distribution of precipitation, Classification of world climates; Koppen's and Thornthwatte's schemes and Hydrological cycle.

Unit – V Oceanography:
Relief of Oceans; hypsometric curve, Bottom relief of Indian, Atlantic and Pacific oceans, Ocean deposits, Coral reefs, Temperature, density and salinity of oceans, Ocean circulations; tides and ocean currents, Sea-level changes, Marine resources and their utilization.

Unit – VI Environment Geography:
Components of environment and ecology, Physical factors influencing world distribution of plants and animals, Types, forms and functions of ecosystem; forest, grassland, marine, desert and mountain ecosystems, Bio-diversity; depletion and conservation, Environmental pollution; types, causes, effects and solutions, Climate change; global warming and ozone depletion, Environmental hazards and disasters; types, effects and management and Environmental Impact Assessment (EIA).

PART: III- PRACTICAL GEOGRAPHY

Unit – VII Cartography:
Types of maps and their interpretation, single purpose and composite maps; choropleth, isopleth and chorochromatic maps, Statistical diagrams; one, two and three dimensional diagrams, Climatic graphs; climograph, hyther graph and climatograph, Map projections; classification and their specific uses and Toposheets; Traditional and Open Series Maps (OSM).

Unit – VIII Geospatial Techniques:
Remote sensing and computer application in mapping; digital mapping, electro-magnetic radiations, Remote sensing systems; platforms, sensors, resolution and radiometric characteristics, Digital Elevation Model, Application of remote sensing in the study of land use, land cover and resource planning, Introduction to Geographic Information System (GIS), Fundamentals of GIS; geo-spatial databases, data capture, Raster and vector data, Implications of integration of remote sensing and GIS and Global Positioning System (GPS).

Unit – IX Statistical Method:
Data tabulation, Study of frequency distribution, Measures of central tendency, Selection of class intervals for mapping, Measures of dispersion and concentration; standard deviation, Lorenz curve and Gini's coefficient; Methods of measuring association, simple and multiple correlation and regression.
Measurement of spatial patterns of distribution; nearest-neighbour analysis, Scaling techniques; rank score and weighted score; Sampling techniques for geographical analysis and Models in geography; Simulation model, Gravity model.

PART: IV- ECONOMIC GEOGRAPHY

Unit – X Economic Geography:
Spatial organisation and classification of economies, Factors affecting spatial organization of economic activities; primary, secondary, tertiary and quaternary, Classification of resources, Forest, power and mineral resources, Conservation of resources, World energy crisis, Globalisation and its impact on world economy and Major regional trade blocks and their economic integration.

Unit – XI Agricultural Geography:
Nature, scope and development of agriculture geography, Agriculture typology; agricultural

systems of the world, selected agricultural concepts and their measurements; agricultural productivity and efficiency, cropping pattern, crop concentration, crop diversification, cropping intensity and degree of commercialization, Concept and techniques of delimitation of agricultural regions, Von Thunen's model of land use planning and Green Revolution.

Unit – XII Industrial and Transport Geography:
Nature, scope and development in industrial geography, Factors of localization of manufacturing industries, Classification of industries; Resource based and footloose industries, Theories of industrial location: A. Weber, August Losch, D. M. Smith, Tord Palander and E.
M. Hoover, Industrial regions of the world and Major industrial hazards.
Models of transport development, Structural analysis of transport network, Measure of accessibility and connectivity, Transport cost and spatial patterns of flow.

Unit-XIII Regional Planning:
Typology of Regions, Regional concept in geography and its application to planning, Concept of planning region, Conceptual and theoretical framework of regional planning, regional hierarchy, Methods of regional delineation, Theories of Regional Development, Concept of development, Indicators of development and regional imbalances

PART: V- POPULATION AND SETTLEMENT GEOGRAPHY

Unit – XIV Population Geography:
Nature, scope and development of population geography, Population components and characteristics, Patterns of world population distribution, growth and density, Policy issues, Migration; types, causes and consequences, Patterns and processes of migration, Population theories; Malthus, Marx, Sadler and Ricardo, Demographic transition model, Population-resource regions, Gender discrimination and empowerment of women.

Unit – XV Settlement Geography:
Site, situation, types, size, spacing and internal morphology of rural and urban settlements, Ecological processes of urban growth, Spatial pattern and distribution of urban centres, Rural-urban fringe, City-region, Settlement systems, Primate city, Rank-size rule, Settlement hierarchy; Christaller's central place theory; August Losch's theory of market centres and Concepts of smart city.

PART – VI SOCIO-CULTURAL AND POLITICAL GEOGRAPHY

Unit – XVI Socio-Cultural Geography:
Nature and scope of social geography, social structure and social processes, Elements of social geography: ethnicity, tribe, dialect, language, caste and religion and Concept of social well-being.
Nature and scope of cultural geography, Concept of culture-areas and cultural regions, Cultural regions of the world, Theories of tribal groups, Environment impact on dwelling places as cultural expressions and Problems arising due to cultural diffusion, racism and terrorism.

Unit – XVII Political Geography:
Definition and scope of political geography, Geopolitics, Global strategic views, Concept of nation, state and nation-state, Boundaries and frontiers, Capital cities and core areas, Politics

of world resources, Geography of federalism, Geo-political significance of Indian Ocean and Development of Electoral geography.

PART: VII- REGIONAL GEOGRAPHY

Unit – XVIII Geography of India:
Physiographic divisions, Climate, Vegetation, Drainage, Major soil types, Water resources, Irrigation, Agriculture; major food and commercial crops, Green revolution and food security, Agro-climatic regions, Mineral and power resources, Major industries and industrial regions, Population distribution and growth, Population problems and policies, Tribes, Tribal areas and their problems, Regional disparities in social and economic development, Regional planning in India and planning regions, Development of road, rail and inland water ways and Natural disasters in India; earthquakes, floods, droughts, cyclones and tsunami.

Unit – XIX Geography of Rajasthan:
Physiographic divisions, Climate, Rivers and lakes, Soils and vegetation, Minerals and power resources, Agriculture and irrigation, Agro-climatic regions, Livestock, Major industries and industrial regions, Sites of geo-tourism, Population; distribution, density, growth, sex-ratio, literacy, SC and ST population, Environmental problems; desertification, deforestation and soil erosion, Bio-diversity and its conservation and Development programmes.

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कोटा विश्वविद्यालय, कोटा

एम.बी.एस. मार्ग, कोटा (राजस्थान)–३२४००५

पीएच.डी. प्रवेश परीक्षा के लिए पाठ्यक्रम
विषयः हिन्दी

अधिकतम अंकः 50

इकाई–1 – हिन्दी भाषा तथा व्याकरण

हिन्दी भाषा का उद्‌भव एवं विकास, हिन्दी भाषा की प्रमुख बोलियाँ– राजस्थानी, ब्रज, खड़ी बोली, अवधी, भोजपुरी । राजस्थानी भाषा का प्राचीन स्वरूप– डिंगल; राजस्थानी की प्रमुख बोलियाँ, मारवाड़ी, शेखावाटी, मेवाती, ढूढांणी, हाड़ौती, मालवी, वागड़ी।

राजभाषा के रूप में हिन्दी की संवैधानिक स्थिति तथा मानक हिन्दी। देवनागरी लिपि की विशेषताएं तथा मानकीकरण।

हिन्दी व्याकरण– मानक वर्णमाला, शब्द तथा शब्द निर्माण– उपसर्ग, प्रत्यय, संधि, समास, वाक्य एवं वाक्य भेद, शब्द शुद्धि एवं वाक्य शुद्धि।

शब्द के व्याकरणिक प्रकार– संज्ञा, सर्वनाम, विशेषण, क्रिया, क्रिया विशेषण, सम्बंधसूचक अव्यय, समुच्चयबोधक अव्यय।

इकाई–2– भारतीय काव्यशास्त्र

काव्य– परिभाषा, काव्य लक्षण, काव्य हेतु और काव्य प्रयोजन, साहित्य का स्वरूप।

भारतीय काव्यशास्त्र– काव्य शास्त्र का तात्पर्य, रस सिद्धांत तथा साधारणीकरण, रस निष्पत्ति, ध्वनि सिद्धांत, वक्रोक्ति सिद्धांत , अलंकार सिद्धांत।

अलंकार – अनुप्रास, यमक, श्लेष, वक्रोक्ति, उपमा, उत्प्रेक्षा, रूपक, संदेह, भ्रांतिमान, वयण सगाई, विभावना, अपन्हुति, मानवीकरण।

छंद– परिभाषा तथा महत्व– दोहा, चौपाई, सोरठा, उल्लाला, छप्पय, कुंडलियां, गीतिका, हरिगीतिका, मंदाक्रांता, द्रुतविलंबित, कवित्त।

इकाई–3– पाश्चात्य काव्यशास्त्र

प्लेटो का काव्य सिद्धान्त,

अरस्तू का काव्य सिद्धान्त– अनुकरण, विरेचन और त्रासदीय लौंजाइनस – उद्धात्त सिद्धान्तय क्रोंचे– अभिव्यंजना सिद्धान्तय कॉलरिज – कल्पना सिद्धान्तय टी.एस. एलियट – परंपरा एवं निर्वैयक्तिकता सिद्धान्त, मार्क्सवादी साहित्य चिन्तन, उत्तर आधुनिकतावाद तथा विखण्डनवाद।

इकाई–4–आदि–मध्यकालः पाठ

समग्र अध्ययन के लिये निर्धारित पाठ –

- पृथ्वीराज रासो (पद्‌मावती समय) – चंदबरदाई

- कबीर ग्रन्थावली – (सं. श्यामसुन्दर दास) – आरंभिक 20 पद, साखियाँ– गुरू कौ अंग एवं विरह कौ अंग
- मीरां मुक्तावली – सं. नरोत्तमदास स्वामी (समस्त पद)
- भ्रमरगीत सार – (सं. रामचन्द्र शुक्ल) – 21 से 50 पद
- जायसी ग्रन्थावली – नागमती वियोग खंड (सं. रामचन्द्र शुक्ल)
- तुलसीदास – विनय पत्रिका – (सं. वियोगी हरि) – पद सं. 137 से 161 तक
- बिहारी रत्नाकर – (सं. जगन्नाथ दास रत्नाकर) – आरंभिक 25 दोहे
- घनानंद कवित्त – (सं. विश्वनाथप्रसाद मिश्र) – 1 से 25 तक छंद

इकाई–5 – आधुनिक कालः निर्धारित पाठ

- कामायनी – जयशंकर प्रसाद (चिंता तथा श्रद्धा सर्ग)
- राम की शक्ति पूजा – सूर्यकान्त त्रिपाठी 'निराला'
- अंधेरे में – मुक्तिबोध
- गोदान – प्रेमचन्द
- त्यागपत्र– जैनेन्द्र
- महाभोज (उपन्यास) – मन्नू भण्डारी
- निबंध– श्रद्धा और भक्ति (रामचन्द्र शुक्ल), नाखून क्यों बढ़ते है (हजारी प्रसाद द्विवेदी), निबन्ध संग्रह– गंधमादन (कुबेरनाथराय) से राघवः करूणो रसः।
- कहानियाँ – उसने कहा था (चंद्रधर शर्मा गुलेरी), कफ़न (प्रेमचन्द), पुरस्कार (जयशंकर प्रसाद), रोज़ (अज्ञेय), परायी प्यास का सफर (आलमशाह खान), उजाले के मुसाहिब (विजयदान देथा)।
- मेरी तिब्बत यात्रा– राहुल सांकृत्यायन

इकाई–6–हिन्दी साहित्येतिहास लेखन की परंपरा और आदिकाल

हिन्दी साहित्य के इतिहास लेखन की परंपरा। काल विभाजन और नामकरण। प्रमुख इतिहास ग्रंथों का परिचय।

आदिकाल – सामाजिक–सांस्कृतिक पृष्ठभूमि, आदिकाल की साहित्यिक प्रवृत्तियाँ–सिद्ध, नाथ एवं जैन साहित्य, रासो काव्य परंपरा एवं तत्संबंधी प्रामाणिकता का प्रश्न, प्रमुख कवि एवं उनकी रचनाएँ (सरहपाद, गोरखनाथ, चंदबरदाई, नरपति नाल्ह, अमीर खुसरो, विद्यापति)

इकाई–7–भक्तिकाल

भक्तिकाल – साहित्य का ऐतिहासिक और सामाजिक–सांस्कृतिक आधार। भक्ति आंदोलन का अखिल भारतीय स्वरूप। भक्ति आंदोलन की दार्शनिक पृष्ठभूमि, भक्ति आंदोलन के प्रमुख संप्रदाय एवं आचार्य। भक्ति आंदोलन का क्षेत्रीय वैशिष्ट्य और राजस्थान में भक्ति आंदोलन। भक्ति आंदोलन एवं सामाजिक समरसता। भक्तिकालीन प्रवृत्तियाँ – निर्गुण भक्ति साहित्य (कबीर, रैदास, दादू) सूफी काव्य (कुतुबन, मंझन और जायसी) कृष्ण भक्ति साहित्य (सूरदास, नंददास और मीरां) राम भक्ति साहित्य (तुलसीदास)।

इकाई–8 –रीतिकाल

रीतिकाल साहित्य की सामाजिक–सांस्कृतिक पृष्ठभूमि। रीतिकालीन काव्यशास्त्र। रीतिकालीन साहित्य की स्रोत सामग्री। वर्गीकरण – रीतिबद्ध, रीतिसिद्ध और रीतिमुक्त। प्रमुख कवि और उनकी रचनाएं (केशवदास, मतिराम, भूषण, देव, भिखारीदास, बिहारी, पद्माकर, सेनापति, आलम और घनानंद)।

इकाई–9–आधुनिककालः काव्य

आधुनिककाल की ऐतिहासिक और सामाजिक–सांस्कृतिक पृष्ठभूमि – 1857 का स्वाधीनता संग्राम, हिन्दी नवजागरण, भारतेंदु और उनका मंडल। भारतेंदु युगीन हिन्दी पत्रकारिता। महावीर प्रसाद द्विवेदी और सरस्वती की भूमिका। राष्ट्रीय–सांस्कृतिक काव्यधारा – मैथिलीशरण गुप्त, माखनलाल चतुर्वेदी, रामधारीसिंह दिनकर, श्यामनारायण पांडेय, सुभद्रा कुमारी चौहान। छायावाद– पृष्ठभूमि, प्रवृत्तियां, प्रमुख कवि और रचनाएं – जयशंकर प्रसाद, सूर्यकांत त्रिपाठी 'निराला', सुमित्रानंदन पंत और महादेवी वर्मा। प्रगतिवादी काव्य – केदारनाथ अग्रवाल, नागार्जुन, शमशेर, मुक्तिबोध, प्रयोगवाद और नई कविता– अज्ञेय, धर्मवीर भारती, नरेश मेहता, रघुवीर सहाय, विजयदेव नारायण साही और जगदीश गुप्त।

समकालीन कविता–अशोक वाजपेयी, अरूण कमल, आलोक धन्वा, लीलाधर जगूड़ी, वेणुगोपाल, नन्द चतुर्वेदी और हरीश भादानी।

इकाई–10 –आधुनिककालः गद्य

आधुनिक हिन्दी गद्य का विकास और भारतेंन्दु। हिन्दी गद्य और महावीर प्रसाद द्विवेदी। हिन्दी उपन्यास का विकास और प्रमुख उपन्यासकार। हिन्दी कहानी का विकास और प्रमुख कहानीकार। हिन्दी नाटक और रंगमंच का विकास। हिन्दी निबंध और आलोचना का विकास। हिन्दी की अन्य कथेतर विधाओं का विकास–जीवनी, आत्मकथा, संस्मरण–रेखाचित्र और यात्रा वृत्तांत। हिन्दी की साहित्यिक पत्रकारिताः परम्परा और वैशिष्ट्य।

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination

Subject: History

Max. Marks: 50

UNIT-A: Ancient India

1. Reconstructing Ancient India: Literary and Archaeological Sources.
2. Pre and Proto History of India
   (a) Paleolithic to Neolithic- Chalcolithic Transition – Major Sites, Tools and Culture.
   (b) Saraswati-Sindhu River - Valley Civilization (Harappan Civilization) – Origin and Extent, Major sites and settlement pattern, trade and craft, religious practices, decline and significance of Later Harappan phase.
3. Vedic Age- Vedic Vangmaya, Transformation from Rig Vedic period to the Later Vedic period; Political, Social and Economic life; Religion, ritual and philosophy. Significance of the Vedic Age.
4. State formation and the rise of Mahajanpadas: Republics and Monarchies; Rise of urban centres; Economic growth- craft, guild, money and trade; Emergence of Jainism, Buddhism and Ajivak sects; Rise of Magadha. Invasion of Alexander and its impact on India.
5. Mauryan Empire- Foundation of the Mauryan Empire, political achievements of Chandragupta, Bindusara and Ashoka; Ashoka and his Dhamma, Ashokan Edicts; Polity, Administration and Economy; Art and Architecture.
6. Post Mauryan Period: Shung and Kanvya; Contact with outside world-Indo-Greek, Sakas, Kushanas, Western Kshatrapas; growth of urban centres, trade and economy, Development of religious sects: Vaishnav, Shaiva, Mahayana; Art, Architecture, and Literature.
7. Early State and Society in Deccan and South India: Megalithic period, The Satavahanas, Tamil States of the Sangam Age; Administration, Economy, Sangam literature and culture; Art and Architecture.
8. Imperial Guptas- Political history, polity, society, economy, trade and commerce, literature and art.
9. Economy during Post-Gupta period- trade and commerce, banking & currency.
10. Harshvardhan- conquest, polity, religion, art and literature.
11. Rise of regional states- Chalukyas, Pallavas, Cholas, Rashtrakutas, Pratiharas and Palas.
12. India's contact with outside World- West Asia, Central Asia and East-Asia.
13. Pre-Medieval India (700A.D. to 1200A.D.)- Society and Economy, Feudalism and its impact on socio-political life, Development of regional cultural identities and regional political powers. Development of philosophy and religion during the period.
14. Development of diverse art, literature and culture in ancient India - Architecture, sculpture, music, literature of classical languages, Development of education.

