



**National Institute of Technology Calicut**  
**NITC Campus P.O, Kozhikode – 673601, Kerala, India**

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**DEPARTMENT OF ARCHITECTURE AND PLANNING**

**Syllabus for Written Test for the post of Assistant Professor Grade II (Pay Level -10) with**

**Architecture specializations**

**History & Theory of Architecture**

Factors shaping architectural character of a region; Egyptian Architecture; Greek architecture; Roman architecture; Early Christian architecture; Byzantine architecture; Islamic architecture, Hindu architecture -Dravidian style. Christian Architecture-Romanesque; Gothic and Renaissance Architecture; Mughal and Colonial Architecture in India Modern Architecture -Art movements Architectural theory in historical perspective- deterministic methods and models; concept of creativity, visual design principles- principles of visual design, organic architecture and contemporary movements in architecture; design Process-design approaches

**Building Materials, Construction & Management**

Foundations - masonry construction - stone & brick masonry - composite walls and cavity walls - arch construction – roof trusses, roof covering- RCC slab over walls, reinforcement detailing - doors, windows and ventilators; floors and flooring – partitions- vertical transportation - Long span and light weight construction - space structures in steel and concrete -fire protection -fire design of buildings– mud wall construction - cladding systems – false ceilings and wall paneling - repair and retrofitting of structures; Construction planning, project management – bar charts and activity charts, resource levelling – network planning methods, critical path method – probabilistic techniques, concepts of uncertainty, optimization techniques and optimization models

**Building Climatology & Solar Architecture**

Classification and characteristics of tropical climate & building design criteria in various climatic zones- comfort indices - tropical summer index and effective temperature nomogram-heat exchange of buildings, thermal gradients – periodic heat flow- day lighting , natural ventilation and dampness control; day light factor concept- day lighting systems; functions of ventilation – concepts of ventilation- ventilation design- climate responsive design and solar architecture-thermal performance index. Thermal efficiency of buildings

**Building Services**

Estimation of water supply, source of water and treatment process; plumbing fixtures and hydrant systems; water distribution systems; specialized services, waste classification, solid waste, drainage, waste water treatment and techniques. Design criteria of sound for various architectural spaces, Noise criteria curves, acoustical problems. Behavior of sound in enclosed spaces – principles of geometrical acoustics –Sabine’s formula and its interpretation Auditorium acoustics – design criteria for speech and music – Acoustic design for reverberation control. Wiring system,

Wiring circuits, Service connections, Distribution system in houses - The laws of illumination, different type of lamps and their properties, Criteria and Standards of illumination for different activity areas. Basics of heat transfer and thermodynamic principles; psychometric properties and human comfort parameters. Air conditioning load estimation fundamentals- systems of air condition-

### **Landscape Architecture**

Landscape and garden architecture through history - Design process in landscape architecture - Elements of landscape - Energy saving Landscapes and passive climatic design strategies in landscapes - Design, development and details of landscapes for various functions - Landscape services.

### **Urban & Regional Planning**

Origin, evolution and history of human settlements - planned cities in India and the world - town definitions and classifications, Terminologies, Urban design concept and theories, Physical, Environmental, Infrastructure, Housing aspects of urban planning, Planning theories, Master plans and development plans, survey and analysis in town planning, planning standards - resource allocation, Agencies involved in Planning, Legal aspects of Planning, Acts and Policies

### **Professional Practice**

Role of Council of Architecture, duties and responsibilities in the profession, standards and norms of professional conduct, setting up an office, introduction to building contract laws, powers and duties of architect in a contract, Indian Contract law, tender , invitation, preparation, different types, Arbitration, Role of architect in arbitration, award publication, Architectural competitions

**Syllabus for Written Test for the post of Assistant Professor Grade II (Pay Level -10) with  
specialization in Civil (Structural Engineering)**

**Applied Mechanics**

law of dimensional homogeneity - idealizations of mechanics - vector and scalar quantities - laws of mechanics. Important vector quantities: Elements of vector algebra Equivalent force systems: Equations of equilibrium: Free body diagram - - static indeterminacy. Introduction to structural mechanics: Trusses-The structural model, Section forces in beams, Friction forces: Laws of Coulomb friction - simple contact friction problems. Properties of surfaces: First moment – centroid - second moments and the product of a plane area, transfer theorems - rotation of axes - polar moment of area - principal axes - concept of second order tensor transformation.

