

SYLLABUS FOR THE WRITTEN EXAMINATION

(THE SYLLABUS IS ONLY ILLUSTRATIVE AND NOT EXHAUSTIVE)

Paper – I – General English

1. Essay Writing
2. Report Writing
3. Paragraph Writing
4. Comprehension
5. Note and letter writing

Paper – II – Economic & Social issues (for general RDBS)

1. Nature of Indian Economy - Structural and Institutional features - Economic underdevelopment - Opening up the Indian Economy - Globalisation - Economic Reforms in India - Privatisation.
2. Inflation - Parallel economy - Trends in Inflation & their Impact on National Economy and Individual Income.
3. Objectives of Economy Planning- Evaluation of Indian Planning
4. Poverty Alleviation and Employment Generation in India - Rural and Urban - Measurement of Poverty - Poverty Alleviation Programmes of the Government.
5. Population Trends - Population Growth and Economic Development - Population Policy in India.
6. Agriculture - Characteristics / Status - Technical and Institutional changes in Indian Agriculture - Agricultural performance - Issues in Food Security in India - Non Institutional and Institutional Agencies in rural credit.
7. Industry - Industrial and Labour Policy - Industrial performance - Regional Imbalance in India's Industrial Development - Public Sector Enterprises.
8. Rural Marketing
9. Development of banking and financial institutions in India - Reforms in Banking/ Financial sector.
10. Globalisation of Economy - Role of International Funding Institutions - IMF & World Bank - WTO - Regional Economic Co-operation.
11. Social Structure in India - Multiculturalism - Demographic trends - Urbanisation and Migration - Gender Issues
12. Joint family system - Caste system
13. Communalism and Regionalism
14. Social Infrastructure - Education - Health and Environment
15. Education - Status & System of Education - Socio -Economic Problems associated with Illiteracy - Educational relevance and educational wastage - Educational Policy for India.
16. Social Justice : Problems of scheduled castes and scheduled tribes - socio-economic programmes for scheduled castes and scheduled tribes and other backward classes. Positive Discrimination in favour of the under privileged - Social Movements - Indian Political Systems - Human Development.
17. Current Economic & Social Issues.

Paper –II: For technical discipline

ECONOMICS

(THE SYLLABUS IS ONLY ILLUSTRATIVE AND NOT EXHAUSTIVE)

Section I : Economics (50% weightage)

1. Micro Economics : Theory of Consumer Behaviour, Theory of Firm, Theory of Markets, Theory of Distribution and General Equilibrium
2. Macro Economics : National Income Accounting, Macro Economic Stabilisation Policies, Fiscal and Monetary Policies – Classical, Keynesian and Monetarists, Rational Expectation and Supply Side Economics, Public Finance – Theory of Taxation, Expenditure and Borrowing/Debt.
3. Economics of Development and Planning – Theory of Growth and Development, Regional Imbalances, Planning – Types, Models and Evaluation of Plans, Project Economics, and Economic & Financial sector reforms.
4. International Economics – Theories of Trade, Foreign Exchange Market, Balance of Payments, International Monetary System and WTO.
5. Money & Banking

Section II : Agricultural Economics (30% weightage)

1. Basic Principles of Farm Management
2. Role of Agriculture in Economic Development
3. Factor Market – Land Market, Labour Market, including wages and Capital Market
4. Agricultural Marketing, Agricultural Prices and Terms of Trade
5. Rural Credit Structure – Formal and Informal, Capital Formation in Agriculture
6. Development Programmes including Poverty Alleviation and Rural Employment
7. Agricultural Policy and Planning

Section III : Elementary Statistics for Economists (20% weightage)

1. Measures of central tendency and dispersion – correlation, regression, Time-series analysis and index number
2. Theory of Probability, Sampling theory, Sampling Design and its application
3. Statistical Inference and Estimation, Statistical Tools and their application in Economic Analysis and Input-Output Analysis

FINANCE

(THE SYLLABUS IS ONLY ILLUSTRATIVE, NOT EXHAUSTIVE)