UNIT-B: Medieval Indian History

1. Source of Medieval Indian History: Archaeological and Literary.
2. Foundation and Consolidation of Delhi Sultanate 1206 to 1290 A.D.
3. Territorial expansion of Sultanate during Khalji and Tughlaq period.
4. Rise of Provincial dynasties Vigayanagar, Bahamani and Jaunpur- Polity and Cultural contribution.
5. The Sayyid and the Lodis; the disintegration of Sultanate. Polity of the Sultanate.
6. Society, Culture and Economy during Sultanate period (from 13th century to the close of 15th century)-
   (a) Composition of rural society, ruling classes, town dwellers, women, religious classes, caste and slavery under the Sultanate, Bhakti movement, Sufi movement.
   (b) Persian literature, Literature in the regional languages of North India, Sultanate architecture and provincial variants, Development of music and paintings, Evolution of a Composite Culture, Cultural Synthesis in Medieval India.
   (c) Economy: Agricultural Production, rise of urban economy and non-agricultural production, trade and commerce. Technology and craft during Sultanate period.
7. Mughal Empire, first phase: Babur, Humayun, the Sur Empire: Sher Shah's administration.
8. Portuguese colonial enterprise.
9. Territorial Expansion Akbar, Jahangir, Shahjahan and resistance of Indian powers.
10. Aurangzeb and Decline of Mughal Empire in 18th Century and emerging regional powers.
11. Period of cooperation and conflicts 1556-1707.
12. Policies of the Mughals-Deccan, religious, Rajputs and North-West Frontier policies.
13. Administrative System- Central, Provincial and Revenue administration, Mansabdari and Jagirdari system.
14. Art and Cultures- Architecture, Painting, Music and Literature
15. Economic Life- Agriculture, Industries, Trade and Commerce, Banking and Currency system.
16. Rise of the Marathas- Shivaji- conquests, civil and military administration, nature of Chauth and Sardeshmukhi, concept of Hindu Padpatshahi.
17. Expansion of Maratha power under Peshwas-Maratha Confederacy, civil and military administration under the Peshwas, Third battle of Panipat-1761.
18. Society and Culture in later Medieval India-
    a) Composition of Society, Bhakti movement and Sufi movement.
    b) Literary tradition of Persian, Sanskrit and regional languages. Mughal and Sur Architecture, Regional forms of Architecture. Music and Paintings during Mughal period.
    c) Economy: Agricultural production, rise of urban economy and non-agricultural production, trade and commerce, technology and craft, education, science & technique during the period.

UNIT-C: Philosophy of History and Historiography

(A) Philosophy of History

Analytical and Speculative Philosophy of History.

Analytical Philosophy of History: Nature of historical evidence, inference and fact; Proof and sources of history: Literary- primary, secondary and tertiary and archaeological sources.

Historical Explanation.
General-laws model; historical objectivity; causation.
The idealist tradition:
Dilthey-Croce-Collingwood
Postmodern 'End of History' - the postmodern challenge. Speculative Philosophy of History.
Brief survey of various Speculative philosophers of history - Vico, Herder, Hegel, Marx, Spengler, Toynbee and Fukuyama.
Indian Historians - Barni, Abul Fazal, R.C Majumdar, J.N.Sarkar, D.D.Kosambi and K.M. Ashraf.

(B) Historiography

A brief survey of various traditions of historiography: Indian (Ancient, Medieval and Modern); Chinese (Confucius), Graeco-Roman (Heredotous), Judeo-Christian, Islamic Historian (Ibn Khardum), Ranke and scientific history, Marxist, Colonial, Nationalist, Cambridge, Subaltern and Postmodern.

UNIT-D: Modern India

1. **18th century transition:**
   (a) Decline of Mughal Empire
   (b) Emergence of regional powers
   (c) Advent of European powers
2. Establishment and Expansion of British Rule-Bengal, Avadh, Mysore, Maratha and Sikhs.
3. **Capitalism, Imperialism and Transition to colonial economy:**
   (a) Land revenue settlements in British India; Economic impact of the revenue arrangements; Commercialization of agriculture; decline of cottage industry; Rise of landless agrarian labourers; Impoverishment of the rural society.
   (b) Dislocation of traditional trade and commerce; De-industrialisation; Drain of wealth; British capital investment, European business enterprise and its impact.
4. **Early Structure of the British Raj:**
   The Early administrative structure; From diarchy to direct control; The Regulating Act (1773); The Pitt's India Act (1784); The Charter Act (1833); The Voice of free trade and the changing character of British colonial rule; The English utilitarian and India.
5. **Indian Response to British Rule I: Socio-culture changes**
   (a) The introduction of western education in India; The rise of press, literature and public opinion; The evolution of modern Indian languages and literature; Progress of Science; Christian missionary activities in India.
   (b) Social and Religious Reform Movements: The Brahmo Movement; Devendra Nath Tagore; Iswarchandra Vidyasagar; The Young Bengal Movement; Dayanada Saraswati; Social reform movements of Maharashtra and other parts of India; The contribution of Indian renaissance to the growth of modern India; Sir Saiyad Ahmed Khan and Aligarh Movement. Islamic revivalism- the Feraizi and Wahabi Movements.
   (c) Movements for the upliftment of Dalits and women.
6. **Indian Response to British Rule II: Revolts and uprisings**
   (a) Peasant movement and tribal uprisings in the 18th and 19th centuries including the Rangpur Dhing (1783), the Kol Rebellion (1832), the Mopla Rebellion in

Malabar (1841-1920), the Santal Hul (1855), Indigo Rebellion (1859-60), Deccan Uprising (1875) and the Munda Ulgulan (1899-1900); The Great Revolt of 1857 —Origin, character, casuses of failure, the consequences; The shift in the character of peasant uprisings in the post-1857 period; the peasant movements of the 1920s and 1930s.

7. **Emergence of Indian Nationalism**
   (a) Factors leading to the birth of Indian Nationalism; Politics of Association; The Foundation of the Indian National Congress; objectives of Early Congress; the Moderates and Extremists; The Partition of Bengal (1905); The Swadeshi Movement in Bengal; the economic and political aspects of Swadeshi Movement; The beginning of revolutionary extremism in India.
   (b) Age of Gandhian Politics : Character of Gandhian nationalism; Gandhi's popular appeal; Rowlatt Satyagraha; the Khilafat Movement; the Non-cooperation Movement; National politics from the end of the Non- cooperation movement to the beginning of the Civil Disobedience Movement; the two phases of the Civil Disobedience Movement; Simon Commission; The Nehru Report; the Round Table Conferences; the election of 1937 and the formation of ministries; Cripps Mission; the Quit India Movement; the Wavell Plan; The Cabinet Mission.
   (c) Other strands in the National Movement: Nationalism and the Peasant Movements; Nationalism and Working-class movements; The Revolutionaries: Bengal, the Punjab, Maharashtra, U.P. the Madras Presidency and outside India; Indian National Army (Azad Hind Fauz). The Left; The Left within the Congress: Jawaharlal Nehru, Subhas Chandra Bose, the Congress Socialist Party; the Communist Party of India, other left parties.
8. Constitutional Developments in the Colonial India between 1858 and 1935.
9. Growth of Muslim League and communalism in Indian Politics; Circumstances leading to partition of India.
10. Post-Independence Nation-building- the Linguistic reorganization of the states, Five-year planning, Institutional building during Nehruvian Era, development of science and technology.

UNIT-E: History of Modern World

1. Renaissance- Causes and Impact; Reformation- Causes, growth and significance; Counter Reformation and its impact; geographical discoveries of 15^{th}-16^{th} centuries.
2. Enlightenment and Modern outlook: Major Ideas of Enlightenment and development of scientific attitude, Industrial Revolution- Causes and Impact on Society.
3. Idea of Nation–States– Formation of French and British Nation state, American Revolution- Causes and effects.
4. French Revolution and Napoleonic Era- Causes, important events and impact, contribution of Napoleon Bonaparte.
5. Rise of Nationalism in 19th century and disintegration of empires. Nation building in Germany and Italy.
6. Growth of imperialism and colonialism in the 19^{th} century-Asia and Africa. World War I: Causes and Consequences, The First World War and Paris Peace Conference.
7. Russian Revolution of 1917- Causes and significance.
8. The great depression and its impact, Rise of Fascism and Nazism.
9. Second World Wars- Causes, important events and impact.

10. World organization- League of Nations and U.N.O.
11. Liberation from Colonial Rule: Latin America, Arab World, South Asia and South-East Asia, Chinese Revolution of 1949.
12. Cold War- Emergence of two blocks.
13. Emergence of Third World and Non-alignment.
14. Dismantling Soviet Union and the End of Cold War.

UNIT-F: Political and Cultural History of Rajasthan

1. Sources-Archaeological and Literary sources.
2. Pre and Proto History of Rajasthan- Paleolithic to Chalcolithic Transition – Major Sites-Kalibanga, Ahar, Bagore, Ganeshwar, Balathal, tools and culture.
3. Rajasthan in Early Historical Period – major sites, Republics in Post Mauryan period
4. Gupta and Post Gupta period: Origin of the Rajput – Guhils, Gurjar-Pratihar, Parmar, Rathore, Bhati, Tomar and Chauhan
5. Society, culture and polity in ancient Rajasthan.
6. Medieval Rajasthan- Political powers of Sultanate Age- Chauhan, Guhils, Rathor
7. Rajput resistance- Prithviraj-III, Hamir of Ranthambhor, Rawal Ratan Singh and Kanhaddeo.
8. Mughals and Rajput States-Rajput Resistance - Sanga, Maldeo, Chadrasen and Pratap
9. Rajput Cooperation with the Central Power- Man Singh, Rai Singh, Mirja Raja Jai Singh, Jaswant Singh.
10. Feudal System in Rajasthan.
11. Political and Cultural achievements of rulers in medieval Rajasthan.
12. Rajasthan in 18^{th} century- Instability and origin of new political powers- Jat, Maratha and British.
13. Company Paramountcy and structural changes in the polity of Rajasthan,
14. Role of Rajasthan in the revolt of1857.
15. Awakening in Rajasthan- Social changes and political awakening.
16. Tribal and Peasants movements in Rajasthan.
17. Freedom Struggle in Rajasthan.
18. Economic life of Rajasthan (1818 to 1948 A.D.)- Agriculture, Industry, Trade and Commerce. Economic impact of British Rule- (Land Revenue, Agriculture, Industry, Mines, Salt, Opium, Trade and Commerce, Migration of Marwari Traders, Transport and Communication).
19. Integration of Rajasthan- Its various stages.
20. Development of art-Architecture, Sculpture, Paintings, Music, Dance and Drama from pre - history to modern times.
21. Development of literature throughout the historical period in Rajasthan.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Home Science

Max. Marks: 50

UNIT-I: FOOD SCIENCE AND FOOD SERVICE MANAGEMENT

1. Food science and nutrition.
2. Properties of food – physical and chemical properties
3. Quality evaluation of foods- objectives and subjective.
4. Effects of cooking and processing techniques on nutritional components and other physical parameters, food preservation and application.
5. Food pigments and additives.
6. Food standards, microbiological safety of food, HACCP, food packaging.
7. Perspectives of food service-menu planning, food cost analysis.
8. New product development - Nano technology
9. Food service management of institutional level-hospital, educational institutions, social and special institutions
10. Research methods-fundamental issues, concept, need relevance, scope and ethics in research

UNIT-II: NUTRITION AND DIETETICS

1. Food groups – balanced diet, food pyramid, macro and micro nutrition.
2. Nutrients-role of nutrients in the body, nutrient deficiencies and requirements for Indians.
3. Public health nutrition
4. Nutrition through life span-physiological changes, growth and development from conception to adolescence, nutritional needs and dietary guidelines for adequate nutrition through life cycle, nutrition concerns.
5. Community nutrition, sports nutrition, nutrition in emergencies and disasters.
6. Nutritional assessment-methods and techniques. (Concept of sustainable development SDG's)
7. Nutritional intervention-national nutrition policies and programmes, food and nutrition security.
8. Clinical and therapeutic nutrition.
9. Diet counseling and management.
10. Research methods- research designs, principles and purpose of research

Unit-III: TEXTILES

1. Textile terminologies- fibre, yarn, weave, fabric etc., classification of fibers, yarns and weaves, Identification of fibres and weaves.
2. Manufacturing process of major natural and manmade fibres, properties and their end uses.
3. Different methods of fabric construction-woven, knitted and non-woven fabrics, their properties and end uses.
4. Textiles finishes-classification, processing and purposes of finishes.

5. Dyeing and printing-classification, method of block printing, tie and dye, batik, roller printing, screen printing, discharge, heat transfer printing and digitized printing.
6. Traditional textiles of India-embroidered textiles, printed textiles, woven textiles, dyed textiles of various regions in India. Identification on the basis of fibre content, technique, motif, colour and designed.
7. Textile Testing and quality control-need of testing, sampling method, techniques of testing fibres, yarn, fabrics and garments. Testing of colour-fastness, shrinkage, pilling and GSM of fabrics.
8. Textile and environment-banned dyes, eco-friendly textiles, contamination and effluent treatment, Eco-label and eco marks. (Concept of sustainable development SDG's)
9. Recent developments in textiles and apparels- nano textiles, technical textiles, occupational clothing, zero waste designing, up cycling and recycling.
10. Research methods-types of research, descriptive, survey, historical, qualitative, quantitative, analytical and action research

UNIT-IV: APPAREL DESIGNING

1. Body measurements-procedure, need, figure types and anthropometry.
2. Equipment and tools used for manufacturing garments-advancements and attachments used for sewing machine. Types of machines used and their parts.
3. Elements and principles of design and its application to apparel. Illustrations and parts of garments.
4. Fashion-Terminologies, fashion cycle, fashion theories, fashion adoption, fashion forecasting and factors affecting fashion.
5. Pattern making-drafting, draping and flat pattern making techniques, pattern alteration and dart manipulation techniques.
6. Apparel manufacturing-terminology used, seams, techniques and machines used, process of fabric to apparel manufacture.
7. Apparel Quality Testing-Quality standards and specification, Quality parameters and defects of fabrics and garments.
8. Care and maintenance of clothing-principles of washing, laundry agents, storage techniques case labels and symbols.
9. Selection of clothing for different age groups. Selection of fabrics for different and uses.
10. Research methods-hypothesis testing, types and scope

UNIT-V: RESOURCE MANAGEMENT AND CONSUMER ISSUES

1. Management-concept, approaches, management of time, energy, money, space, motivating factors, motivation theories, decision making.
2. Functions of management-planning, supervision, controlling, organizing, evaluation, family life cycle-stages, availability and use of resources.
3. Resources-classification, characteristics, factors affecting use, resource conservation, time management, work simplification techniques, classes of change, fatigue and its management.
4. Management of natural resources-land, forest, water, air, water harvesting, municipal solid waste management. (Concept of sustainable development, SDGs.)
5. Money management-family income, types, supplementation, budgeting, household accounts, family savings and investment, tax implications.
6. Human resource management- functions, need, human resource development-

challenges, functions, manpower planning, training need assessment, training methodologies, training evaluation.
7. Consumer-definition, role, rights and responsibilities, consumer behavior, consumer problems, education and empowerment.
8. Consumer protection- consumer organization, cooperatives, alternative redressal, standardization, standard marks, quality control, buying aids, consumer legislation.
9. Entrepreneurship-concept, process, barriers, entrepreneurial motivation, challenges, enterprise setting, project planning and appraisal, enterprise management.
10. Research methods-sampling techniques, types of sampling, sampling procedures, probability and non-probability sampling.

UNIT-VI: HOUSING AND INTERIOR DESIGN

1. Design fundamentals – elements of art, principles of design, principles of composition.
2. Colour - dimensions of colour, psychological effects of colour, colour schemes, factors affecting use of colour.
3. Space planning and design-housing need and important, principles of planning spaces, types of house plans, economy in construction, planning for different income groups.
4. Building regulations-norms and standards, zoning, housing for special groups andareas, housing finance.
5. Housing and environment- building materials- impact on environment, green rating systems, energy efficiency in buildings, energy auditing, indices of indoor comfort.
6. Energy as a resource- conventional and non- conventional sources, renewable /non-renewable energy, energy management, national efforts on energy conservation.
7. Product design - design thinking process, diffusion and innovation, designcommunication, ergonomic considerations.
8. Ergonomics - significance, scope, anthropometry, man, machine, environment relationship, factors affecting physiological cost of work, body mechanics, functional design of work place, time and motion study, energy studies.
9. Furniture and furnishing - historical perspectives, architectural styles, contemporary tends, wall finishes, window and window treatments.
10. Research methods-selection and preparation of tools for data collection-questionnaire, interview, observation, measuring scales, ranking and measurement, reliability and validity of tools

UNIT-VII: CHILD/HUMAN DEVELOPMENT

1. Principles of growth and development, care during pregnancy and pre-natal and neonatal development.
2. Theories of human development and behavior.
3. Early childhood care and education – activities to promote holistic development.
4. Influence of family, peers, school, community and culture on personality development.
5. Children and persons with special needs, care and support, special education, prevention of disabilities, rehabilitation.
6. Children at risk-child labour, street children, children of destitute, orphans, child abuse and trafficking.
7. Adolescence and youth: changes, challenges and programs to promote optimal development.
8. Adulthood, characteristics, changing roles and responsibilities in early and

middleadulthood, Late adulthood.
9. Aging-physical and psychological changes and care needs.
10. Research methods-types of variables and their selection.