**Theory of Structures**

Development of structural system- Types of loads on structures post and beam structures –Tension, Compression & Shear: Types of external loads - Hooke's law - Poisson's ratio - elongation of bars of constant and varying sections - statically indeterminate problems in tension and compression - Stresses in Laterally Loaded Symmetrical Beams: Theory of simple bending – moment of resistance - beams of uniform strength - stresses in bending - strain energy due to bending. Differential equation of the elastic curves - Slope and deflection of beams by successive Integration Columns: Axial loading of short and long columns - Concept of Elastic stability – Euler's theory - Strain energy and complementary energy: Principle of superposition, Principle of virtual work, Castiglione's theorem, theorem of complementary energy, Betti's theorem, Maxwell's law of reciprocal deflections, Castiglione's second theorem Statically Determinate and Indeterminate Structures: Degree of indeterminacy –Force Method of Analysis of Statically Indeterminate Structures: Three Moment Equation: analysis Displacement Method of Analysis of Statically Indeterminate Structures: Slope deflection method Moment distribution method, Substitute frame method: Matrix Analysis: Plastic Analysis: - plastic analysis of beams and portal frames by equilibrium and mechanism methods.

**Structural Design**

Concrete mix design using IS code method - standard loadings. Design concepts of working stress method, ultimate load method and limit state methods Limit state of collapse - Flexure: moment capacity of rectangular and flanged sections - singly and doubly reinforced sections–. Limit state of Serviceability: Limit State of Collapse - Shear: Nominal shear stress- design shear strength of concrete – design of shear reinforcement – critical sections for shear in structural elements. Limit State of Collapse - Torsion: General – critical section – equivalent shear and bending moment– reinforcement for torsion – design for bond and anchorage. Limit State of Collapse - Compression: Analysis and design of columns of rectangular and circular cross sections - axially loaded columns - columns with uniaxial and biaxial eccentricity using SP 16 design charts - short and slender columns. Principles , losses and methods of pre-stressing - analysis of simple pre-tensioned and post tensioned beams at transfer for dead loads and live loads – approximate design of simple

determinate beams. Properties of structural steel –connections - design of connection. Design of Steel Girders: Analysis and design of laterally restrained – unrestrained – simple and compound beams - deflection criteria - check for shear. Design of compression members – built-up columns – lacing and battens – design of column bases. steel roof systems - design of roof trusses – roofing elements and purlins - analysis for dead loads and wind loads – wind bracings. allowable stresses, design of beams for flexure, shear and bearing in timber design – deflection criteria - design of solid and built up columns – flitched beam- formwork design. Analysis and Design of brick masonry - slenderness ratio

### **Surveying & levelling**

Principles of surveying - plane surveying - geodetic surveying –Types of errors. Distance Measurement: Ranging - Vertical Control: Levelling - Definitions– Curvature and refraction – Methods for establishing vertical control– Principle of levelling-Methods of Booking - Differential levelling – Reciprocal levelling - Errors in levelling – Applications of levelling. Angle and Direction Measurement: Definitions Methods of determining angles and Prismatic compass – WCB system – Magnetic declination – Local attraction. Transit theodolite – Temporary adjustments - Measurement of horizontal angles - Method of repetition and reiteration - Measurement of vertical angles – Instrumental errors – Personal and natural errors. Traverse – Traverse stations – Types of traverse – Closed traverse computations and adjustments using Bowditch rule and Graphical Method. Combined Distance and Angular measurement: Tacheometric surveying - Stadia method – Subtense bar - Tangential tacheometry. Area Computation – Traverse – Area between traverse and irregular boundary - Area computation from Plans – Areas and Volumes of Cross Section – Prismoidal Correction – Prismoidal and Trapezoidal Formulae - Determination of quantities for excavation.

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