I. FINANCIAL ACCOUNTING

1. Meaning; Objectives; Basic Accounting: Principles, Concepts and Conventions; Limitations of Financial Accounting.
2. Preparation of Financial Statements - Nature of Financial Statements; Capital and Revenue Expenditure; Trading Account; Profit & Loss Appropriation Account and Balance Sheet; Limitation of Financial Statements.
3. Analysis & Interpretation of Financial Statements - Tools of Financials Statements Analysis: Ratio Analysis - different types of ratios; Advantages and Limitation of ratio analysis.
4. Depreciation : Reserves and Provisions - Meaning; Need for providing Depreciation; Methods of providing Depreciation; Provisions and Reserves; Choice of Methods; Objectives of Depreciation Policy.
5. Inventory Valuation - Nature and Importance of Inventory Valuation; Types of Inventory Systems; Methods of Inventory Valuation; Choice of Method.
6. Developments in Accounting - Interim Reporting - Segment Reporting - Value added Statement - Corporate Social Reporting - Human Resource Accounting - Accounting for Intangible Assets - Accounting for Financial Instruments - Environmental Accounting - Inflation Accounting.
7. Statement of Sources and Application of Funds - Meaning of Funds; Distinction between Funds and Cash; Preparation of Fund Flow Statement; Analysis of flow of funds; Utility of Fund Flow Statement; Preparation of Cash Flow Statement ; Utility of Cash Flow Statement.
8. Preparation of Final Accounts of Banking, Insurance and Electricity Companies - Prudential Norms like Capital Adequacy Ratio, Non-Performing Assets - Provisions therefore for Banks and Financial Institutions.
9. Accounting Standards, Accounting Standards Interpretations and Guidance Notes on various accounting aspects issued by the ICAI and their applications.
10. Overview of International Accounting Standards (IAS)/ International Financial Reporting Standards (IFRS), Interpretations by International Financial Reporting Interpretation Committee (IFRIC), Significant difference vis-a-vis Indian Accounting Standards.
11. Consolidated Financial Statements of Group Companies, Concept of a Group, purposes of consolidated financial statements minority interest, Goodwill, Consolidation procedures.
12. Financial Reporting by Mutual Funds, Non-banking finance companies, Merchant bankers, Stock & Commodity market intermediaries.

II. MANAGEMENT ACCOUNTING

1. Meaning and scope of Management Accounting; Financial Accounting Vs. Management Accounting; Role of Management Accounting; Function and Position of Controller.
2. Variable Costing - Fixed Costs and Variable Costs; Distinctions between variable costing and absorption costing; application of Variable Costing as a technique; Differential costing and decision making.
3. Management Control System - distinction between strategic planning, Operational Control and Management Control System; Responsibility Accounting; Transfer Pricing; Tools of Control - Residual Income and Return on Investment Performance Budgeting; Economic Value Added.
4. Appraisal of Firms - Objectives; Uniform Costing: Ratio Based Comparison; Credit Rating; Risk Management.
5. Appraisal of Projects - Methods of appraisal - preparation of project report - Economic, Technical, Financial feasibility - Techniques for evaluation of projects like Pay Back Method, Discounted Cash Flow, Net Present Value, Internal Rate of Return, etc. - Sensitivity analysis in capital budgeting - Impact of inflation in capital budgeting - Risk analysis in capital budgeting - Social cost benefit analysis - Simulation and decision tree analysis.

III. FINANCIAL MANAGEMENT

- i. Marginal Costing - Cost-Volume-Profit Analysis, Profit Planning; Break-even analysis - Break even Point and Break-even chart.
- ii. Methods of costing - Job costing - Contract costing - Batch costing - Process costing - Unit costing - Operation costing and Operating costing.
- iii. Cost of Capital - cost of different sources of finance - Weighted average cost of capital - Marginal cost of capital - Concepts of operating and financial leverage - Capital structure patterns - Designing optimum capital structure - Different sources of finance - Long, medium and short term finance.
- iv. Money market and their operations.
- v. Business valuations - Mergers, Acquisitions and Corporate restructuring.
- vi. Budgetary Control - Meaning and Objectives; Operation of Budgeting System; Types of Budgets; Preparation of Sales Budget, Production Budget, Cash Budget, Master Budget; Flexible Budgeting; Zero Budgeting.
- vii. Standard Costing - Meaning of Standard Costing; distinction between Standard Costing and Budgeting Control; Advantages of Standard Costing; Setting up of Standards; Variance Analysis - Material, Labour and Overheads.
- viii. Working Capital Management - Factors affecting Working Capital requirements; Assessment of Working Capital; Inventory Management; Receivable Management; Cash Management; Method of Financing Working Capital; different forms of bank credit; Working Capital and Banking Policy.
- ix. Asset Liability Management - Components of assets and liabilities in Bank's Balance Sheet and their management, liquidity management - Interest Rate Risk Management, Management of Exchange Risk - RBI guidelines.