UNIT-VIII: FAMILY STUDIES

1. Dynamics of marriage and family relationships. Alternative form of families.
2. Family welfare-approaches, programmes and challenges, role in national development.
3. Domestic violence, marital disharmony, conflict, resolution of conflict.
4. Parent education, positive parenting, community education.
5. Family disorganization, single parent families.
6. Family studies-family in crisis, family therapy, initiatives for child development.
7. Human rights, rights of children, rights of women, status of women, gender roles.
8. Guidance and counseling- across life span and for care givers.
9. Health and well-being across life span development. (Concept of sustainable development SDG's)
10. Research methods- data collection and classification, coding, tabulation, inferential and descriptive statistics.

UNIT-IX: COMMUNICATION FOR DEVELOPMENT

1. Basics of communication- nature, characteristics, functions, process, models, elements, principles, barriers, perception, persuasion and empathy, types of communication, levels (settings) of communication transactions, process of listening.
2. Communication systems and communication theories- human interaction theories, mass communication theories, message design theories, communication systems, culture and communication.
3. Concept of development- theories, models, measurement and indicators of development.
4. Concept of development- communication models and approaches, diffusion and innovation, mass media, social marketing.
5. Role of communication in development- need and importance, development journalism, writing for development-print, radio, television and internet.
6. Concerns of development communication- gender, health, environment, sustainability, human rights, population, literacy, rural and tribal development.
7. Advocacy and behavior change communication- concept, theories, models, approaches, application and challenges.
8. Traditional, modern and new media for development - folk forms of songs, art, dance, theatre, puppetry, advertisement, cinema, ICTs for development-community radio, participatory video, social media and mobile phones.
9. Organization/agencies/institutes working for development communication-international/national/state and local.
10. Research methods-analysis of data through parametric and non-parametric tests.

UNIT-X: EXTENSION MANAGEMENT AND COMMUNITY DEVELOPMENT

1. Historical perspectives of extension–genesis of extension education and extension systems in India and other countries, objectives of extension education and extension service, philosophy and principles of extension programme development.
2. Programme management- need assessment, situation analysis, planning, organization, implementation, monitoring and evaluation.
3. Extension methods and materials- interpersonal, small and large group methods,

audiovisual aids-need, importance, planning, classification, preparation and field testing, use and evaluation of audio-visual materials.

4. Curriculum development and planning for extension education and development activities, Bloom's taxonomy of educational objectives and learning.
5. Non-Formal, adult and lifelong education-historical perspectives, concept, theories, approaches, scope, methods and materials used, challenges of implementation and evaluation, issues to be addressed.
6. Training, skill development and capacity building for human resource development-methods of training, entrepreneurship development.
7. Community development- perspectives, approaches, community organization, leadership, support structures for community development, Panchyati raj institutions, NGOs and community-based organizations.
8. People's participation and stakeholders' perspectives, Participatory Learning and Action-methods and techniques.
9. Development programmes in India for urban, rural and tribal population groups-programmes for nutrition, health, education, wage and self-employment, women's development, skill development, sanitation and infrastructure. (Concept of sustainable development SDG's)
10. Research methods-scientific report writing, presentation of data, interpretation and discussion.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Law

Max. Marks: 50

UNIT-I: Constitutional Law:
Preamble, Fundamental Rights and Duties, Directive Principles of State Policy, President and his Powers, The Union & the State Judiciary, Parliamentary Privileges, Legislative Relations between the Union and the States, Services under the Union and States, Emergency Provisions and Amendment of the Constitution.

UNIT-II: Jurisprudence:
Meaning, Nature, Scope, Sources, Schools and Concepts.

UNIT-III: Public International Law:
Nature and Sources of International Law, Relation between International Law and Municipal Law, Subjects of International Law, Acquisition and loss of State Territory, Recognition, Extradition, Asylum, Intervention, Diplomatic Agents, Treaties, United Nations Organization and Its Organs.

UNIT-IV: Human Rights:
Human Rights: Nature, Concept, Origin and Development, Classification, Protection of Human Rights under the Indian Constitution and Other Laws, Enforcement of Human Rights, The Protection of Human Rights Act, 1993.

UNIT-V: Environmental Law:
The Environment (Protection) Act, 1986; The Air (Prevention & Control of Pollution) Act, 1981, The Water (Prevention & Control of Pollution) Act, 1974, The Wild Life Protection Act, 1972.

UNIT-VI: Law of Torts
Torts: Nature, General Exceptions, Vicarious Liability, State Liability, Strict Liability, Negligence, Nuisance, Defamation, Malicious Prosecution and False Imprisonment.

UNIT-VII: Law of Crimes
Crimes: Mens Rea, Actus Reus, Preparation and Attempts, Abetment, General Explanations, General Exceptions, Joint and Constructive Liability, Offences against Public Tranquility, Offences against Human Body, Offences against Women, Offences against Property.
Offences under The Information Technology Act, 2000.

UNIT-VIII: Law of Contract, Transfer of Property and Intellectual Property Rights
Contract: General Principles of Law of Contract (Sections 1 to 75 of Indian Contract Act, 1872).

Transfer of Property: General Principles of Transfer of Property (Sections 1 to 53 A of The Transfer of Property Act, 1882).
Sale, Mortgage, Lease, Exchange and Gifts.
Intellectual Property Rights: Meaning and Scope of Intellectual Property Rights, International and Regional Influence, TRIPS and Intellectual Property Rights in India.

UNIT-IX: Family Law
Hindu Law: Relating to Marriage, Divorce, Adoption, Maintenance, Guardianship, Hindu Joint Family, Coparcenary and Succession.
Muslim Law: Relating to Marriage, Dower, Divorce, Hiba, Pre- emption, Will and Wakf.

UNIT-X: Research Methodology
Research Methods, Formulation of Research Problem, Hypothesis, Data Collection and Report Writing.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Management

Max. Marks: 50

Unit – I

Management – Overview, Definition, Functions, Management Roles, Responsibilities, Fundamentals of Planning – Objectives, Strategies, Policies, Decision making, Fundamentals of Organizing – Nature and Purpose, Direction-concept.

Business Environment – Nature, concept and Significance of Internal environment. Management of organizational resources, Overview of Organizational change. External Environment- Nature & Significance. Factors influencing Business Environment, Changing role of Government, Concept of LPG.

Unit – II

Organizational Behaviour – Significance & Theories. Individual Behaviour – Personality, Perception, Values, Attitude, Learning and Motivation.Group Behaviour – Team Building, Leadership, Group Dynamics Interpersonal Behaviour & Transactional Analysis.
Organizational Culture & Climate.Work Force Diversity & Cross Culture Organizational Behaviour Emotions.

Introduction of Human Resources Management, Nature, Function, Role & Significance
Human Resource Planning, Recruitment- Sources, Procedure. Selection – Steps in selection procedure, requirement vs. Selection. Mobility of personal: - transfer, promotion, demotion, separation, retirement. Job design, Job enrichment, job enlargement, Job description, and Job Specifications. Job Analysis.

Training and Development: - need, significance, Methods, Process of Designing a Training Program. Career development, Performance Appraisal

Unit – III

Introduction to financial Services Marketing: Concept of financial services, GDP, Reforms in financial sector, recent issues and challenges in financial services in India.
Indian financial system: Overview of Indian financial institutions, Types of financial services – fund and fee based. Overview of the different activities performed by a bank. Risk in financial servives and changing perception of intermediaries regarding financial services.

Capital Structure – Theories, Cost of Capital, Sources and Finance Budgeting and Budgetary Control, Types and Process, Zero base Budgeting Leverages – Operating, Financial and Combined Leverages, EBIT-EPS Analysis, Financial Breakeven point & Indifference Level.

Unit – IV

Introduction of Marketing – Marketing Management, Seller's & Buyers' Market, Marketing Mix Customer Satisfaction, Business components, Customer Relationship Management.

(STP) Segmentation, Targeting, Positioning, Marketing environment: Competitive Forces-Oligopoly, Monopoly, Monopolistic and Pure, Internal Environment, Micro Environment and Macro Environment. Product: Definition, Nature of Product, Product Policy & Mix, Product Life cycle

Market Segmentation: Definition, Types of Market Segmentation, Targeting, Positioning.
Price & Place- Pricing decision and strategies, Price and Non-Price Competition, Pricing methods, Place or Channel of Distribution: definition, levels, types, distribution strategies-intensive, selective and exclusive distribution promotion.

Strategic Management: Concept, Process, Decision and Types.
Porter's Approach to industry analysis, Strategy Formulation: SWOT Analysis, Corporate Strategy, Business portfolio Analysis: BCG, GE Business Model

Unit – V
Corporate Social Responsibility: Nature, scope & Importance; Corporate Governance: Concept, Work Ethics and etiquettes. Emerging Areas: Tourism, International Business, HR Accounting, Emotional Intelligence, Total quality Management (TQM), Rural Marketing, Artificial Intelligence (AI) & Big Data, Green Marketing.

Entrepreneurship development – Concept, Types, Theories and Process, Developing Entrepreneurial Competencies.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Mathematics

Max. Marks: 50

1- **Analysis:** Elementary set theory, finite, countable and uncountable sets, Real number system as a complete ordered field, Archimedean property, supremum, infimum. Sequences and series, convergence, limsup, liminf. Bolzano Weierstrass theorem, Heine Borel theorem. Continuity, uniform continuity, differentiability, mean value theorem. Sequences and series of functions, uniform convergence. Riemann sums and Riemann integral, Improper Integrals.

Metric spaces, compactness, connectedness. Normed linear Spaces. Spaces of continuous functions as examples, Banach spaces, Inner Product space, Hilbert space,

2- **Three-Dimensional Coordinate Geometry:** Straight Line, Sphere, Cylinder, Cone and their properties (Rectangular Coordinates only), Central Conicoids and their properties (Referred to principal axes only).

3- **Ordinary Differential Equations:** First order non-linear differential equation, singular solutions and extraneous Loci, Second order linear differential equation with constant and variable coefficients. Simultaneous and Total Differential Equations.

4- **Partial Differential Equations:** Lagrange and Charpit methods for solving first order PDEs, Cauchy problem for first order PDEs. Classification of second order PDEs, General solution of higher order PDEs with constant coefficients, Method of separation of variables for Laplace, Heat and Wave equations.

5- **Mechanics**: Equilibrium of coplanar forces, Moments, Friction, Catenary. Simple harmonic motion, rectilinear motion under variable laws, Motion in resisting medium. D'Alembert's Principle, Moment and Product of inertia, Motion in two-dimensions. Lagrange's equations of Motion, Euler's Equations of Motion, Motion of a top

6- **Abstract Algebra**: Groups, subgroups, normal subgroups, quotient groups, homomorphisms, cyclic groups, permutation groups, Cayley's theorem, class equations, Sylow theorems. Rings, Principal Ideal domain, Euclidean Rings, ideals, prime and maximal ideals, quotient rings, unique factorization domain, principal ideal domain, Euclidean domain. Polynomial rings and irreducibility criteria. Fields, finite fields, field extensions.

7- **Linear Algebra**: Vector spaces, subspaces, linear dependence, basis, dimension, algebra of linear transformations. Algebra of matrices, rank and determinant of matrices, linear equations. Eigenvalues and eigenvectors, Cayley-Hamilton theorem. Matrix representation of linear transformations. Change of basis, canonical forms, diagonal forms, triangular forms, Jordan forms. Inner product spaces, orthonormal

basis. Quadratic forms, reduction and classification of quadratic forms.

8- **Complex Analysis**: Analytic Functions, Cauchy's Theorem, Cauchy's Integral Formulae, Power Series, Laurent's Series, Singularities, Theory of Residues, Complex Transformations, Contour Integration.

9- **Special Functions**: Hypergeometric, Confluent Hypergeometric Functions and their properties. Bessel, Legendre Function/Polynomial of first kind and their properties. Hermite, Laguerre Polynomials and their properties.

10- **Integral Transforms**: Laplace, Inverse Laplace transform and their properties. Fourier transform, Inverse Fourier transform and their properties, Hankel, Mellin transform and their properties.

11- **Differential and Integral Equations**: Classification of Second Order Partial Differential Equations, Green's Functions, Sturm-Liouville Boundary Value Problems, Cauchy's Problems and Characteristics.

Calculus of variation- Variation of a functional, Euler-Lagrange's equation, Necessary and sufficient condition for extrema, Variational method for Boundary Value Problems in ordinary and partial differential equations.

Integral Equations of first and second kind of Fredholm and Volterra type, solution by successive substitutions and successive approximations.

12- **Metric spaces and Topology:** Metric spaces, compactness, Connectedness, Topological spaces, closed sets, closure, Dense set, Neighbourhood. Interior, exterior and boundary points, Accumulation points and derived sets. Bases and sub-bases. First and Second Countable spaces, Separable spaces, Separation axioms, compactness, continuous functions and compact sets, connected spaces.

13- **Numerical Analysis**: Numerical solutions of algebraic equations, Method of iteration and Newton-Raphson method, Rate of convergence, Solution of systems of linear algebraic equations using Gauss elimination and Gauss-Seidel methods, Finite differences, Lagrange, Hermite and spline interpolation, Numerical differentiation and integration, Numerical solutions of ODEs using Picard, Euler, modified Euler and Runge-Kutta methods

14- **Operations Research**: Simplex methods, Duality, Degeneracy, Revised Simplex Method, Integer Programming Problems, Assignment and Transportation Problems, Game Theory– Two-person zero sum game, Inventories- Single item deterministic inventory models with finite replacement, simple probabilistic models.

15- **Mathematical Statistics**: Probability, Conditional Probability, Addition and Multiplication theorems of probability, Baye's Theorem, Expectations, Moment Generating Function, Probability Distributions: Binomial, Poisson, Uniform and Normal, Correlation and Regression, Line of Regressions.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Physical Education

Max. Marks: 50

Unit -I:

- Physical education and adapted physical education, their objectives Philosophies of education as applied to physical education.
- Growth and development of physical education in India: Recreation- its principles, characteristics and importance. Modern trends in recreation. Indoor and outdoor recreational programmes. Recreational programmesfor various categories of people.
- Wellness- its importance, benefits and challenges. Development and maintenance of wellness.
- Teaching Aptitude – nature, objectives, characteristics of teaching, learner characteristics and teaching methods.
- Social aspects of sports- sports as a socializing agency, social values, sports leadership, sports as cultural heritage and social aspects of competition.
- Ancient & Modern Olympics games, Asian and Commonwealth games. Structure and functions of international and national bodies controlling various games and sports. Prominent honors and awards in games and sports.

Unit -II:

- Exercise physiology its scope and importance in the field of physical education and sports.
- Cardio respiratory adaptations to long- and short-term physical activities.
- Muscle- its types, characteristics and functions. Microscopic structure of muscle fibre. Sliding filament theory of muscular contraction. Types of muscle fibres and sports performance. Muscular adaptations to exercise.
- Neuro-muscular junction and transmission of nerve impulse, kinesthetic Sense organs and neural control of motor skills.
- Bio-chemical aspects of exercise - Metabolism of food products. Aerobic and anaerobic systems during rest and exercise. Direct and indirect methods of measuring energy cost of exercise.
- Recovery process - Physiological aspects of fatigue. Restoration of energy stores. Recovery oxygen. Nutritional aspects of performance.
- Environmental influence on human physiology under exercise.
- Women in sports- trainability. Physiological gender differences and special problems of women athletes.
- Aging - Physiological consequences, life style management and healthful aging. Physiological responses of various therapeutic modalities and rehabilitation.
- Physiological aspects of various Ergogenic aids. Massage manipulations and their physiological responses.

Unit- III:

- Kinesiology and biomechanics. Modern trends in biomechanics. Planes and Axes of human body. Joints and their movements.
- Muscle attachments - Origin, insertion, action and leverage of the principalmuscles used in sports.
- Motion: its laws and their application in sports. Projectile and principles of projections
- Mechanical advantage and applications of Levers in sports.Posture and its deformities with their corrective exercises.
- Kinesiological, Muscular and mechanical analyses of fundamental movements: Mechanical analyses of major sports skills

Unit – IV:

- Sports psychology- its importance in the field of physical education and sports. Motivation in sports- types, theories and dynamics.
- Psychological factors affecting sports performance- Emotions, Anxiety aggression, stress, self-confidence, concentration, mental practice and goal setting.
- Personality- Theories of personality, measurement of personality.
- Group dynamics, Group cohesion and leadership in sports.
- Cognitive process- memory and thinking. Principles of Motor skill learning.Transfer of training and its types with its implication in sports.
- Long- and short-term psychological preparation for performance/ competition. Psychological skill training for activation and relaxation Spectators and sports performance.

Unit -V:

- Professional and other courses of physical education in India. Role of Government agencies monitoring professional courses in physical education.
- Qualities, qualifications and responsibilities of physical education personnel at primary, secondary and higher education levels. Scope of physical education personnel in the promotion of health, fitness and wellness.
- Recent Government policies for promoting physical education and sports in India.
- Hierarchy of organizational set-up in physical education at schools, colleges and university level.
- Role of public & private sectors in the promotion of physical education and sports in the country.
- Curriculum development- Concepts and principles of curriculum planning. Subject matter for different levels of education - primary, secondary and higher education.
- Curriculum design and content- importance, selection and classification of subject matter with reference to age, sex and differently abled pupils. Integrated programme for boys and girls.
- Teaching aids - Time-table, Concepts, credit system for various subject courses-theory and practical, Impact of technology in physical education and sports, Curriculum evaluation: Concepts and purpose; procedure and appraisal.

Unit -VI:

- Health- its objectives and spectrum. Health education, its importance and principles. Role of genetics and environment in achieving health. Health-related physical fitness.