- x. Risk Management - Risk and Banking business, Risk Regulations in Banking Industry, Market Risk, Credit Risk, Operational Risk.
- xi. (a) Indian Capital Market : Role of various primary and secondary market institutions.
(b) Capital Market Instruments : Financial derivatives - Stock futures, Stock options, Index futures, Index options, Interest rate futures.
Option valuation techniques : Binomial model, Black Scholes Option Pricing Model, Greeks - Delta, Gamma, Theta, Rho and Vega.
Pricing of Futures - Cost of carry model.
OTC derivatives - Swaps, Swaptions, Forward Rate Agreements (FRAs), Caps, Floors and Collors.
- xii. Security and Bond Analysis
Fundamental Analysis - Economic analysis, Industry analysis and Company analysis. Bond valuation, Price Yield relationship, Bond Price forecasting - application of duration and convexity, Yield curve strategies.
Technical Analysis - Market cycle model and basic trend identification, different types of charting, support and resistance, price patterns, moving averages, Bollinger Bands, momentum analysis.
- xiii. Portfolio Theory and Asset Pricing
Efficient Market Theory - Random Walk Theory; Markowitz model of risk return optimization
Capital Asset Pricing Model (CAPM)
Arbitrage Pricing Theory (APT)
Sharpe Index Model
Portfolio Management - Formulation, Monitoring and Evaluation
Equity Style Management
Principles and Management of Hedge Funds
International Portfolio Management
- xiv. Financial Services in India : Investment Banking, Retail Banking, Mutual Funds, Money Market Operations.

IV. AUDITING

- i. Auditing - Nature and scope - Audit process - Objectives of audit - basic principles governing an audit - Types of audit - Relationship of auditing with other subjects - Internal Audit and External Audit - Audit & Inspection.
- ii. Planning and Programming of Audit - Division of work, supervision and review of audit notes and working papers; planning the flow of audit work.
- iii. Conduct of Audit - Audit Programme; Audit Note Book; Working Papers and Audit Files.
- iv. Internal Control - Internal Control, Internal Check, Internal Audit and Concurrent Audit.
- v. Vouching - General consideration vouching of payments and receipts; Vouching of payment into and out of Bank; Vouching of Goods on consignment, Sale on approval basis, Empties, Sale under hire-purchase system and various types of allowances to customers.
- vi. Verification - Meaning; General Principles; Verification of Cash in hand and Cash at Ban; Verification and Valuation of Investments and Inventories; Loans

- Bills Receivables; Free hold and Leasehold property; Debtors, Plant and Machinery; Verification of different liabilities.
- vii. Audit of Limited Company - Statutory requirements under the Companies Act, 1956, - Audit of branches - Joint Audit - Concepts of true and fair and materiality and audit risk in the context of audit of companies.
 - viii. Dividends and divisible profits - financial, legal and policy considerations with special reference to depreciation - Audit reports - Qualification and Notes on accounts - Special report on offer documents.
 - ix. Audit under Income-Tax and Indirect Taxes - Special features of audit of banks, insurance companies, Co-operative Societies and Non-banking Financial Companies - Audit of Incomplete Records - Special audit assignments like audit of bank borrowers - Inspection of special entities like banks, financial institutions, etc. - Investigation including due diligence.
 - x. Concept of Cost Audit, Management Audit, Operational Audit, Environmental Audit and Energy Audit.
 - xi. Audit under computerised environments - Computer Auditing - Specific problems of EDP audit - need for review of internal control especially procedure controls and facility controls - techniques of audit of EDP output - use of computer for internal and management audit purpose - test packs - computerised audit programme - involvement of the auditor at the time of setting up the computer system.

AGRICULTURAL ENGINEERING

(THE SYLLABUS IS ONLY ILLUSTRATIVE AND NOT EXHAUSTIVE)

Engineering in agriculture and rural life. Soil and water resources of India, present status of utilization and scope. Hydrological process; evapotranspiration, infiltration and run off; soil erosion and soil loss estimation; design and construction of mechanical soil conservation structures, farmponds and reservoirs. Hydraulic of open channel, design of irrigation and drainage channels. Design, work estimation and equipment for land development. Design and construction of dug and tube-wells; water-lifts and pumps design, construction, operation and maintenance; conveyance and distribution of water, measurement of water flow; water application methods. Drainage theory, drainage characteristics of different types of soils, design and installation of surface and sub-surface drains, drainage in respect to salt affected soils. Legal aspects relating to land water. .

Agricultural mechanization; merits and demerits of traditional equipment; sources of farm power; commercial and non-commercial, renewable and non renewable sources of energy, scope and economics. Thermodynamic principles, design features, construction details and performance characteristics of engines, power tillers, tractors and bulldozers. Functional requirements, principles of working, construction, operation, repair, maintenance and economics of seedbed preparation, planting, transplanting, sowing, fertilizer application, inter-culture, spraying and dusting, harvesting, threshing and transport machinery; package of implements for major crops like rice, wheat, sorghum, maize, gram, pigeon pea, groundnut, rapeseed/mustard, potato, sugarcane, cotton, etc. Farm machinery manufacture, testing, test codes and standards in India.

Agricultural produce management, marketing and profit sharing, post harvest engineering and technology in India. Properties of agricultural produces and by-products. Principles, constructional details, operation and management of cleaners, graders, dryers, burr mill, hammer mill, roller mills, cane crushers, expellers, hullers, pearlers, modern rice mills, dalmill, solvent extraction. Thermal processing, canning preservation, pasteurisers, can washers. Farm structures, farm stead planning; layout of farm buildings, rural roads, farm fences, cost estimation.

Psychrometry, heat and vapour flow in farm building; calculation of heating and cooling loads, heat transfer and insulation. Principles of refrigeration and air-conditioning, storage engineering, functional, structural and thermal design of grain bins, silos, godown and cold storage. Storage engineering, structures and equipment for live stock and rural home waste handling and management, rural water supply and sanitation. Rural electrification, illumination, electrical safety.

PLANTATION & HORTICULTURE

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General :

Prospects and problems of Horticulture Development in the country covering fruits, vegetables, plantation crops, spices, floriculture, medicinal and aromatic crops; XI five year plan for horticulture development; National Horticulture Mission; National Programme on Organic Farming ; Institutional set up for Policy Planning, Research, Extension & Marketing for horticulture development like National Horticulture Board (NHB), National Medicinal Plant Board (NMPB), Agricultural and Processed Food Products Export Development Authority (APEDA), major institutions for horticulture research & extension, Commodity Boards like Tea Board, Coffee Board, Rubber Board, Spices Board & Coconut Development Board. Status of Exports of Horticulture commodities, problems and constraints and potentialities.

I. Fruits, Plantation Crops & Spices :

Agroclimatic distribution of different crops. Methods of propagation; mist propagation and other advances made in clonal propagation and micro- propagation (Tissue culture); Rootstocks for different crops and rootstock scion incompatibility. Use of plant growth regulators, retardants, inhibitors and their role in setting, growth, development and maturity of fruits. Nursery and Orchard management practices; water management, drip irrigation; training and pruning, pollination, fruit thinning and fruit drop; dormancy of seeds and buds, chilling requirement; intercrops and cropping system. High density orcharding.

Cultivation of important fruits such as apple, mango, citrus, grape, guava, pineapple, banana, litchi, ber, pomegranate and papaya and plantation crops like tea, coffee, rubber, coconut, arecanut, cashewnut and oil palm, spices like pepper, cardamom, ginger, turmeric, cinnamon, clove and seed spices; new selections, varieties or hybrids developed, major production problems faced, improved production technology evolved through research in these crops.

Review of the present status of chronic production problems like mango malformation, alternate bearing, spongy tissue in mango, citrus decline, guava wilt, coconut root wilt, quick wilt of pepper, 'Katte' disease of cardamom etc. and success achieved through research.

II. Vegetable Crops :

Climatic requirement. Nursery management, major cultivation problems, mulching. Weed control, harvesting, transport and marketing. Vegetable seed production, seed viability and purity. Cultivation and breeding for improvement of important vegetable crops like cole crops, potato and other tuber crops, solanaceous

vegetable, root crops, leafy vegetables, cucurbits, beans peas, onion. Production of F1 hybrids, Cultivation of exotic vegetable crops; protected cultivation of vegetables.