- Community health programme- Health appraisal & health instructions. International and national health promoting government & private agencies.
- School Health programme and personal hygiene.
- Communicable diseases: causes, symptoms, prevention through other means and Immunization.
- Psychosomatic disorders/ sedentary life style diseases: causes, symptoms and prevention.
- Obesity related health problems. Body weight control and its significance on health. Role of exercise, dieting and combination of exercise & dieting on weight control.
- First-aid- objectives and principles. First-aid for Shock, poisoning, burns, drowning, bleeding, electric shock and common sports injuries.
- Pollution- Air, water, sound and radiation. Effects of pollution on health, Preventive and safety measures from pollution.
- Nutrition- Balanced diet and its components. Nutritional Deficiencies. Understanding of malnutrition and nutritional supplements.
- Effects of smoking, alcohol, & drugs on health; prevention and rehabilitation.

Unit -VII:

- Sports training- its characteristics and principles. Training load, its features, principles and adaptation process. Means and methods of executing training load. Overload, its Causes, symptoms and remedial measures.
- Strength- its characteristics, types of strength, factors determining strength and strength development.
- Endurance- its characteristics, types of endurance, factors determining endurance and endurance development.
- Speed- its characteristics, types of Speed, factors determining Speed and speed development.
- Flexibility-its characteristics, types of flexibility, factors determining flexibility and flexibility development.
- Coordinative abilities- its characteristics, types of coordinative abilities, factors determining coordinative abilities and development of coordinative abilities.
- Technique and skill- its characteristics and importance. Different stages of technique development and technique training. Tactics and strategy.
- Planning- its importance and principles. Types of planning.
- Periodization- its importance, objectives and types of periodization. Concept of different periods - Preparatory, competition and transitional. Types of Competition: Talent identification- process and procedure.

Unit -VIII:

- Research in physical education- its importance and classification. Ethical issues in research. Methods of research- Descriptive, historical and experimental. Experimentalresearch designs.
- Identification and formulation of research problem. Types of research hypotheses and their formulation. Hypotheses testing.
- Tools of research- Questionnaires, opinionnaires, interviews and observation.
- Sources and steps of literature search- library, research data bases, internet- search engines, online journals. Note taking and critical reading.
- Sampling Techniques- Probability and non-probability.Data, its types and collecting

measures.

- Normal probability curve and grading scales.
- Statistical processes, their importance and uses in research.
  Application of parametric and non-parametric statistical techniques in research.
- Computer applications- statistical packages for data analyses- SPSS, e-mail, search engines and Microsoft office.
- Preparation of research proposal, report, abstract, paper for publication and paper for presentation.

Unit - IX:

- Test, measurement and evaluation -their types and importance in physicaleducation and sports. Principles and processes of evaluation in physical education.
- Criteria of selecting an appropriate test and administration of testing programme.
- Types of tests and construction of standard knowledge and skill tests.
- Tests for fitness- Physical fitness, motor fitness, motor ability and motor educability. Health related fitness tests.
- Test for fitness components- strength, endurance, speed, flexibility and coordinative abilities.
- Sports skill tests- Badminton, Basketball, Football, Hockey, Tennis, and Volleyball.
- Anthropometric Measurements- land marks and measurement of various body segments, height, sitting-height, weight, diameters, circumferences, skinfolds, body mass index, ponderal index.
- Somatotype and Posture evaluating techniques.
- Testing of physiological phenomenons- Blood pressure, breathing frequency vital capacity, heart rate, pulse rate, body temperature and body composition.
- Tests for psychological variables- Anxiety, aggression, team cohesion, achievement motivation, mental-toughness, and self-efficacy.

Unit - X:

- Management- its principles and theories. Scope of management in physical education and sports. Guiding principles for organizing physical education & sports programmes in institutions.
- Personnel management- objectives and principles. Self-appraisal, communication skills and time management. Essential skills of administration.
- Financial management- objectives, purposes, principles and scope. Planning and preparation of budget. Mechanics of purchase and auditing.
- Supervision - objectives, principles and importance of supervision. Techniques of supervision. Duties and responsibilities of a supervisor.
- Facility management- planning, procuring and maintenance of facilities- indoor and outdoor facilities. Planning and management of sports infrastructure. Management of records.
- Role of sports manager- interpersonal, informational and decision making. Managerial skills – technical, human and conceptual. Qualities and qualification of sports manager.
- Event management- its principles, planning, check list, rehearsal, itinerary, execution, reporting and follow-up procedures of an event.
- Public relation- principles of public relations in physical education and sports.Mass

Media- communication and publicity, qualifications of public relation officer.

Unit - XI: Yogic Sciences-

- **Introduction**
  Meaning and definition of Yoga, Astanga Yoga: Yama, Niyama, Aasna, Pranayama, Prathyahara, Dharana, Dhyana, Samadhi, Concept of Yogic Practice; Principales of Breathing- Awareness- Relaxation, Seqence- Counter pose- Time- Place- Clothes-bathing- Emptying the bowels- Stomach-Diet-No Straining- Age- Contra- Indication – Inverted asana – Sunbathing.
- **Aasanas and Pranayam**
  Loosening exercise: Techniques and benefits. Asanas: Types- Techniques and benefits, Surya Namaskar: Methods and benefits. Pranayama: Types- Methods and benefits. Nadis: Meaning, methods and benefits, Chakras: Major Chakars- Benefits of clearing and balancing Chakras.
- **Kriyas**
  Shat Kriyas- Meaning, Techniques and Benefits of Neti – Dhati – Kapalapathi- trataka –Nauli – basti, Bandhas: Meaning, Techniques and Benefits of Jalendra Bandha, Jihva Bandha, Uddiyana bandha, Mula Bandha.
- **Mudras**
  Meaning, Techniques and Benefits of Hasta Mudras, Asamyukta hastam, Samyukta hastam, Mana Mudra, Kaya Mudra, banda Mudra, Adhara Mudra. Meditation: Meaning, techniques and Benefits of Meditation – Passive and active, Saguna Meditation and Nirguna Meditation.
- **Yoga and Sports**
  Yoga Supplemental Exercise – Yoga Compensation Exercise – Yoga Regeneration Exercise- Power Yoga. Role of yoga in Psychological Preparation of athelete: Mental Welbeing, Anxiety, Depression Concentration, Self-Actualization. Effect of Yoga on Physiological System: Circulatory, Skeletal, Digestive, Nervous, Respiratory, Excretory Syste.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Physics

Max. Marks: 50

I: Electromagnetic Theory

Electrostatics: Gauss's Law and its applications; Laplace and Poisson equations, boundary value problems; Magnetostatics: Biot-Savart law, Ampere's theorem, electromagnetic induction; Maxwell's equations in free space and linear isotropic media; boundary conditions on fields at interfaces; Scalar and vector potentials; Gauge invariance; Electromagnetic waves in free space, dielectrics, and conductors; Reflection and refraction, polarization, Fresnel's Law, interference, coherence, and diffraction; Dispersion relations in plasma; Lorentz invariance of Maxwell's equations; Dynamics of charged particles in static and uniform electromagnetic fields; Radiation from moving charges, dipoles and retarded potentials.

II: Electronics

Physics of P-N junction, Diode as a circuit element, clipping and clamping, Rectification, Zener regulated power supply Transistor as a circuit element, CC, CB and CE configuration, Transistor as a switch, Feedback in amplifiers, Oscillators, FET, MOSFET and their applications, Operational amplifiers and its applications, inverting and non-inverting amplifiers, adder, integrator differentiator, wave form generator, multivibrators, comparator, Schmidt trigger. Boolean Algebra, Digital integrated circuits: Logic gates, NAND and NOR gates as building blocks, X-OR gate, Half and Full adder circuits, Karnaugh map, Flip – Flops, counters and registers.

III: Circuit Analysis

Energy sources, Active and Passive elements, Kirchhoff's laws and their applications. Four terminal networks, Z, Y and h parameters, Thevenin's and Norton's Theorem, Maximum Power Transfer Theorem, Superposition Theorem, Reciprocity Theorem, Miller Theorem, T and PI Network, Mean and rms values in AC circuits. LR, CR and LCR circuits- series and parallel resonance. Quality factor. Principal of transformer.

IV: Atomic & Molecular Physics

Quantum states of an electron in an atom; Electron spin; Stern-Gerlach experiment; Spectrum of Hydrogen, helium and alkali atoms; Relativistic corrections for energy levels of hydrogen; Hyperfine structure and isotopic shift; width of spectral lines; LS & JJ coupling; Zeeman, Paschen Back & Stark effect; X-ray spectroscopy; Electron spin resonance, Nuclear magnetic resonance, chemical shift; Rotational, vibrational, electronic, and Raman spectra of diatomic molecules; Frank–Condon principle and selection rules; Spontaneous and stimulated emission, Einstein A & B coefficients; Lasers, optical pumping, population inversion, rate equation.

V: Condensed Matter Physics

Crystal structure, Miller Indices, Bravais lattices; Reciprocal lattice, diffraction and the

structure factor; Bonding of solids; Elastic properties, phonons, lattice specific heat; Free electron theory and electronic specific heat; Einstein and Debye model, Response and relaxation phenomena; Drude model of electrical and thermal conductivity; Boltzman transport equation, Sommerfield theory of electrical conductivity, Mathiessen's rule, Hall effect and thermoelectric power; Origin of Atomic Magnetism, Diamagnetism, paramagnetism, and ferromagnetism; Curie, Langevin and Quantum theories of magnetism, Electron motion in a periodic potential, band theory of metals, Kronig-Penny model, Effective mass, concept of holes, insulators and semiconductors; Superconductivity, type– I and type- II superconductors, BCS theory, DC and AC Josephson Effects, Semiconductor: laws of mass action, Impurity conductivity, Recombination mechanism, Photo conductivity and Photo luminescence.

VI: Mathematical Methods of Physics

Dimensional analysis; Vector algebra and vector calculus; Linear algebra, matrices, Cayley Hamilton theorem, eigen value problems; Linear differential equations; Special functions (Hermite, Bessel, Laguerre and Legendre); Fourier series, Fourier and Laplace transforms; Elements of complex analysis; Elementary ideas about tensors; Introductory group theory; Elements of computational techniques: roots of functions, interpolation, extrapolation, integration by trapezoid and Simpson's rule, solution of first order differential equations using Runge-Kutta method; Finite difference methods; Elementary probability theory, random variables, binomial, Poisson and normal distributions.

VII: Classical Mechanics

Newton's laws; Phase space dynamics, stability analysis; Central-force motion; Kepler's laws, Gravitational field and potentials; Two-body collisions, scattering in laboratory and centre-of-mass frames; Rigid body dynamics, Angular momentum, moment of inertia tensor, non-inertial frames and pseudoforces; Variational principle, Lagrangian and Hamiltonian formalisms and equations of motion; Poisson brackets and canonical transformations; Symmetry, invariance and conservation laws, cyclic coordinates; Periodic motion, small oscillations and normal modes; Damped harmonic oscillations, Driven harmonic oscillations; Waves in media, Superposition of waves; Special theory of relativity, Lorentz transformations, relativistic kinematics and mass– energy equivalence. Kinematics of moving fluids: Bernouli's theorem, Viscosity, Surface tension.

VIII: Quantum Mechanics

Wave-particle duality; Wave functions in coordinate and momentum representations; Commutators and Heisenberg's uncertainty principle; Matrix representation; Dirac's bra and ket notation; Schroedinger equation (time-dependent and time-independent); Eigen value problems such as particle-in-a-box, harmonic oscillator, etc.; Tunneling through a barrier; Motion in a central potential; Orbital angular momentum, Angular momentum algebra, spin; Addition of angular momenta; Hydrogen atom, spin-orbit coupling, fine structure; Time-independent perturbation theory and applications; Variational method; WKB approximation; Time dependent perturbation theory and Fermi's Golden Rule; Selection rules; Semi-classical theory of radiation; Elementary theory of scattering, phase shifts, partial waves, Born approximation; Identical particles, Pauli's exclusion principle, spin-statistics connection; Relativistic quantum mechanics: Klein Gordon and Dirac equations.

IX: Thermodynamic and Statistical Physics

Laws of thermodynamics and their consequences; Thermodynamic potentials, Production of low temperature and its applications; Maxwell relations; Chemical potential, phase equilibria;

Phase space, micro- and macro states; Micro canonical, canonical and grand-canonical ensembles and partition functions; Free Energy and connection with thermodynamic quantities; First and second-order phase transitions; Classical and quantum statistics, ideal Fermi and Bose gases; Principle of detailed balance; Blackbody radiation and Planck's distribution law; Bose-Einstein condensation; Random walk and Brownian motion; Introduction to non-equilibrium processes; Diffusion equation.

X: Nuclear and Particle Physics

Basic nuclear properties: size, shape, charge distribution, spin and parity; Binding energy, semi-empirical mass formula; Liquid drop model; Fission and fusion; Nature of the nuclear force, form of nucleon-nucleon potential; Charge-independence and charge-symmetry of nuclear forces; Isospin; Deuteron problem; Evidence of shell structure, single- particle shell model, its validity and limitations; Rotational spectra; Elementary ideas of alpha, beta and gamma decays and their selection rules; Nuclear reactions, reaction mechanisms, compound nuclei and direct reactions; Classification of fundamental forces; Elementary particles (quarks, baryons, mesons, leptons); Spin and parity assignments, isospin, strangeness; Gell-Mann-Nishijima formula; C, P, and T invariance and applications of symmetry arguments to particle reactions, parity non- conservation in weak interaction; Particle accelerators and detectors.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Political Science

Max. Marks: 50

1. **Indian Political Thought-**
   - Manu & Kautilya. Traditions of Non-Violence in Buddhism & Jainism.
   - Nature of State in Medieval India: Ziauddin Barani, Abul Fazal.
   - Raja Ram Mohan Roy, Dayanand Saraswati, Sir Syed Ahmed Khan, E.V. Ramaswamy Naicker.
   - Dadabhai Naoroji, Aurbindo Ghosh. M. K. Gandhi, Jawaharlal Nehru,
   - Jai Prakash Narain, Ram Manohar Lohiya, B.R. Ambedkar, Kamala Devi Chattopadhyay.

2. **Political Concepts and Ideologies-**
   - Perspective of the State: Ideal, Liberal, Marxist, Post-Colonial and Sub-altern.
   - Sovereignty, Power, Authority, Legitimacy.
   - Rights, Liberty, Equality, Justice, Citizenship.
   - Concept of Democracy: Classical, Liberal & Marxist Theories, Models of Democracy: Representative, Participatory, Deliberative.
   - Political Ideologies: Liberalism, Marxism, Conservatism.

3. **Comparative Politics and Governments-**
   (With Special Reference to Constitutional Frameworks of UK, USA, France, China & Canada)
   - Constitution, Types of Constitutions, Constitutionalism in Theory and Practice.
   - Classification of Government: Democracy and Dictatorship, Unitary and Federal, Parliamentary and Presidential.
   - Organs of Government: Theory of Separation of Powers, Executive, Legislature and Judiciary-their interrelationship in comparative perspective.
   - Theories of Political parties, Types and functions of Political parties, Pressure Groups and Interest Groups.

4. **Indian Constitution and Institutions-**
   - Making of Indian Constitution, Preamble, Fundamental Rights, Directive Principles of State Policy and Fundamental Duties.
   - Constitutional Framework of Indian Federalism, Center-State Relations and institutions of Local Self Governments.
   - Union Executive- P r e s i d e n t , Prime Minister and Council of Ministers. Parliament- Composition, Power and Role.
   - Judiciary- Supreme Court, High Court, Judicial Review, Basic Structure Debate, Judicial Activism and Judicial Reforms.

- State Executive- Governor, Chief Minister and Council of Ministers. State Legislature- Composition, Power and Role.

5. Theories and Concepts of International Relations-

- Theories: Idealist, Realist, Neo- Realism, Systems, Marxist, Functionalist, Constructivism and Dependency.
- Approaches: Decision making, Game, Communication and Bargaining.
- Concepts: National Power and its elements, National Interest and its instruments, Balance of Power, Collective Security.
- Arms Race and Arms Control, Disarmament, Nature, Causes and Types of Wars.
- Emerging Concepts: Multiculturalism and Identity Politics, Regionalism, Green Politics, End of History.

6. Western Political Thought-

- Plato, Aristotle, Cicero, St. Thomas Aquinas
- Machiavelli, Hobbes, Locke, Rousseau.
- Bentham, J.S. Mill, Hegel, T.H. Green.
- Karl Marx, Gramsci, Habermas, Frantz Fanon.
- Hannah Arendt, John Rawls, Robert Nozick, Michael Walzer.

7. Political Theory-

- Nature and Need of Political Theory, its main concerns, decline and resurgence.
- Behaviouralism and Post-Behaviouralism. Fact- Value Dichotomy.
- System's Approach, Structural Functional Approach.
- Group Theory, Elite Theory, Rational Choice Theory.
- Nationalism: European and Non-European. Feminism and Post-Modernism.

8. Comparative Politics Analysis-

- Approaches to the study of Comparative Politics- Institutionalism and New Institutionalism, Political Culture, Political Development, Political Socialization.
- State in comparative perspective: Characteristics and changing nature of state in Capitalist and Socialist economies and advanced industrial and developing societies.
- Governance: Bureaucracy, Public Policy, Good Governance and Democratic Governance, Civil Society.
- Colonialism and Decolonization: Development and Under Development, Liberalization, Privatization and Globalization.
- Revolution and Resistance, Democratization. New Social Movements and Patterns of changes in contemporary societies.

9. Political Processes and Dynamics in India-

- Historical Background of Indian Politics- Making of India as a Nation State, Demands of Autonomy and Separatist movement, Emerging Trend in Centre-State relations, Practices of grass root democracy.
- Socio-Cultural Aspects of Indian Politics- Issue of Caste, Class, Religion, Ethnicity and Gender in Indian Politics, Civil Society, Social and Political Movements.

- National and Regional Political Parties, Ideological and Social bases of Parties, Trends in Electoral behavior, Electoral Reforms, Pressure Groups.
- Commentators of Indian Politics- Granville Austin, Morris Jones, Rudolph and Rudolph, Rajni Kothari, C.P. Bhambri and Amartya Sen.
- Polity of Rajasthan- Formation of Rajasthan; Different Phases of Political competition in Rajasthan, Determinants of Party Politics in Rajasthan, People's Movements in Rajasthan.

10. International Politics and Indian Foreign Policy-

- Rise of Super Powers, Cold War and Bi- Polarity, Non- Alignment Movement, End of Cold War and Remaking of the World order.
- United Nations: Objectives, structure and functioning, revision of the Charter. India's Contribution to United Nations, Regional and Sub-regional Organizations- SAARC, EU, ALBA, ASEAN, African Union, OPEC, BRICS, BIMSTEC, G-20.
- American Hegemony in Contemporary Global Order. Nuclear Proliferation and Disarmament, International Terrorism. Issue of Human Rights in International Politics.
- Political Economy of International Relations: From Brettonwoods to WTO, New International Economic Order, North-South Dialogue, South-South Co-operation, and Environmental issues.
- India’s relations with USA, Russia, China and European Union: India and its Neighbours, ‘Look East’ Policy, India and West Asia, Central Asia, Africa, Latin America. Indian Diaspora, Neo-Liberal Mould of Indian Foreign Policy.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Public Administration

Max. Marks: 50

1. **Basic Premises**: Meaning, Nature, Scope & Significance of Public Administration, Evolution and present status of Discipline, Public Administration as an independent discipline, Public & Private Administration, Paradigm shift from Government to Governance- New Public Administration, New Public Management, Public Choice Theory, Good Governance, Globalization and its impact on Public Administration, Post Modernism.

2. **Theories and Approaches**: **Classical**- Fayol, Gulick, Urwick, Mooney & Riley. **Scientific Management**- F.W. Taylor and Associates. **Bureaucratic Theory**- Max Weber, Criticism and Post-Bureaucratic Organizations. **Human Relation:** - Elton Mayo, M.P. Follet and Chester Barnard. Herbert Simon, Behavioural, Systems, Ecological Approaches, Structural Functional.**Organizational Humanaism:** Chris, Argyris, Rensis Likert.

3. **Principles of Organisation**: Hierarchy, Unity of Command, Span of Control, Coordination, Delegation, Supervision, Authority and Responsibility, Line and Staff and Auxiliary Agencies, Centralization & Decentralization.

4. **Administrative Behaviour**: **Leadership**- Trait, Behavioural and Contingency Theories. **Communication-** Meaning and Types. **Decision-Making-** Contribution of Herbert Simon. **Motivation-** Contribution of Maslow, Herzberg, McGregor, Clayton Alderfer.

5. **Comparative and Development Administration**: Evolution, Meaning, Nature, Scope and Significance of Comparative Public Administration (CPA), Approaches to study of CPA- Ecological and Structural Functional Approach, Contribution of F.W. Riggs, Problems of comparative Research, Features of Administrative systems of UK, USA and France. Concept and Features of Development Administration and Administrative Development, Development and Non-Development Dichotomy, Anti-Development Thesis, Bureaucracy and Development. Role of Non-state actors in Development administration.

6. **Human Resource Management**: Evolution of Civil Services, Bureaucracy and Civil Service, Classification, Recruitment, Training, Promotion, Career-Development, Conduct and Discipline, Political Rights of Civil Servants, Right to Strike.

7. **Financial Administration**: Meaning and Importance of Financial Administration, Concept, Principles, Significance, Role and Types of Budgets, Audit and Accounts-concept and importance.

8. **Public Policy**: Meaning, Significance and Types, Formulation, Implementation and Evaluation, Models of Public Policy-Making.
9. **Administrative Law:** Meaning, sources, significance, Administrative Law and Rule of Law, Delegated Legislation, Administrative Tribunals: - Concepts Emergence and Significance, Administrative Adjudication.

10. **Research Methodology**: Meaning, Nature and Problems of Objectivity in Social Research, Scientific Method, Types of Social Research, Research Design, Hypothesis, Sampling, Sources and Methods of Data Collection.

11. **Evolution and Development of Indian Public Administration**: Kautilya, British Legacy, Constitutional Framework, Parliamentary Democracy and Federalism, Salient Features of Indian Administration.

12. **Union Government and Administration:** President, Prime Minister and Council of Ministers, Central Secretariat, Cabinet Secretariat, Prime Minister's Office, Cabinet Committees, Regulatory Authorities in India with special reference to Insurance Regulatory and Development Authority (IRDA) & Telecom Regularity Authority of India (TRAI), Union-State Relations- Legislative, Administrative and Financial.

13. **State Administration:** Governor, Chief Minister and Council of Minister, Chief Secretary, State Secretariat, Directorates and Field Organizations. Divisional Commissioner, Role of District Collector in Revenue Administration, Law & Order Administration & Development Administration.

14. **Local Self Government- Urban and Rural:** Meaning, Evolution and Development, Features of 73rd and 74th Constitutional Amendment Acts, Organization and Functions of Urban and Rural Local Bodies, Major Challenges and Role in Modern Times.

15. **Personnel Administration in India:** Features and Constitutional Framework of Civil Services, Classification, Recruitment & Recruitment Agencies, Training, Promotion and Capacity Building, Conduct and Discipline, Neutrality and Anonymity. Commitment, Professional Associations and Unionism.

16. **Financial Administration in India:** Preparation, Enactment and Execution of Budget, Parliamentary Committees, Parliamentary Control over Finance, Comptroller and Auditor General of India, Role of Ministry of Finance, Monetary & Fiscal Policies, Public Borrowings and Public Debts.

17. **Economic Policy and Planning:** Salient features, Economic Policy since Independence, Mixed Economy and Industrial Policies, New Economic Policy and Disinvestment Policy, Economic Planning in India, Decentralized Planning, NITI Aayog, National Development Council, Public Sector Enterprises in India, Types, Features and their relative problem areas, Impact of Liberalization, Privatization & Globalization (LPG).

18. **Accountability and Control:** Administrative Accountability and Responsiveness, Legislative, Executive and Judicial Control over Administration, Lokpal and Lokayukta.

19. **Issues in Indian Administration:** Minister-Civil Servant Relationship, Generalists versus Specialists. Ethics, Law and Order Administration- Role of Central and State Agencies in tackling Insurgency, Terrorism and Corruption, Cyber Crimes, Administrative Reforms in India- Issues and Problems, Citizens Charter, Service Delivery, Right to Information, Role of Civil Society.

20. **Social Administration:** Social Welfare and Social Justice, Social Change, Welfare Boards- Centre and State, Major Sectors- Education and Health, Role of Non-Government Organizations and Self-Help Groups in socio-economic development, Reservation Policy.

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कोटा विश्वविद्यालय, कोटा

एम.बी.एस. मार्ग, कोटा (राजस्थान)–३२४००५

पीएच.डी. प्रवेश परीक्षा के लिए पाठ्यक्रम
विषयः संस्कृत

अधिकतम अंकः 50

इकाई–1 – वैदिक साहित्य

1.1 देवता– अग्नि, सवितृ, इन्द्र, रुद्र, बृहस्पति, अश्विनी, वरुण, उषस्, सोम।

1.2 निम्नलिखित सूक्तों का अध्ययनः–

ऋग्वेद – अग्नि (1.1), इन्द्र (2.12), पुरुष (10.90), हिरण्यगर्भ (10.121), नासदीय (10.129), वाक् (10.125), उषस् (3.61)।

शुक्ल यजुर्वेद – शिवसंकल्प (अध्याय 34 मन्त्र 1–6), प्रजापति (अध्याय 23 मन्त्र 1–5)।

अथर्ववेद – राष्ट्राभिवर्द्धनम् (1.29), काल (10.53), पृथिवी (12.1)।

1.3 वैदिक काल के विषय में विभिन्न सिद्धांत– मैक्समूलर, ए.वेबर, जैकोबी, बालगंगाधर तिलक, एम. विन्टरनिट्त्ज, भारतीय परम्परागत विचार।

ऋग्वेद का क्रम

वैदिक संहिताएं तथा उनकी विषय वस्तु, संहिताओं के पाठ–भेद

1.4 ब्राह्मण एवं आरण्यक– सामान्य लक्षण, विशेषताएं प्रतिपाद्य विषय, अग्निहोत्र, अग्निष्टोम यज्ञ, दर्शपौर्णमास यज्ञ एवं पंचमहायज्ञ।

1.5 उपनिषदों की विषयवस्तु तथा प्रमुख अवधारणाओं का अध्ययन। विशेषतः निम्नलिखित उपनिषदों के संदर्भ में– ईश, कठ, तैत्तिरीय।

1.6 वेदांगों का सामान्य परिचय एवं निरुक्त– शिक्षा, कल्प, व्याकरण, निरुक्त, छन्द, ज्योतिष, निरुक्त (अध्याय 1 और 2)

निरुक्त में चार पद– नाम, आख्यात, उपसर्ग, निपात, षड्भावविकार

निरुक्ताध्ययन के उददे्श्य, निम्नलिखित शब्दों की व्युत्पत्तियाँ–

आचार्यः, वीरः, ह्रद, गो, समुद्र, अश्व, अग्नि, वृत्र, आदित्य, उषस्, मेघ, वाक्, उदक, नदी, जातवेदस्, वैश्वानर, निघण्टुः।

इकाई–2 – दर्शन

2.1 ईश्वरकृष्ण की सांख्यकारिका– सत्कार्यवाद, पुरुष–स्वरूप, प्रकृति–स्वरूप, सृष्टि विचार प्रत्ययसर्ग, कैवल्य।

2.2 सदानन्द का वेदान्तसार– अनुबन्धचतुष्टय, अज्ञान, अध्यारोप–अपवाद, लिंगशरीरोत्पत्ति, पंचीकरण, विवर्त, जीवन्मुक्ति।

2.3 केशवमिश्र की तर्कभाषा– पदार्थ, कारण, प्रमाण– प्रत्यक्ष, अनुमान, उपमान, शब्द

2.4 लौगाक्षिभास्कर का अर्थसंग्रह– धर्मलक्षण, शाब्दी भावना, आर्थी भावना, विधि एवं उसके प्रकार।

2.5 पातञ्जल योग सूत्र– चित्तभूमि, चित्तवृत्तियाँ, ईश्वर का स्वरूप, योगांग, समाधि, कैवल्य।

2.6 सर्वदर्शनसंग्रह– जैनमत, बौद्धमत, चार्वाक का सामान्य अध्ययन।

इकाई–3 – व्याकरण तथा भाषा–विज्ञान

3.1 महाभाष्य (पस्पशाह्निक)– शब्द की परिभाषा, शब्द एवं अर्थ का संबंध, व्याकरण के अध्ययन के उद्देश्य, व्याकरण की परिभाषा, साधु शब्द के प्रयोग का परिणाम, व्याकरण की पद्धति।

3.2 लघुसिद्धांत कौमुदी –

समास, तिङन्त (भू एवं एध् धातु मात्र)
कृदन्त
तद्धित–अपत्यार्थक, मत्वर्थीय
स्त्री–प्रत्यय
परिभाषाएं– संहिता, गुण, वृद्धि, प्रातिपदिक, नदी, घि, उपधा, अपृक्त, गति, पद, विभाषा, सवर्ण, टि, प्रगृह्य, सर्वनाम–स्थान, निष्ठा, सार्वधातुक, आर्धधातुक, अङ्.ग, भ, सर्वनाम।

3.3 सिद्धांत कौमुदी– कारक प्रकरण।

3.4 भाषाविज्ञान– भाषा की परिभाषा एवं प्रकार, भाषा तथा वाक् में अंतर, भाषा तथा बोली में अंतर, भाषा का वर्गीकरण (परिवारमूलक एवं आकृतिमूलक)
संस्कृत ध्वनियों के विशेष संदर्भ में मानवीय ध्वनि यंत्र, भाषा की प्रक्रिया एवं ध्वनियों का वर्गीकरण–स्पर्श, संघर्षी, अर्धस्वर एवं स्वर।
ध्वनि संबंधी नियम (ग्रिम, ग्रासमान, वर्नर)
ध्वनि परिवर्तन की दिशाएँ तथा कारण।
वाक्य का लक्षण तथा भेद।
भारोपीय भाषा परिवार का सामान्य एवं संक्षिप्त–परिचय।
वैदिक, लौकिक संस्कृत एवं प्राकृत भाषा में प्रमुख अंतर।

इकाई –4–काव्यशास्त्र

4.1 नाट्यशास्त्र (प्रथम द्वितीय तथा षष्ठ अध्याय)

4.2 दशरूपक (प्रथम तथा तृतीय प्रकाश)

4.3 काव्यप्रकाश, काव्यलक्षण, काव्यप्रयोजन, काव्यहेतु, काव्यभेद, शब्दशक्ति, अभिहितान्वयवाद, अन्विताभिधानवाद, रसस्वरूप एवं रससूत्रविमर्श, रसदोष, काव्यगुण। अलंकार – अनुप्रास, श्लेष, वक्रोक्ति, उपमा, रूपक, उत्प्रेक्षा, समासोक्ति, अपह्नुति, निदर्शना, अर्थान्तरन्यास, दृष्टान्त, विभावना, विशेषोक्ति, संकर, संसृष्टि।

4.4 साहित्यदर्पण :– काव्य की परिभाषा, काव्य की अन्य परिभाषाओं का खण्डन, शब्दशक्ति – संकेतग्रह, अभिधा, लक्षणा, व्यंजना, रस (रस –भेद स्थायीभावों सहित, रूपक के प्रकार, नाटक के लक्षण, महाकाव्य के लक्षण।)

4.5 ध्वन्यालोक (प्रथम उद्योत)

इकाई – 5– संस्कृत साहित्य पुराण एवं अभिलेख

5.1 रामायण – रामायण का क्रम, रामायण में आख्यान, रामायणकालीन समाज, परवर्ती ग्रन्थों के लिए रामायण एक प्रेरणा–स्रोत, रामायण का साहित्यिक महत्त्व।

5.2 महाभारत – महाभारत का क्रम, महाभारत में आख्यान, महाभारतकालीन समाज, परवर्ती ग्रन्थों के लिए महाभारत एक प्रेरणा–स्रोत, महाभारत का साहित्यिक महत्त्व।

5.3 पुराण – पुराण की परिभाषा – महापुराण एवं उपपुराण, पौराणिक सृष्टिविज्ञान, पौराणिक आख्यान।

5.4 कौटिल्यकृत अर्थशास्त्र (प्रथम दस अधिकार)

5.5 स्मृति शास्त्र– मनुस्मृति (प्रथम, द्वितीय तथा सप्तम अध्याय), याज्ञवल्क्यस्मृति (व्यवहाराध्याय मात्र)

5.6 पुरालिपि एवं अभिलेख–

- पुरालिपि– ब्राह्मीलिपि को पढ़ने का इतिहास, भारत में लेखन कला की प्राचीनता, ब्राह्मीलिपि की उत्पत्ति के सिद्धान्त, शिलालेख सम्बन्धी सामग्री के प्रकार, गुप्त एवं अशोक कालीन ब्राह्मीलिपि।
- अशोक के प्रमुख अभिलेख
- राजस्थान के प्रमुख संस्कृत अभिलेख।

5.7 पाण्डुलिपियों का विस्तृत अध्ययन –

- राजस्थान के पाण्डुलिपि ग्रन्थालय।
- सरस्वती भवन, सरस्वती महल, भण्डारकर ओरिएण्टल रिसर्च इंस्टीट्यूट एवं भारत के प्रमुख पाण्डुलिपि ग्रन्थालय आदि।
- शारदा, ग्रन्थ, बंग, मलयालम, नेवारी, ओड़िया आदि लिपियों में भारत में प्राप्त पाण्डुलिपियों का संक्षिप्त परिचय।

इकाई – 6– पद्य, गद्य, नाटक और चम्पू

6.1 निम्नलिखित ग्रन्थों का सामान्य अध्ययन :–

- पद्य : रघुवंशम्, मेघदूतम्, किरातार्जुनीयम्, शिशुपालवधम्, नैषधीयचरितम्, बुद्धचरितम्।
- गद्य : दशकुमारचरितम्, हर्षचरितम्, कादम्बरी।
- नाटक :– स्वप्नवासवदत्तम्, अभिज्ञानशाकुन्तलम्, मृच्छकटिकम्, उत्तररामचरितम्, मुद्राराक्षसम्, वेणीसंहारम्।
- चम्पू काव्य–नलचम्पू।

6.2 निम्नांकित ग्रन्थों का विशिष्ट अध्ययन –

- अभिज्ञानशाकुन्तलम् (चतुर्थ अंक)
- रघुवंशम् (प्रथम तथा त्रयोदश सर्ग)
- किरातार्जुनीयम् (प्रथम सर्ग),
- शिशुपालवधम् (प्रथम सर्ग),
- कुमारसम्भवम् (पंचम सर्ग),
- कादम्बरी – (कथामुख भाग से जाबालि आश्रम पर्यन्त)

इकाई – 7– राजस्थानीय संस्कृत

राजस्थान के संस्कृत विद्वान् एवं कवि तथा उनका शास्त्रीय, साहित्यिक अवदान– पं.मधुसूदन ओझा, भट्ट मथुरानाथ शास्त्री, पं. गिरिधर शर्मा चतुर्वेदी, पं. नवल किशोर कांकर, पं. दुर्गाप्रसाद द्विवेदी, पं. हरिशास्त्री दाधीच, पं. विद्याधर शास्त्री, पं. हरिद्विज, पं. जगदीशचंद्र आचार्य, पं. नित्यानंद शास्त्री, पं. श्रीराम दवे, पं. विश्वेश्वर नाथ रेऊ, पं. गणेश राम शर्मा, पं. गिरिधर व्यास शास्त्री, पं. गिरिधर शर्मा नवरत्न, पं. रामप्रताप शास्त्री, ब्रह्मानन्द शर्मा, हरिराम आचार्य, देवर्षि कलानाथ शास्त्री।

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Sociology

Max. Marks: 50

Unit I: Basic concepts

- Meaning, Definition, Subject-matter, Scope, Nature and Perspectives of Sociology, Sociology and Enlightenment.
- Society, Culture, Community, Norms and Values, Institutions, Associations and Social Structure, Social System.
- Social Groups: Meaning, Types, Status and Role, Norms and Values and Types of membership.
- Social Control: Meaning, Types, Agencies and Theories.
- Socialization: Meaning, Stages and Theories, Sub-concepts of Socialization.
- Status and Role, Meaning, Types, Interplay between Status and Role, Role Conflict, Norms and Values.
- Social Stratification: Meaning, Forms and Theories, Pattern of Inequalities.
- Social Processes- Assimilation, Competition, Conflict and Co-operation, Accommodation, Associate and Dissociative Process.
- Social Change and Social Mobility- Meaning, Patterns, Factors and Theories.
- Social Deviance: Meaning, Types and Theories.
- Social Interaction: Meaning and Types.