III. Floriculture :

Cultivation, handling and marketing of orchids, roses, jasmine, carnation, gerbera, anthurium, gladiolus, chrysanthemum and tuberose. Protected cultivation of flowers.

IV. Food technology and Post Harvest Management of horticultural crops :

Importance of post harvest technology for fruit and vegetable preservation; causes of spoilage of fresh and processed products. Principles and methods of preservation like canning, dehydration, use of preservatives, freezing, fermentation, freeze drying. Physiology of storage, problems and importance, different storage methods and their principles. Importance of quality control and food safety.

V. Others :

Dryland Horticulture ; Sericulture (Mulberry, Tasar, Eri & Muga) - cultivation and rearing; Edible Mushroom (Button Mushroom, Oyster and Paddy straw) cultivation; Importance of Bee Keeping in Horticulture; Organic farming of horticulture crops ; precision farming ; impact of climate change in horticulture.

ANIMAL HUSBANDRY

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Forage Production

Different types of fodder crops i.e. Leguminous and non leguminous, package of practices for different fodder crops, Grasses and grasslands, silvipastoral systems, conservation of fodder.

Animal Genetics and Breeding

Different livestock breeds and their characteristics, Systems of breeding , methods of selection

Physiology of Reproduction and Lactation

Male and female reproductive organs and their functions, Semen collection, evaluation and preservation, Artificial insemination, embryo transfer, synchronization of oestrus, gestation periods of different farm animals, problems in reproduction, physiology of milk production

Animal Nutrition

Different feeding systems, nutrient requirements of farm animals, nutrient composition of different feed ingredients and fodders, balanced rations, feeding of different categories of farm animals, least cost formulation of concentrate mixtures, complete feeds, bypass proteins and bypass fats, feeding strategies in case of adverse climatic conditions, utilisation of crop residues and industrial byproducts.

Animal Health

Major diseases of farm animals , their prevention and control. Herd immunity, disease free zones, zero disease concept.
Diseases of zoonotic importance, State and central rules for prevention of animal and animal product borne diseases.

Dairy Farm Management and Economics

Principles of management of farm and labour, different categories of livestock i.e. Young, growing, breeding stock, pregnant, in production etc , different systems of rearing livestock i.e intensive, semi intensive, free range etc., housing needs of farm animals.

Factors affecting farm efficiency, farm planning and budgeting, resource allocation.

Commercial livestock farming, mixed farming and specialised farming, economics of livestock farming

Dairy Science

Clean milk production, Composition of milk and factors affecting it, legal standards of milk in India. Physical properties and nutrition value of milk.

Collection, quality, testing and grading of raw milk, pricing, processing, packaging, storing, distribution, marketing.

Different types of milk viz standardised, toned , double toned, flavoured etc. and different milk products - their preparation, composition, legal and quality standards, Costing of dairy products

Type of microorganisms in milk and their morphological characteristics, milk borne diseases. Growth of Bacteria in milk. Milk fermentation, starter cultures etc.

Poultry Production

Pureline breeding farms and hatcheries. Commercial poultry production for eggs and meat. Other poultry species like ducks, quails, turkeys, emu, ostrich etc. Marketing of poultry products.

Other species of Livestock (Sheep, Goat, Pig and Rabbit)

Commercial meat and wool production involving sheep, goat, pigs and rabbits

Meat and Meat Products

Production of meat (all types) - composition and characteristics of good meat - slaughter houses/meat processing plants - meat inspection - preservation of meat - meat byproducts and their utilization

COMPUTER SCIENCE

(THE SYLLABUS IS ONLY ILLUSTRATIVE AND NOT EXHAUSTIVE)

1. **Introduction to Software**
2. **Data Structure through 'C' and 'PASCAL'**
3. **Elements of Systems Analysis and Design**
4. **Numerical and Statistical Computing**
5. **Data Communication and Networks**
6. **Computer Architecture**
7. **Object Oriented Systems**
8. **Computer Fundamentals**
9. **File Structure and Programming in COBOL**
10. **Database Management Systems**
11. **Software Engineering**
12. **Accounting and Finance on Computers**
13. **Operating Systems**
14. **Intelligent Systems**
15. **Relational Database**
16. **Management Systems**

ELECTRICAL ENGINEERING

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Electromagnetic Theory

Electromagnetic fields in magnetic, dielectric and conductive materials. Various laws related to flow of current and field development. Plane Wave propagation in various mediums.

Materials :

Insulators for electrical and electronics applications, magnetic materials, properties of materials, electrical circuits, circuit theory, kirchoff's laws, network theorems and application, three phase circuits etc.

Measurements and Instrumentation

Units and standards, Measurement of current, voltage and power, Power Factor and Energy, Indicating Instruments, Measurement of resistance, Inductance, capacitance and frequency etc. Digital Voltmeter and other measuring instruments and measurements etc.

Control Systems

Control System Analysis, Control System Components, Electromechanical, hydraulic, pneumatic components etc.

Electrical Machines

Transformer : Magnetic circuits-analysis and design of Power and distribution transformers. Construction and testing. Equivalent circuits. Losses and Efficiency. Regulation, Auto, single and three phase Transformers and parallel operation, selection criteria, fault level and vector group etc.

Rotating machines : Basic concepts of Emf and torque etc. Rotating fields, operating characteristics and performance analysis.

AC/DC single and three phase generators, induction motors, synchronous alternator, motors, DC motors, speed control of motor, traction and braking, varidrives, electromechanical and soft starter, capacitor and capacitor banks etc. Parallel operation of alternators etc.

Maintenance of equipment's etc.

Cables and Conductors

Various types of cables and conductors, construction details, selection criteria, short circuit rating and current carrying capacity, etc. Methods of laying of cables etc.

Transmission and Distribution

Transmission line, design criteria, performance various equipment's and accessories, radial and loop system of power distribution. Voltage control, Load flow studies. Optimal Power System operation Fault Analysis. Internal and external wiring system, control wiring, etc.

Protection, Relay and Metering System

Circuit breakers, switches, MCCB, fuses, isolators, etc. Basic theory and selection/ installation criteria, fault level calculations. Lighting, arrestors and selection criteria, earthing system. Various types of relays. Relay selection and settings, etc. Metering system, trivector electromechanical / electronic meters, etc.

Economic Aspects

Schematic diagrams, estimation, rate analysis, tariff calculations

Illumination

Design / selection of lamps and fittings etc.

Electronics

Small signal Amplifiers, biasing circuits. Multistage amplifiers, transducers, Signal processing, computer application, EPABX, LAN/WAN system, voice/data communication, building of automation system etc.

Electro Mechanical Works

Basic concepts of selection and installation of elevators, fire alarm, fire detection and fire fighting system. Knowledge of Pumps, centrifugal and submersible, selection and installation, etc.

Principles of Thermodynamics

Basic concepts of Thermodynamics, thermal cycles, etc. Principles of air-conditioning. Basic concepts of thermal and hydroelectric power plants with various components, basic design / estimation of plants. Cost estimation, economics of generation, etc.

Power Plants

Basic concepts of thermal and hydro electric power plants with various components, basic design / estimation of plants. Cost estimation, economics of generation, etc. Non conventional energy sources.

Project Management

Project planning, estimation. Project scheduling and monitoring techniques of project monitoring PERT/CPM etc. SCADA system of data management and supervision.

CIVIL ENGINEERING

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Building Materials : IS classification of bricks, its strength and tests. Tests on cement, timber, cement mortar and concrete. Importance of W/C ratio, concrete strength, concrete ingredients including admixtures, non-destructive testing of concrete, mix design methods, different types of structural timber, plywood.

Solid Mechanics : Elastic constant, stress, plane stress, Mohr's circle of stress, strains, plain strain, combined stress, elastic theory of failure. Simple bending, shear, torsion of circular and rectangular sections and simple member.

Structural Analysis : Analysis of determinate structures, analysis of indeterminate skeletal frames - moment distribution, slope deflection, stiffness, force and energy methods.

Design of steel, masonry and concrete structures : Principles of working stress method, design of connections, simple members, limit state design for bending, shear, axial compression and combined forces, codal provisions for slabs, beams, walls and footings. Designs of brick masonry as per IS codes.

Basics of Soil Mechanics : Foundation, load bearing capacity of soils, causes of failure of foundation, remedial measures for improving bearing capacity of soils, different types of foundations for buildings - Basic Indian Standards

Estimation : Estimates and quantities of materials, different methods - Principles of valuation of buildings - Analysis of rates.