Unit II: Western Sociological Thinkers/Thought

- Auguste Comte: Comte's views on Sociological Methods and Sociology. Law of Three Stages, Hierarchy of Sciences. Comte's views on science. Religion of Humanity.
- Hebert Spencer: Classification of Social Systems or Society. Stages of Societal Evolution. Societal Institutions. Organic and Super-Organic Analogy. Principles of Sociology.
- Emile Durkheim: Division of Labour in Society. Social Facts and Rules of Sociological Method. Suicide and its types. The Elementary Forms of Religious Life. Durkheim on Education.
- Max Weber: Weber's Methodology. Study of Religions. Social Stratification and Types of Authority. Bureaucracy. Social Action.
- Karl Marx: Types of Society. Dialectical Materialism. Class Structures. Class Conflict and Social Change. Capital, Labour Theory of Value and Surplus Value.
- Georg Simmel: Problem Areas of Sociology. Group Affiliation. Social Differentiation. Conflict as Social Form. Exchanges as Social Form.
- Vilfredo Pareto: The Rise and Fall of the Elites. Theory of Sentiments. Pareto's views on General Sociology. The Interface between Social, Economic and Political Phenomena. The Social System.

Unit III: Indian Social System: Structure and Change

- Characteristics of Indian Society, Unity, Plurality and Diversity.
- Ancient Indian Social System: Varnashram System and Purushartha, Sanskara, Karma and Education.
- Indian Social Institutions: Family, Marriage and Kinship, Education, Religion, Caste, Economy and Polity.
- Class Structure in India: Agrarian, Industrial.
- Dynamics in Caste and Class in Indian Society: Pattern of Mobility and Inequality.
- Gender Relations and Women Empowerment: Status of Women in India and Women Empowerment; Social Legislations for Women, Domestic Violence, Dowry and Issues of Divorce, Crime against Women.
- Deviance and Crime: Juvenile Delinquency, Cyber Crime, Crime against Children, White Collar Crime.
- Challenges before Indian Society: Poverty, Illiteracy, Unemployment, Regionalism, Communalism, Casteism, Corruption, Terrorism, Socio- Cultural Exclusion.
- Pathologies of Development: Problems of Weaker Sections and Minorities, Problems of SCs, STs, OBCs, Marginalized groups and Children.
- Planned Change in India- Indian Society, Five Year Plans, Panchayati Raj, Welfarist Policies and Sustainable Development.
- Globalization and its Impact on Indian Society.

Unit IV: Social Research

- Social Survey and Social Research: Meaning and Types; Scientific Method.
- Issues of Objectivity/Value Neutrality, Biases, Subjectivity and issues of Ethics in Social Research.
- Model, Paradigm and Theory Building in Sociological Research.
- Research Design: Meaning and Types.
- Hypothesis: Meaning, Nature and Types.
- Sampling: Meaning and Types.
- Techniques of Data Collection: Observation, Interview, Schedule, Questionnaire.
- Methods of Data Collection: Case Study Method, Content Analysis, Cultural study Approach, Discourse Analysis, Ethnography.

Unit V: Perspectives on Indian Society-

- Rural Studies: M.N. Srinivas, S.C. Dube and Andre Beteille.
- Urban Studies: MSA Rao, V.S. D'Souza, Meera Kosambi.
- Tribal Studies: K.S. Singh, S. L. Doshi, Verginius Xaxa.
- Gender Studies: Neera Desai, Sharmila Rege, Beena Agarwal.
- Development of Sociology in India: Indological and Textual Perspective. Structural-Functional Perspective. Marxian Perspective. Civilizational Perspective. Synthesis of Textual and Field Views. Subaltern Perspective.

Unit VI: Sociological Theories-

Meaning, nature and types of Sociological Theory, Structural- Functionalism, Neo-Functionalism, Conflict Theory, Marxian Theory, Neo-Marxism, Phenomenology, Ethnomethodology, Symbolic-Interactionism, Feminism, Structuralism, Structuration, Post- Structuralism, Post-Modernism.

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UNIVERSITY OF KOTA, KOTA

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Syllabus for Ph.D. Entrance Examination
Subject: Urdu

Max. Marks: 50

Unit – I

(a) Various Theories of origin of Urdu Language.
(b) Western Hindi and its dialects namely: Braj Bhasha, Haryanvi, Punjabi and Khari Boli.
(c) Arabic & Persian elements in Urdu Language.

Unit – II

(a) Classical genres of Urdu Poetry: Ghazal, Qasida, Marsiya, Masnavi.
(b) Modern genres of Urdu Poetry and their development: Muarra Nazm, Nasri Nazm and Azad Nazm.
(c) Sonnet, Geet and Doha.

Unit – III

(a) Development of Urdu Language and Literature in Deccan.
(b) Salient features of Deccani Language and Literature.
(c) Role of Quli Qutubshah, Nusrati, Wajhi, Ghawwasi and Wali in the development of Deccani Language and Literature.

Unit – IV:

(a) Delhi School of Poetry and its salient features.
(b) Lucknow School of Poetry and its salient features.
(c) Important Poets of Delhi and Lucknow School:
Ghazal: Meer, Dard, Atish, Nasikh, Ghalib and Momin.
Qasida: Sauda, Zauq and Muneer Shikohabadi.
Marsiya: Meer Anis and Mirza Dabeer.
Masnavi: Meer Hasan, Daya Shankar Naseem and Mirza Shauq.
(d) Development of Jadeed Nazm in Urdu.

Unit – V

(a) Development of Criticism and Tahqiq in Urdu.
(b) Role of Rajasthan's Urdu Poets in freedom movement.
(c) Rhetorics.

Unit– VI

Various kinds of Urdu Prose:

(a) Dastan, Novel and Drama.

(b) Short Story, Essays and Biography.
(c) Khutoot Nigari, Inshaiya Tazkira Nigari and Khaka Nigari.

Unit – VII

Urdu Prose in Northern India:

(a) Fort William College.
(b) Delhi College.
(c) Aligarh Movement.

Unit– VIII

Socio-reformative aspect of Urdu Literature:

(a) 1857, Urdu Literature and Journalism.
(b) Role of Urdu Poetry in Freedom Movements.
(c) Progressive Movement.

Unit– IX

Urdu Prose - Fictions:

(a) **Dastan** (1) **Bagh-o-Bahar** by Meer Amman
(2) **Fasanai Ajaib** by Rajab Ali Baig Suroor

(b) **Novel** – (1) **Tobatunnasooh** by Nazir Ahmed.
(2) **Umravjan** by Mirza Hadi Ruswa
(3) **Godan** by Prem Chand

(c) Short Story

(1) **Wardat** by Prem Chand
(2) **Annadata** by Krishna Chander
(3) **Manto Ke Numainda Afsane** (S.H. Manto) Edited by Athar Parvez.

Unit– X

Urdu Prose - Non-Fictions:

(a) **Nairange-Khayal** by M.H. Azad.
(b) **Intekhab-e-Mehdi Ifadi** published by U.P. Urdu Academy.
(c) **Mazameen-e-Sir Sayed** by Ale Ahmed Suroor.
(d) **Yadgar-e-Ghalib** by Hali.
(e) **Ghubar-e-Khatir** by Abul Kalam Azad.
(f) **Mazameen-e-Rasheed** by Rasheed Ahmed Siddiqui.
(g) **Abe Gum** by Mushtaq Yusufi.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Zoology

Max. Marks: 50

1 **Taxonomy**

(a) Principles, rules and basis of Taxonomy and classification, Genetic and Molecular basis of classification.
(b) Binomial system of nomenclature.
(c) General survey of animal kingdom, classification up to order and inter-relationship of the various phyla.

2 **Diversity of Life Forms**

Structure and functions of the invertebrates (Protozoa to Echinodermata) and their economic importance.

(a) Levels of structural organizations- Unicellular, colonial and multicellular forms, Coelom, segmentation and metamerism.
(b) Locomotory organs and their mechanisms.
(c) Food, feeding and digestion.
(d) Respiration.
(e) Excretory and osmoregulatory organs.
(f) Primitive and advanced nervous systems.
(g) Reproduction: Asexual, sexual and parthenogenesis, Larval forms

3 Structural organization of Chordates

(a) Protochordates, Balanoglossus, Herdmania, Branchiostoma.
(b) Comparative anatomy of integument, skeletal, digestive, respiratory, circulatory, urinogenital & nervous systems of vertebrates.
(c) Adaptation in vertebrates (fishes, amphibians, reptiles, birds and mammals).
(d) Economic importance of chordates.

4 **Developmental Biology**

(a) Structure of Gamets and Gametogenesis.
(b) Fertilization.
(c) Early embryonic developments (Cleavage, Blastulation, Fate maps, Morphogenetic movements, Gastrulation).
(d) Organisers and Organogenesis.
(e) Development of Frog and Chick including Metamorphosis in Frog
(f) Formation of extra embryonic membranes in Chick.
(g) Function and types of placenta in mammals, gestation and Parturition.
(h) Cell differentiation and teratogenesis.
(i) Sex differentiation in humans.

5 Genetics:

(a) Mendelian laws of inheritance, recombination, linkage, linkage maps and crossing over, Multiple alleles, gene interaction.

(b) Mutation – Natural and induced mutations. Chromosome number and forms, structural rearrangements; Polyploidy.
(c) Cytoplasmic inheritance.
(d) Human genetics – normal and abnormal, pedigree analysis, karyotypes, genes and diseases, eugenics.
(e) Sex chromosomes and sex determination.
(f) Quantitative genetics-polygenic inheritance, heritability and its measurements, QTL mapping.
(g) Cloning and Transgenic Varieties.

6 **Evolution**

(a) Origin of life; history of evolutionary thoughts.
(b) Lamarckism and Darwinism. Sources and nature of variations. Natural selection. Hardy-Weinberg law, Causes of speciation.
(c) Concept of species and sub-species including their molecular basis.
(d) Fossils and their studies, outline of Geological eras. Origin and evolution of man.
(e) Principles and theories of continental distribution of animals.
(f) Zoogeographical realms of the world, Endemic species.

7 Ethology

(a) Approaches and methods in study of behaviour.
(b) Proximate and ultimate causation, altruism and evolution-Group selection, kin selection, reciprocal altruism.
(c) Neural basis of learning, memory, cognition, sleep and arousal.
(d) Biological clocks, Development of behaviour, social communication; Social dominance; Use of space and territoriality. Aggressive behaviour.
(e) Parental investment and Reproductive success; Parental care, Mating systems.
(f) Habitat selection and optimality in foraging; Migration, orientation and navigation; Domestication and behavioural changes.

8 Cellular Organization and Molecular Biology

(a) Structure and function of cell and cytoplasmic constituents: Structure of nucleus, mitochondria, Golgi bodies, endoplasmic reticulum, lysosomes and ribosomes. Cell cycle and cell division.
(b) Membrane structure and function: Structure of model membrane, Lipid bilayer and membrane protein, diffusion, osmosis, ion channels, Active transport membrane pumps, mechanism of solving and regulations of intracellular transport, Electrical properties of membrane.
(c) Structure and types of nucleic acids.
(d) DNA replication, repair and recombination (Unit of replication, enzymes involved, replication origin and replication fork, fidelity of replication, extra chromosomal replicons, DNA damage and repair mechanisms, homologous and site-specific recombination).
(e) RNA synthesis and processing (transcription factors and machinery, formation of initiation complex, transcription activator and repressor, RNA polymerases, capping, elongation, and termination, RNA processing, RNA editing, splicing, and polyadenylation, structure and function of different types of RNA, RNA transport).
(f) Protein synthesis and processing (Ribosome, formation of initiation complex,

initiation factors and their regulation, elongation and elongation factors, termination, genetic code, aminoacylation of tRNA, tRNA-identity, aminoacyl tRNA synthetase, and translational proof-reading, translational inhibitors, Posttranslational modification of proteins).

(g) Control of gene expression at transcription and translation level (regulating the expression of phages, viruses, prokaryotic and eukaryotic genes, role of chromatin in gene expression and gene silencing).

9 Cell Communication

(a) Cellular communication**:** Regulation of hematopoiesis, general principles of cell communication, cell adhesion and roles of different adhesion molecules, gap junctions, extracellular matrix, integrins, neurotransmission and its regulation.

(b) Cell signaling**:** Hormones and their receptors, cell surface receptor, signaling through G-protein coupled receptors, signal transduction pathways, second messengers, regulation of signaling pathways, bacterial and plant two-component systems, light signaling in plants, bacterial chemotaxis and quorum sensing.

(c) Cancer**:** Changes in progenitor cells, oncogenes, tumor suppressor genes, cancer and the cell cycle, virus-induced cancer, metastasis, interaction of cancer cells with normal cells, apoptosis, therapeutic interventions of uncontrolled cell growth.

10 Biological Techniques and Biotechnology

(a) Microscopic techniques: Light microscopy, Confocal, Florescence, Phase contrast, Electron and Atomic force microscopes and images processing methods in microscopy.

(b) Histochemical staining of Nucleic acids and Enzymes. Antibody generation, ELISA, RIA, Blotting techniques, Immunocytochemical techniques, FISH, GISH, RT PCR technique.

(c) Radiolabelling Techniques; Types and properties of Radio isotopes, Tracer techniques, Autoradiography and safety guidelines.

(d) Electrophoresis, Centrifugation, Chromatography, Colorimetry Spectrophotometry.

(e) Isolation and purification of RNA, DNA (genomic and plasmid) and proteins. Different separation methods.

(f) Analysis of RNA, DNA and proteins by one- and two-dimensional gel electrophoresis, Isoelectric focusing gels.

(g) Molecular cloning of DNA & RNA fragments in bacterial and eukaryotic systems.

(h) Expression of recombinant proteins using bacterial, animal and plant vectors.

(i) Isolation of specific nucleic acid sequences, Generation of genomic and cDNA libraries.

(j) Plasmid, phage, cosmid, BAC and YAC vectors.

(k) *In vitro* mutagenesis and deletion techniques, gene knock out in bacterial and eukaryotic organisms.

(l) Protein sequencing methods, detection of post translation modification of proteins. DNA sequencing methods, strategies for genome sequencing.

(m) Methods for analysis of gene expression at RNA and protein level, large scale expression, such as micro array-based techniques.

(n) Isolation, separation and analysis of carbohydrate and lipid molecules.

(o) RFLP, RAPD and AFLP techniques.
(p) Statistical applications in Biology – Mean, Median, Mode, Student's 't' test, Chi-square test, Standard Deviation. Correlation and Regression, Variance and Analysis of Variance. Computer applications in biology– fundamentals of computers.

11 Animal Ecology Biodiversity and Wild life Studies

(a) Environment - Biotic and Abiotic Components, Population and its Ecology: Characteristics of population, growth curves, regulation. Life history strategies, concept of meta population, demes and dispersal, interdemic, extinction, age structured populations.
(b) Population, interspecific and intraspecific relationships.
(c) Community ecology and succession, concept of ecosystem.
(d) Biogeochemical cycles. Limiting factors. Concepts of habitat and ecological niche.
(e) Major biomes and their communities and Biogeography.
(f) Pollution - its control and management, Biodegradation and Bioremediation.
(g) Concepts, principles and types of biodiversity, convention on Biodiversity IUCN and Red data book.
(h) Major Biodiversity areas and hotspot in India.
(i) National Parks and wild life sanctuaries in Rajasthan.
(j) Rare, Endangered species or Threatened species and their conservation strategies. Major endangered animals in India.

12 Human Physiology

(a) Chemistry of carbohydrates, proteins, lipids and nucleic acids. Enzymes and hormones. Biological oxidation. Metabolism of carbohydrates, proteins and lipids.
(b) Structure, types and mechanism of muscle contraction. Structure of neuron and transmission of axonic and synaptic nerve impulse.
(c) Functions of sensory organs concerned with vision, sound perception, taste, smell and touch.
(d) Physiology of Gastrointestinal tract: Contractility, Secretion of digestive juices, GI hormones. Mechanism of digestion and absorption.
(e) Physiology of Respiration: Pulmonary ventilation and gaseous exchange.
(f) Structure and Circulation of Blood: Blood structure and functions, blood groups, clotting of blood, elementary idea of immunology. Structure and functions of the heart, Cardiac Cycle, Heart Beat, and its chemical regulation.
(g) Physiology of Excretion: Kidney structure, urine formation, counter current mechanism, regulation of electrolyte and water balance of the body.
(h) Endocrine Physiology: Structure, functions of Pituitary, Thyroid, Parathyroid, Adrenal, Islets of langerhans and pineal gland.
(i) Physiology of Reproduction: Structure and hormones of Ovary & Testis. Hormonal control of gametogenesis and menstrual cycle.