Building Construction : Construction methods for brick/stone masonry, RCC/steel multistoried buildings, construction techniques and practices and non destructive testing of buildings and structural audit.

Construction planning and management : Bar chart, linked bar chart, work-break down structure, activity-on-arrow diagrams, critical path, probabilistic activity duration, event based networks, PERT network, time-cost study, crashing resource allocation.

Fluid mechanics and hydraulic machines : Fluid properties, pressure buoyancy, flow kinematics, flow measurements, open channel flow, normal flow, losses in pipe flows, centrifugal pumps, reciprocating pump, air vessels, performance parameters.

Surveying : Various methods of surveying, measurement of distances and directions, contour surveying, measurement of elevations, setting out of curves,

triangulation and traversing, computation of co-ordinates, concept of global positioning system, remote sensing and techniques etc.

Hydrology & Irrigation : Hydrological cycle, precipitation and related data analysis, PMP unit and hydrographs evaporation and transpiration, floods and their management, PMP, streams and their gauging, river morphology, routing of floods, capacity of reservoirs. Multipurpose uses of water, soil-plant-water relationship, irrigation systems, water demand assessment, storages and their yields, ground water yield and well hydraulics, water logging, drainage design, irrigation revenue, design of rigid boundary canals, Lacey's and tractive force concepts in canal design, lining of canals, sediments transport in canals, non-overflow and overflow sections of gravity dams and their design, energy dissipaters and tailwater rating, design of headworks, distribution works, falls, cross drainage works, outlets, river training. Environment impact assessment.

Water supply and sanitation : Sources of supply, yield, design of intakers and conductors, estimation of demand, water quality standards, control of water borne diseases, Primary and Secondary treatment, conveyance and distribution system of treated water, rural water supply, institutional and industrial water supply. Rural sanitation system, design of sewers and sewerage system, waste disposal system.

Transportation Engineering : Planning of highway system, alignment and geometric design, horizontal and vertical curves, grade separation, materials and construction methods for different surfaces and maintenance, principle of pavement design, drainage, types of bridges, types of loading, basic principle of bridge design.

WATER RESOURCES- MINOR IRRIGATION

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Water requirement of crops :

Crop period, duty, delta of crop, duty of water, relation between duty and delta, irrigation efficiency, consumptive use of water, soil moisture relationship, soil-moisture deficiency, estimating depth and frequency of irrigation on the basis of soil moisture regime concepts.

Canal Irrigation System :

Alignment of canals, watershed canals, contour canals, side shape canals, distribution system for canal irrigation, main canal, branch canal, distributaries, minors, water courses, curves in channels, gross command area, culturable command area, irrigation intensity, time factor, area factor, determination of channel capacity, channel losses, evaporation, seepage (Percolation and absorption), seepage loss factors, empirical formulas for channel loss, sediment transport and load, mechanics of sediment transport, design of channels in coarse alluvium, shields entertainment method for channel with protected bank, regime channels, Kennedy's theory, critical velocity rates, design procedure, Kutter's formula, Manning's formula, roughness co-efficients, Chery's formula, Lacey's theory, Lacey's regime channels, Lining of irrigation canals and economics of lining.

Hydrology :

Definition, hydrologic cycle, rainfall and its distribution, run-off and surface run-off, yield of drainage basin, sub-surface run-off, hydrograph, infiltration, soil moisture, field capacity, infiltration capacity curve and its equation, small and large watershed, precipitation and its measurement, frequency of storm intensity duration curve, stage discharge curve, velocity of flow in a stream, time of concentration of a catchment, valley storage, Unit Hydrograph Theory, computation of run-off from rainfall, flood discharge and design flood.

Ground water, Hydrology and Construction of wells and tubewells :

Drainage of ground water, ground water reservoir, occurrence of ground water, porosity yield, specific yield, specific retention of different kinds of formations, determination of specific yield, permeability, transmissibility, velocity of ground water, hydraulics of wells, aquifers and aquicludes, non-artesian, unconfined, artesian aquifers and artesian wells, specific capacity, infiltration wells, infiltration galleries, measurement of yield by theoretical and practical method, pumping test and recuperation test, Thiem's equilibrium formula for confined and unconfined aquifers, well interference, well loss and specific capacity, open wells and dug wells, different methods of recharging, various types of tubewells and its

construction, methods of drilling of tubewells, well casing and screens, gravel packing, design of strainer, pumping arrangement.