13 Economic Zoology

(a) Disease causing agents including vectors.
(b) Apiculture, Sericulture, vermiculture.
(c) Aquaculture.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Music

Max. Marks: 50

UNIT-I:

1. **General idea of the term of Vocal Music:** Varna, Alankar, Gram, Moorchana, Prabhandh, Dhatu, Sthay, Ragaalap, Rupkaalap, Aalapti, Swasthan-Niyam, Geeti, Kaku, Gamak, Tan, Types of Tan, Mel/Thaat, Raga, Rag Jati, Rag-Lakshan, Vadi-Samvadi-Anuvadi- Vivadi, Aavirbhav– Tirobhav, Parmel Praveshak, Tala, Lay and different Laykari.
2. Kanth bhed (Shabd bhed), Kanth ke Gun-Dosh (Shabd ke Gun-Dosh), Types of Gayak, Gayakon ke Gun-Dosh, Vaggeyakar Lakshan according to Sangeet- Ratnakar. Nayak, Gayak, Kalawant, Atai & Dadhi.
3. Detail study of following- Sangeet, Nad, Shruti, Swar, Saptak & Swarsthan according to Ancient, Medieval and Modern scholars.

UNIT-II:

Vocal Music in Ancient Period-

1. General study of Music during Vedic Period with special reference of Saam- Gayan.
2. Study of Vocal Music in Yagvalkya Shiksha, Manduki Shiksha, Nardiya Shiksha, Ramayan, Mahabharat and Purana.
3. Study of Vocal Music with special reference in Natyashastra.

UNIT-III:

1. **Various Song forms of Karnatic Music**- Kriti, Padam, Jaavli, Tillana, Varnam (Pad varnam & Tan Varnam), Ragam, Tanam, Pallavi, Swarjati etc.
2. Classification of 'That' according to Pt. Bhatkhande and Pt. Vyankatmakhi. Knowledge of Katpayadi system. Comparative study of Swar and Tal of Hindustani and Karnatic Music.
3. General Study of Rabindra Sangeet, Haveli Sangeet and Gurmati Sangeet.

UNIT-IV:

1. Anatomy and Physiology of Human throat and ear, Human Voice and its technique, Voice culture, Voice production and Vrinda-Gaan.
2. Elementary theory of sound. Consonance – Dissonance, Harmonics, Musical intervals, Melody, Harmony. Homophony, Polyphony, Chord, Symphony, Counter points, Authentic and Plegalmodes.
3. Types of Scales- Diatonic, Chromatic and equally tempered Scale. Frequencies of Swara in different Scales. Comparative study of Hindustani and Western Scales. Division of Scales according to Cent and Severt.

UNIT-V:

Evolution and Development of Indian and Western Notation System.

1. 'Rasa-Theory its constituent elements. Exposition and Elaboration of 'Rasa' by various commentators. Rag & Rasa, Rag-Dhyan, Applications of general principles of Aesthetics to Music.
2. Explain the theories of learning, Attention, Interest and Imagination in Indian Classical Music. Musical Aptitude Test. Research Methodology, Research aptitude and various research fields in music.

UNIT-VI:

1. **Contribution of Scholars and their textual tradition**: Bharat, Dattil, Matanga, Narad, Jaydev, Sharangdeva, Sudhakalash, Nanyadev, Parshvdev, Lochan, Maharana Kumbha, Ramamatya, Pundarik-vitthal, Somnath, Damodar, Vyankatmakhi, Ahobal, Hridaya Narain Deva, Sriniwas, Pt. Bhatkhande, Pt. V.D. Paluskar, Pt. Omkarnath Thakur, K.C.D. Brihaspati, Dr. Premlata Sharma.
2. **Contribution of Trinity**- Tyagraja, Muttuswami Dikshitara, Shyama Shastri.
3. **Life sketch & Contribution of Great Vocalist**- Tansen, Amir Khusrou, Bade Gulam Ali khan, Ut. Faiyaz Khan, Pt. Bhimsen Joshi, Vinayak Rao Patwardhan, Abdul Karim Khan, Ut. Alladiya Khan, Malikarjun Mansur, Raja Bhaiya Puch wale, Dagar Bandhu, Keshar Bai Kerkar, Ut. Amir Khan, Ut. Aman Ali Khan, Begum Akhtar, Kumar Gandharv, Kishori Amonkar, Pt. Jasraj, Girija Devi, M.S Subbulakshmi, Lata Mangeshkar.

UNIT-VII:

1. Historical study of Jati-Gayan, Prabandh, Dhruva, Dhrupad, Khayal, Dhamar, Thumri, Tappa, Tarana, Chaturang, Trivat, Dadra, Sadra, Lakshangeet, Sargam Geet, Ragmala, Gazal and Qawwali.
2. Study of the tradition and speciality of different Gharana's of Vocal Music- Dhruvpad, Khayal and Thumri.
3. Detail study of Classification of Raga from Ancient to Modern period. Time Theory (Samay-Siddhant) of Hindustani Music.
4. Knowledge about Ashtang Gayki, Khand-meru or Merukhand Swarprastar and Nasht-Uddisht Kriya.

UNIT-VIII:

1 **Comparative and Critical study of following Ragas-** Bhupali-Deskar, Kamod-Chhayanut, Hamir-Kedar, Shyam kalyan-Shuddh Sarang, Tilak kamod-Des, Bageshari-Rageshri, Bhimpalasi-Patdeep, Aasavri-Jounpuri, Malkouns-Chandrkouns, Bhatiyar-Bhankhar, Darbari-Adana, Miyan ki Todi-Multani, Miyan malhar-Bahar.

2 **Study of Ragas according to Ragang** -

a) Kalyan - Shyam Kalyan, Puriya-Kalyan, Shuddh Kalyan.
b) Bilawal- Alhaiya Bilawal Yamani Bilawal, Devgiri Bilawal, Sarparda Bilawal.
c) Sarang- Madhyamad Sarang, Mian-ki-Sarang, LankDahan Sarang.
d) Bhairav- Ahir Bhairav, Nat Bhairav, Shivmat Bhairav.
e) Kanhada- Nayaki Kanhada, Kaunsi Kanhada, Abhogi Kanhada
f) Khamaj- Jaijaiwanti, Tilang, Jhinjoti.
g) Malhar- Surdasi-Malhar, Ramdasi Malhar, Megh Malhar
h) Bihag- Bihagda, Nat Bihag, Maru Bihag.
i) Kouns- Jogkouns, Madhukouns, Chandrakouns.
j) Todi- Gurjari Todi, Bhupal Todi, Multani.

k) Purvi- Shree, Basant, Paraj.
l) Marwa- Sohni, Puriya, Bhatiyar.

3 **General study of all Ashray Raga. Study of Rag**: Yaman, Durga, Shankra, Nand, Hindol, Hansdhwani, Vrindavni, Sarang, Goud-Sarang, Gorakh-kalyan, Jog, Puriya-Dhanashree, Lalit, Vibhas, Gunkali, Jogiya, Kalingda, Ramkali, Gouri, Hanskinkini, Narayni, Desi, Kalawati, Madhuwanti, Bilaskhani.

UNIT-IX:

1. Margi and Deshi Taal, 'Das Pranas of Taal', Hindustani and Karnatic Taal system.
2. Comparative and critical study of following Taal- Pashto, Teevra, Rudra, Mani, Ektal, Choutal, Sooltal, Shoolfaqta, Adachoutal, Deepchandi, Dhamar, Jhumra, Gaj-jhampa, Punjabi, Jatt-Tal, Shikhar, Matt-Tal, Laxmi, Brahm Tal.
3. Tunning of Tanpura, Tabla, Pakhawaj and their technique. Study of Harmonics (Swayambhu swara) generated by Tanpura. General idea about various 'Baaz' of Tabla.
4. Study of Indian Music Education System from Ancient to Modern Period. Gharana and Institutional education system. Heredity and Environment in Music.

UNIT-X:

1. Major Indian Classical Music Conferences and Awards in India.
2. Contribution of Sangeet Natak Akademi, Doordarshan and All India Radio for the Development of Music. Knowledge of works and financial support schemes provided by the Government of India, Ministry of Culture and various academies for the Music sector.
3. Elementory Knowledge of main Classical Dances of India- Bharatnatyam, Kathak, Kathakali, Manipuri, Oddissi, Satriya, Kuchipudi and Mohiniattam.
4. General Study of the Folk Music of various regions with special reference to Rajasthani folk Music. Influence of Folk Music on Indian Classical Music & vice-versa.

Unit XI: Musical Instruments and its Classification

1. Classification of Indian Musical Instruments in Ancient, Medieval andModern period.
2. Different types of Veenas in ancient period.
3. Tat - Sitar, Sarod, Violin, Dilruba, Israj, Santoor, Tanpura, Surbahhar, Guitar.Ghan - Jaltarang, Ghatam, Morsing, Chipali, Manjeera, Jhanjh, Kartal.
4. Sushir - Flute and its varieties, Shehnai**,** Nagaswaram**,** Harmonium.
5. Avanaddha - Pakhawaj, Tabla, Mridangam, Kanjira, Khol, Chang, Nakkara,Duff, Hudaka, Dholak.
6. Origin, evolution, playing techniques and famous artist of these Instruments.

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UNIVERSITY OF KOTA, KOTA

MBS Road, Near Kabir Circle, Kota (Rajasthan)-324005

Syllabus for Ph.D. Entrance Examination
Subject: Education

Max. Marks: 50

Unit 1: Educational Studies

a) Contribution of Indian Schools of philosophy (Sankhya Yoga, Vedanta, Buddhism, Jainism) with special reference to Vidya, Dayanand Darshan; and Islamic traditions towards educational aims and methods of acquiring valid knowledge.
b) Contribution of Western schools of thoughts (Idealism, Realism, Naturalism, Pragmatism, Marxism, Existentialism) and their contribution to Education with special reference to information, knowledge and wisdom.
c) Approaches to Sociology of Education (symbolic Interaction, Structural Functionalism and Conflict Theory). Concept and types of social Institutions and their functions (family, school and society), Concept of Social Movements, Theories of Social Movements (Relative Deprivation, Resource Mobilization, Political Process Theory and New Social Movement Theory).
d) Socialization and education- education and culture; Contribution of thinkers (Swami Vivekananda, Rabindranath Tagore, Mahatma Gandhi, Aurobindo, J.Krishnamurthy, Paulo Freire, Wollstonecraft, Nel Noddings and Savitribai Phule) to the development of educational thought for social change, National Values as enshrined in the Indian Constitution - Socialism, Secularism, justice, liberty, democracy, equality, freedom with special reference to education.

Unit 2: History, Politics and Economics of Education

a) Committees and Commissions' Contribution to Teacher Education Secondary Education Commission (1953), Kothari Education Commission (1964-66), National Policy of Education (1986,1992), National Commission on Teachers (1999), National Curriculum Framework 2005, National Knowledge Commission (2007), Yashpal Committee Report (2009), National Curriculum Framework for Teacher Education (2009), Justice Verma Committee Report (2012).
b) Relationship between Policies and Education, Linkage between Educational Policy and National Development, Determinants of Educational Policy and Process of Policy formulation: Analysis of the existing situation, generation of policy options, evaluation of policy options, making the policy daecision, planning of policy implementation, policy impact assessment and subsequent policy cycles.
c) Concept of Economics of Education: Cost Benefit Analysis Vs Cost Effective Analysis in Education, Economic returns to Higher Education Signaling Theory Vs Human Capital Theory, Concept of Educational Finance; Educational finance at Micro and Macro Levels, Concept of Budgeting.
d) Relationship Between Politics and Education, Perspectives of Politics of Education Liberal, Conservative and Critical, Approaches to understanding Politics (Behaviouralism, Theory of Systems Analysis and Theory of Rational Choice), Education for Political Development and Political Socialization.

Unit 3: Learner and Learning Process

a) Growth and Development: Concept and principles, Cognitive Processes and stages of Cognitive Development, Personality: Definitions and theories (Freud, Carl Rogers, Gordon All port, MaxWertheimer, Kurt Koffka), Mental health and Mental hygiene.
b) Approaches to Intelligence from Unitary to Multiple: Concepts of Social intelligence, multiple intelligence, emotional intelligence Theories of Intelligence by Sternberg, Gardner, Assessment of Intelligence, Concepts of Problem Solving, Critical thinking, Metacognition andCreativity.
c) Principles and Theories of learning: Behaviouristic, Cognitive and Social theories of learning, Factors affecting social learning, socialcompetence, Concept of social cognition, understanding social relationship and socialization goals.
d) Guidance and Counselling: Nature, Principles and Need, Types of guidance (educational, vocational, personal, health and social & Directive, Non-directive and Eclectic), Approaches to counselling – Cognitive-Behavioural (Albert Ellis – REBT) & Humanistic, Person- centred Counselling (Carl Rogers) - Theories of Counselling (Behaviouristic, Rational, Emotive and Reality).

Unit 4: Teacher Education

a) Meaning, Nature and Scope of Teacher Education; Types of Teacher Education Programs, The Structure of Teacher Education Curriculum and its Vision in Curriculum Documents of NCERT and NCTE at Elementary, Secondary and Higher Secondary Levels, Organization of Components of Pre-service Teacher Education Transactional Approaches (for foundation courses) Expository, Collaborative and Experiential learning.
b) Understanding Knowledge base of Teacher Education from the view point of Schulman, Deng and Luke & Habermas, Meaning of Reflective Teaching and Strategies for Promoting Reflective Teaching, Models of Teacher Education - Behaviouristic, Competency-based and InquiryOriented Teacher Education Models.
c) Concept, Need, Purpose and Scope of In-service Teacher Education, Organization and Modes of In-service Teacher Education, Agencies and Institutions of In-service Teacher Education at District, State and National Levels (SSA, RMSA, SCERT, NCERT, NCTE and UGC), Preliminary Consideration in Planning in-service teacher education programme (Purpose, Duration, Resources and Budget).
d) Concept of Profession and Professionalism, Teaching as a Profession, Professional Ethics of Teachers, Personal and Contextual factors affecting Teacher Development, ICT Integration, Quality Enhancement for Professionalization of Teacher Education, Innovation in Teacher Education.

Unit 5: Curriculum Studies

a) Concept and Principles of Curriculum, Strategies of CurriculumDevelopment, Stages in the Process of Curriculum development, Foundations of Curriculum Planning - Philosophical Bases (National, democratic), Sociological basis (socio cultural reconstruction), Psychological Bases (learner's needs and interests), Bench markingand Role of National level Statutory Bodies - UGC, NCTE and University in Curriculum Development.
b) Models of Curriculum Design: Traditional and Contemporary Models (Academic / Discipline Based Model, Competency Based Model, SocialFunctions / Activities Model [social reconstruction], Individual Needs & Interests Model, Outcome Based Integrative Model, Intervention Model, C I P P Model (Context, Input, Process, Product Model).
c) Instructional System, Instructional Media, Instructional Techniques and Material in enhancing curriculum Transaction, Approaches to Evaluation of Curriculum:

Approaches to Curriculum and Instruction (Academic and Competency Based Approaches), Models of Curriculum Evaluation: Tyler's Model, Stakes' Model, Scriven's Model, Kirkpatrick's Model.

d) Meaning and types of Curriculum change, Factors affecting curriculum change, Approaches to curriculum change, Role of students, teachers and educational administrators in curriculum change and improvement, Scope of curriculum research and Types of Research in Curriculum Studies.

Unit 6: Research in Education

a) Meaning and Scope of Educational Research, Meaning and steps of Scientific Method, Characteristics of Scientific Method (Replicability, Precision, Falsifiability and Parsimony), Types of Scientific Method (Exploratory, Explanatory and Descriptive), Aims of research as a scientific activity: Problem-solving, Theory Building and Prediction, Types of research (Fundamental, Applied and Action), Approaches to educational research (Quantitative and Qualitative), Designs in educational research (Descriptive, Experimental and Historical).

b) Variables: Meaning of Concepts, Constructs and Variables, Types of Variables (Independent, Dependent, Extraneous, Intervening and Moderator), Hypotheses - Concept, Sources, Types (Research, Directional, Non-directional, Null), Formulating Hypothesis, Characteristics of a good hypothesis, Steps of Writing a Research Proposal, Concept of Universe and Sample, Characteristics of a good Sample, Techniques of Sampling (Probability and Non-probability Sampling), Tools of Research - Validity, Reliability and Standardisation of a Tool, Types of Tools (Rating scale, Attitude scale, Questionnaire, Aptitude test and Achievement Test, Inventory), Techniques of Research (Observation, Interview and Projective Techniques).

c) Types of Measurement Scale (Nominal, Ordinal, Interval and Ratio), Quantitative Data Analysis - Descriptive data analysis (Measures of central tendency, variability, fiduciary limits and graphical presentation of data), Testing of Hypothesis (Type I and Type II Errors), Levels of Significance, Power of a statistical test and effect size, Parametric Techniques, Non- Parametric Techniques , Conditions to be satisfied for using parametric techniques, Inferential data analysis, Use and Interpretation of statistical techniques: Correlation, t-test, z-test, ANOVA, chi-square (Equal Probability and Normal Probability Hypothesis). Qualitative Data Analysis - Data Reduction and Classification, Analytical Induction and Constant Comparison, Concept of Triangulation.

d) Qualitative Research Designs: Grounded Theory Designs (Types, characteristics, designs, Steps in conducting a GT research, Strengths and Weakness of GT) - Narrative Research Designs (Meaning and key Characteristics, Steps in conducting NR design), Case Study (Meaning, Characteristics, Components of a CS design, Types of CS design, Steps of conducting a CS research, Strengths and weaknesses), Ethnography (Meaning, Characteristics, Underlying assumptions, Steps of conducting ethnographic research, Writing ethnographic account, Strengths and weaknesses), Mixed Method Designs: Characteristics, Types of MM designs (Triangulation, explanatory and exploratory designs), Steps in conducting a MM designs, Strengths and weakness of MM research.

Unit 7: Pedagogy, Andragogy and Assessment

a) Pedagogy, Pedagogical Analysis - Concept and Stages, Critical Pedagogy- Meaning, Need and its implications in Teacher Education, Organizing Teaching: Memory Level (Herbartian Model), Understanding Level (Morrison teaching Model), Reflective Level (Bigge and Hunt teaching Model), Concept of Andragogy in Education: Meaning, Principles, Competencies of Self-directed Learning, Theory of Andragogy (Malcolm

Knowles), The Dynamic Model of Learner Autonomy.

b) Assessment – Meaning, nature, perspectives (assessment for Learning, assessment of learning and Assessment of Learning) - Types of Assessment (Placement, formative, diagnostic, summative) Relations between objectives and outcomes, Assessment of Cognitive (Anderson and Krathwohl), Affective (Krathwohl) and psychomotor domains (R.H. Dave) of learning.

c) Assessment in Pedagogy of Education: Feedback Devices: Meaning, Types, Criteria, Guidance as a Feedback Devices: Assessment of Portfolios, Reflective Journal, Field Engagement using Rubrics, Competency Based Evaluation, Assessment of Teacher Prepared ICT Resources.

d) Assessment in Andragogy of Education - Interaction Analysis: Flanders' Interaction analysis, Galloway's system of interaction analysis (Recording of Classroom Events, Construction and Interpretation of Interaction Matrix), Criteria for teacher evaluation (Product, Process and Presage criteria, Rubrics for Self and Peer evaluation (Meaning, steps of construction).

Unit 8: Technology in/ for Education

a) Concept of Educational Technology (ET) as a Discipline: (Information Technology, Communication Technology & Information and Communication Technology (ICT) and Instructional Technology, Applications of Educational Technology in formal, non-formal (Open and Distance Learning), informal and inclusive education systems, Overview of Behaviourist, Cognitive and Constructivist Theories and their implications to Instructional Design (Skinner, Piaget, Ausubel, Bruner, Vygotsky), Relationship between Learning Theories and Instructional Strategies (for large and small groups, formal and non-formal groups).

b) Systems Approach to Instructional Design, Models of Development of Instructional Design (ADDIE, ASSURE, Dick and Carey Model Mason's), Gagne's Nine Events of Instruction and Five E's of Constructivism, Nine Elements of Constructivist Instructional Design, Application of Computers in Education: CAI, CAL, CBT, CML, Concept, Process of preparing ODLM, Concept of e learning, Approaches to e-learning (Offline, Online, Synchronous, Asynchronous, Blendedlearning, mobile learning)

c) Emerging Trends in e learning: Social learning (concept , use of web 2.0 tools for learning, social networking sites, blogs, chats, video conferencing, discussion forum), Open Education Resources (Creative Common, Massive Open Online Courses; Concept and application), E Inclusion - Concept of E Inclusion, Application of Assistive technology in E learning , Quality of E Learning – Measuring quality of system: Information, System, Service, User Satisfaction and Net Benefits (D&M IS Success Model, 2003), Ethical Issues for E Learner and E Teacher - Teaching, Learning and Research.

d) Use of ICT in Evaluation, Administration and Research: E portfolios, ICT for Research - Online Repositories and Online Libraries, Online and Offline assessment tools (Online survey tools or test generators) – Concept and Development.

Unit 9: Educational Management, Administration and Leadership

a) Educational Management and Administration – Meaning, Principles, Functions and importance, Institutional building, POSDCORB, CPM, PERT, Management as a system, SWOT analysis, Taylorism, Administration as a process, Administration as a bureaucracy, Human relations approach to Administration, Organisational compliance, Organinsational development, Organisational climate.

b) Leadership in Educational Administration: Meaning and Nature, Approaches to

leadership: Trait, Transformational, Transactional, Valuebased, Cultural, Psychodynamic and Charismatic, Models of Leadership (Blake and Mouton's Managerial Grid, Fiedler's Contingency Model, Tri-dimensional Model, Hersey and Blanchard's Model, Leader-Member Exchange Theory).

c) Concept of Quality and Quality in Education: Indian and International perspective, Evolution of Quality: Inspection, Quality Control, Quality Assurance, Total Quality Management (TQM), Six sigma, Quality Gurus: Walter Shewart, Edward Deming, C.K Pralhad.

d) Change Management: Meaning, Need for Planned change, Three- Step-Model of Change (Unfreezing, Moving, Refreezing), The Japanese Models of Change: Just-in-Time, Poka yoke, Cost of Quality: Appraisal Costs, Failure costs and Preventable costs, Cost Benefit Analysis, Cost Effective Analysis, Indian and International Quality Assurance Agencies: Objectives, Functions, Roles and Initiatives (National Assessment Accreditation Council [NAAC], Performance Indicators, Quality Council of India [QCI] , International Network for Quality Assurance Agencies in Higher Education [INQAAHE].

Unit 10: Inclusive Education

a) Inclusive Education: Concept, Principles, Scope and Target Groups (Diverse learners; Including Marginalized group and Learners with Disabilities), Evolution of the Philosophy of Inclusive Education: Special, Integrated, Inclusive Education, Legal Provisions: Policies and Legislations (National Policy of Education (1986), Programme of Action of Action (1992), Persons with Disabilities Act (1995), National Policy of Disabilities (2006), National Curriculum Framework (2005), Concessionand Facilities to Diverse Learners (Academic and Financial), Rehabilitation Council of India Act (1992), Inclusive Education under Sarva Shiksha Abhiyan (SSA), Features of UNCRPD (United Nations Convention on the Rights of Persons with Disabilities) and its Implication.

b) Concept of Impairment, Disability and Handicap, Classification of Disabilities based on ICF Model, Readiness of School and Models of Inclusion, Prevalence, Types, Characteristics and Educational Needs of Diverse learners' Intellectual, Physical and Multiple Disabilities, Causes and prevention of disabilities, Identification of Diverse Learners forInclusion, Educational Evaluation Methods, Techniques and Tools.

c) Planning and Management of Inclusive Classrooms: Infrastructure, Human Resource and Instructional Practices, Curriculum and Curricular Adaptations for Diverse Learners, Assistive and Adaptive Technology for Diverse learners: Product (Aids and Appliances) and Process (Individualized Education Plan, Remedial Teaching), Parent- Professional Partnership: Role of Parents, Peers, Professionals, Teachers, School.

d) Barriers and Facilitators in Inclusive Education: Attitude, Social and Educational, Current Status and Ethical Issues of inclusive education in India, Research Trends of Inclusive Education in India.

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UNIVERSITY OF KOTA, KOTA

M.B.S. Road, Near Kabir Circle, Kota-324005

Syllabus for Ph.D. Entrance Examination
Subject: Biotechnology

Max. Marks: 50

Unit-I
Biochemistry, Molecular & Cell Biology

Bio molecules, Metabolism, Membrane transport, Structure and regulation of prokaryotes and eukaryotes genes, Transcription, Translation, Post-transcriptional and Translational modifications, Molecular interaction, Molecular markers, Genetic and physical mapping, Gene interaction; Protein-protein interactions, Mass spectro photometry, Signal transduction pathways and their elucidation, Primary and secondary metabolic pathways, Cell & developmental biology. Systems biology frameworks for metabolic engineering, Nano biotechnology.

Unit-II
Microbial & Plant Biotechnology

Microbial taxonomy and diversity (bacteria, fungi, virus); Microbial nutrition, growth, and control; Microbial metabolism; Microbial genetics; Microbial production and purification of fermented food and food products, recombinant proteins, industrial enzymes; Types of bioreactors; Bio-separation techniques; Concept of plant cellular totipotency; Clonal propagation; Organogenesis and somatic embryogenesis, artificial seed, somaclonal variation, embryo culture, *in vitro* fertilization; Plant products of industrial importance; Plant-microbe interactions.

Unit-III

Medical Biotechnology and Immunology

Infectious diseases: Microbial (viral, bacterial, fungal), Cancer biology, Antibody engineering, vaccines, and the associated manufacturing processes, Cell culture technologies, Regenerative medicine & transplantation technology, Animal biotechnology, Animal cell preservation, Stem cells and healthcare, Clinical trials
Immunity, types of Immunity, Immunological disorders: Hypersensitivity, Immunodeficiency diseases; Antigen, Antigen processing and presentation, Antibodies – structure and function, clonal selection, antibody diversity, Antigen antibody interactions, monoclonal antibodies and its clinical applications, Immuno-techniques.

Unit-IV

Environmental Biotechnology and Techniques

Biotransformation and biodegradation; Bioremediation, Bio fertilizers; Biosensors – living biosensors for the management and manipulation of microbial consortia; Role of biotechnology in energy production, Centrifugation Techniques, Chromatographic Techniques, Electrophoretic Techniques: Spectroscopic techniques, Radiolabeling techniques, Microscopic techniques.PCR, Blotting techniques.

Unit-V

Genetic Engineering, Bioinformatics and Genomics

Genetic engineering; Cloning and expression vectors, rDNA technology, Whole genome sequencing & Annotation, Gene transfer technologies, Major bioinformatics resources (NCBI, EBI, PDB); Sequence and structure databases and analysis, Sequence analysis, Phylogeny, Comparative genomics; Molecular modeling and simulations. Overview and functions of a computer system; Basics of database management system- Conceptual Schema, ER diagrams, normalization, and SQL. Genomics and proteomics.

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UNIVERSITY OF KOTA, KOTA

M.B.S. Road, Near Kabir Circle, Kota-324005

Syllabus for Ph.D. Entrance Examination
Subject: Microbiology

Max. Marks: 50

Unit-I

General Microbiology and Physiology

Historical perspectives; Pure culture techniques. Microbial World, Concepts and Scope, Microbial Growth curve, Culture preservation and Maintenance. Microbial nutrition, Major Characteristics used to Classify Micro organisms Viruses, Fungi, Bacteria, Archaea and Molecular taxonomy. Metabolism of Carbohydrate, Alternate pathways of Carbohydrate Metabolism, Gluconeogenesis, Utilization of sugars other than glucose, Lipid metabolism.

Unit-II

Genetics and Molecular Biology

Viral Genetics: Phage Phenotypes, Phenotypic Mixing, Bacterial Genetics: Bacterial Transformation, Bacterial Conjugation, Transduction, Mutation and mutagenesis, Fungal and Algal genetics.

Identification and characterization of DNA, RNA, plasmids. Southern, Northern, Western Blotting, RAPD, RFLP, PCR. Centrifugation Techniques, Chromatographic Techniques, Electrophoretic Techniques: Spectroscopic techniques, Radiolabeling techniques, Microscopic techniques.

Unit-III

Immunology and Medical Microbiology

Immunity and its types, Antigens and Antibodies, Super antigen, clonal selection, antibody diversity, monoclonal antibodies and its clinical applications, Antibody engineering (Construction of monoclonal antibodies), Lymphoma and other diseases by genetically engineered antibodies. Immunological disorders: Hypersensitivity, Immunodeficiency diseases (Primary and Secondary), opportunistic infections, autoimmune diseases. Immunological Techniques.

Milestones in the development of Medical Microbiology, Microbial Infections, Urinary tract infections, Sexually transmissible infection, Oral cavity and respiratory infection, Gastrointestinal infection, Nosocomial infections, Epidemiology, Pathogenesis, Spectrum of disease, Laboratory diagnosis and Prevention. Microbial diseases of Human and Animals. Important diseases of plants; Antibiotics: Types, mode of action and resistance.

Unit-IV

Microbial Ecology, Agriculture and Environment Microbiology

Concepts of Ecology, Microbial Interactions with Plants and Animals, 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, Defense Mechanism of Plant Disease, Plant Diseases and their management, Host pathogen interaction, Mycorrhiza and Lichens, Biogeochemical cycles, Mechanism of Biological Nitrogen Fixation. Biofertilizer, PGPR, Biopesticides. Biodeterioration, Biodegradation and Biomonitoring.

Unit-V

Industrial Microbiology

Concepts and Scope of industrial Microbiology, Fermentation, Fermenters. 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, Food and Dairy Microbiology, Prebiotics and Probiotics. IPR, Patents, Biosafety.

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Syllabus for Ph.D. Entrance Examination
Subject: Wildlife Science

Max. Marks: 50

Biogeography

Biogeography: Applied biogeography, Biogeographic process, Endemism, refugia. Biogeographic classification of India and World. Dispersal: Ecology of dispersal, barriers, Dispersal of flora and fauna on oceanic islands, corridors and their importance; threats and solution.

Biological Diversity and Evolution

Types of Biodiversity, Keystone species, umbrella species, flagship species, indicator species, Indigenous and introduced / exotic species. History of evolutionary thought; natural selection and Species concepts and speciation; phylogenetic, evolutionary and ecological species concepts.

Environmental Ecology

Basic concepts and structure of ecosystems: abiotic and biotic components; climatic and edaphic regimes, energy flow, the establishment of trophic equilibrium; trophic levels, food chains, food webs, productivity, biogeochemical cycles; nutrients and minerals. Ecological niche and succession, Eutrophication and biomagnification.

Landscape Ecology

Fundamentals of landscape ecology; basics of cartography, principles of remote sensing, sensors,image interpretation and digital image processing, global positioning system (GPS), Monitoring and management in ecological restorations. Types of census (Lion, Tiger, birds and aquatic animals).

Habitat Ecology

Introduction to Habitat Ecology - Historical, ecological & evolutionary perspectives. Ecology of major habitats: terrestrial and Wetlands, Habitat diversity, Physical and anthropogenic factors influencing terrestrial habitats. Habitat degradation.
Inventory, evaluation and monitoring of habitat, Monitoring changes in habitat parameters, use and availability of habitat resources.

Population Ecology

Monitoring population and other demographic parameters: Population dynamics: Predator-Prey Dynamics, carrying capacity, Sampling designs for population estimation, and methods:

Watershed Management

Concepts of watershed; role of mini-forests and forest trees in overall resource management, forest hydrology, watershed development in respect of torrent control, river channel stabilization, avalanche and landslide controls, rehabilitation of degraded area.

Taxonomy

Classification of Angiosperms, mammals, birds, reptiles and amphibians (up to order). Status and distribution of mammals, birds and reptiles.

Bio-statistics

Introduction and application in wildlife studies. Types of variables and scales of measurements (nominal, ordinal, interval / ration scales). Data summarization, frequency tables and curves. Data presentation: different types of Graphs and Diagrams. Skewness and Kurtosis. Introduction to statistical distributions. Normal distribution and its salient features. Parametric vs. non parametric statistical techniques. Introduction to hypothesis testing. Level of significance.

Forest Types

Major forest types of Rajasthan (Tropical thorn forest, tropical dry deciduous forest, Bamboo forest, Central India Subtropical forest. Mixed miscellaneous forest.

Animal Behavior

Definition and importance, Patterns of behavior, Physiological, neural and hormonal mechanisms of behavior. Types of migration, factors governing migration. Techniques in animal behavior studies: sampling methods; ad-libitum, focal animal, all occurrences, sequence, one zero & scan sampling.

Physiology and Nutritional Ecology

Feeding ecology of herbivores, carnivores, insectivores and omnivores – food selection, quantity,quality (nutritional value), seasonal variations, relations of food to animal condition.. Importance of minerals to animal health, growth and reproduction. Ecology of seed predation (depredation). Role of animals in pollination.

Wildlife Health

Introduction to disease and epizootiology, Determinants of disease and disease transmission, Disease and population dynamics. Wildlife Forensics- Overview, various forensic protocols for species identification, Molecular markers used in wildlife forensics; Wildlife forensics based on DNA analysis and morphometry; Wildlife crime case studies. Key agencies contributing in wildlife crime enforcement.

Wildlife Conservation and Managment

Ex-situ and In-situ conservation-International efforts and Indian initiatives, protected areas in India: sanctuaries, national parks, biosphere reserves, wetlands, mangroves and coral reefs, conservation of wild biodiversity. Committee Reserves Management of special habitats; riparian zones, grasslands etc. Analysis of wildlife management problems in plantations and exploited forests. Management plan for Protected areas: Forest working plans. Important conservation projects undertaken in India: Project Tiger, Project Elephant, Rhino- reintroduction and Tiger-reintroduction Program.
Captive breeding and Propagation of endangered Species in India and world.

Wildlife in the human Landscape areas;

Park-people interface, conflict and objectives of human dimension in management; Eco-development – What, why, and where; Community participation in conservation and management of wildlife, Traditional conservation practice of flora & fauna conservation development linkage; livelihood analysis; Stakeholders in conservation; Conflict and management;

Natural Resources:

Water and Energy-Introduction to natural resources; Clean and renewable energy mechanism, types of renewable energy sources; Advantages and methods of sustainable usage of renewable energy sources;
Solar energy, wind energy & atomic energy. Impacts of renewable energy on the wild flora and fawn. Traditional and innovative water harvesting practices.

Policies and Acts related to environment

Indian Forest Policy, 1988 of People's involvement, Joint Forest Management, Involvement of women; Forestry policies and issues related to land use, timber and, sustainable forest management; industrialization policies; institutional and structural changes. Forest laws, necessity; general principles, Indian Forest Act 1927; Forest Conservation Act,1980; Wildlife Protection Act 1972 and their amendments; Application of Indian Penal Code to Forestry.

Research Methodology

Quantitative and Qualitative Research Techniques: Survey Techniques and its limitations, Operationalization and Questionnaire Construction, Interview Schedule, Reliability and Validity.
Research Definition ; Importance and Meaning of research , Characteristics of research, Types of Research, Steps in research; Identification, Selection and formulation of research problem ,Research design, Research questions, Formulation of Hypothesis and Review of Literature.
Sampling techniques and types
Research Report: Types of reports , contents, styles of reporting, Steps in drafting reports. Evaluating the final draft. Citation, reference and bibliography.

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