Diversion Head Works :

Principles and design of weir and barrage, gravity and non-gravity weirs, layout of diversion headworks, diversion weir, types of weirs, masonry weirs with vertical drops, the under sluices, the canal head regulator, silt control works, causes of failure by piping and by uplift.

Canal falls, Canal regulators :

Types of falls and their design, design of head regulator and cross regulator.

Cross drainage works :

Aqueducts and siphon, level crossing principles and design.

Dams and Reservoirs :

Basic principles of reservoir planning, types of dams and their characteristics, selection of dam site, investigations (Engineering, Geological & Hydrological) combination of forces for design of dams, modes of failure and criteria for structural stability of gravity dams. Elementary profile of a gravity dam, construction of gravity dam, cracking of concrete in gravity dam, joints in gravity dam, keyways, water stops and foundation treatment for gravity dams.

Spillage, gates and energy dissipators :

Definition, location, design consideration, various types of spillways, design of crest of ogee spillway, cavitation, energy dissipators below overflow spillway and their design, use of hydraulic jump as energy dissipater, stilling basin, types of gates and their characteristics.

River control :

Scope and objective of river control, marginal embankment, spurs, cut-offs, launching apron.

LAW

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Candidates are expected to have expert Knowledge of the following laws :

1. The Constitution of India
2. Indian contract Act, 1872
3. Partnership Act, 1932
4. Companies Act, 1956
5. The Code of Civil Procedure, 1908
6. The Transfer of Property Act, 1882
7. Sales of Good Act
8. Industrial Disputes Acts, 1947
9. Trade Union Act, 1926
10. Arbitration and Conciliation Act, 1996
11. Negotiable Instruments Act, 1881
12. Indian Easements Act, 1882
13. Specific Relief Act
14. Indian Succession Act, 1925
15. Hindu Succession Act, 1956
16. The Right to Information Act, 2005
17. Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002
18. Recovery of Debts due to banks and the Financial Institutions Act, 1993
19. Criminal Procedure Code, 1973
20. Indian Penal Code, 1872
21. Indian Evidence Act, 1872

The candidate is also expected to have practical knowledge of drafting, pleading and conveyancing.

राजभाषा
(पाठ्यक्रम केवल निदेशी है सम्पूर्ण नहीं)

1. सामान्य ज्ञान :
 - (क) (1) भाषा, विभाषा, उपभाषा, बोली, राष्ट्रभाषा, राजभाषा, राज्यभाषा, क्षेत्रीय भाषा से अभिप्राय
 - (2) राजभाषा अधिनियम विषयक जानकारी
 - (3) हिन्दी का क्षेत्र तथा उसकी विभिन्न उपभाषाएँ और बोलियाँ
 - (4) हिन्दी भाषा के विकास की संक्षिप्त रूपरेखा
- (ख) हिन्दी की ध्वनियाँ, शब्दभाण्डार और वाक्यरचना : देवनागरी लिपि
2. व्यावहारिक हिन्दी :
 - (1) शब्द . प्रयोग--समानार्थक/ पर्यायवाची शब्द, विपरीतार्थक शब्द, अनेकार्थी शब्द, शब्दों में पारस्परिक अन्तर, वर्तनी--शुद्धि
 - (2) लोकोक्तियाँ और मुहावरे : अर्थ और वाक्यों में प्रयोग
 - (3) वाक्य-शुद्धि
 - (4) विरामचिहनों का प्रयोग
 - (5) प्रारूपण, टिप्पण, व्याख्या, संक्षेपण, पल्लवन
 - (6) पत्र - लेखन
3. अंग्रेजी का व्यावहारिक ज्ञान :
 - a. Synonyms, antonyms, idioms, similar words, use of articles and prepositions, transformation of sentences, direct and indirect speech.
 - b. Correction of sentences
 - c. Punctuation
 - d. Expansion and comprehension
 - e. Letter-Writing
 - f. Essay-Writing
4. पारिभाषिक शब्दावली :

प्रशासन, बैंक तथा ग्रामीण बैंकों सम्बंधी अंग्रेजी हिन्दी - पारिभाषिक शब्दावली.
5. अनुवाद :
 - (1) अंग्रेजी से हिन्दी
 - (2) हिन्दी से अंग्रेजी