TAMIL NADU PUBLIC SERVICE COMMISSION

SYLLABUS

CIVIL ENGINEERING AND ARCHITECTURE

(DIPLOMA STANDARD)

Code: 509

UNIT–I: ENGINEERING MECHANICS (20 Questions)

Loads - Simple Stresses and Strain –Modulus of Elasticity / Elastic constants – Application of stress and strain in engineering field – Behaviour of ductile and brittle material –Shear Force and Bending Moment – Geometrical propertiesofsections–Centroid–Momentof Inertia– StressesinBeamsandShafts– Stresses in Beams due to bending – Stresses in shafts due to torsion – Pin Jointed Frames.

UNIT-II: CONSTRUCTION MATERIALS AND CONSTRUCTION PRACTICE (20 Questions)

Bricks, Lime, Tiles, Cement, Fine Aggregate, Coarse Aggregate, Timber, Ply wood, Steel, Glass, Plastics, PVC, UPVC, Paints, Mortars, Concrete, M-sand, P-sand – Latest construction Materials and Chemicals – Green Building Concepts & Materials - Usage of PPC, Flyash Bricks, Hollow clay Bricks,Solar Panels.

Different types of Foundations -Masonry, Floors, Roofs, Interior Works - False ceiling – Wall paneling – Wooden flooring

Precast Concrete Construction -Doors and Windows - Weathering Course - Damp proof course – Plastering - Painting.

Conservation of Heritage Structures.

UNIT–III: ENVIRONMENTAL ENGINEERING POLLUTION CONTROL (20 Questions)

Sources of Water – Collections and Conveyance of Water – Quality of Water – Treatment of Water – Distribution System – Appurtenances and

Maintenance of Water Lines – Collections and Conveyance of Sewage – Treatments and Disposal– Environmental Pollution and Control –Waste Water Treatment and Solid Waste Management – Land, Water & Air Pollution - Drainage arrangements and Sanitary fittings in Buildings – Environmental Impact Assessment (EIA) - Methodology – Conservation of Marsh Lands – Reclamation of Water Bodies.

UNIT–IV: SURVEYING AND REMOTE SENSING(20 Questions)

Types of Surveys – Chain surveying – Compass surveying – Levelling – Contour surveying – Theodalite surveying – Trignometrical levelling – Tacheometry – Field work– Simple problems - Curves, Global Positioning System (GPS) - Photogrammetric Surveying and Hydrographic Surveying -Total Station and Geographical Information System (GIS) – Fundamentals of Remote sensing - Photogrammetry – Image interpretation & Analysis.

UNIT–V: ESTIMATION, COSTING & VALUATION (20 Questions)

Estimates and its types – System of taking out quantities – Trade and Group systems - Stages of Detailed Estimate – Measurements & Material Requirement –Specification& Report Writing – Approximate Estimates – Areas and Volumes - Detailed Estimate – Data – Abstract Estimate- Valuation of Land and Buildings.

UNIT–VI: STRUCTURAL ENGINEERING (20 Questions)

Slope and Deflection of Beams – Propped Cantilevers – Fixed Beams – Arches – Continuous Beams – Theorem of Three Moments –Moment Distribution Method – Columns and Struts – Combined Bending and Direct Stresses – Earth Pressure and Retaining Walls.

Reinforced cement concrete structure – Working Stress Method - Analysis and design of singly and doubly reinforced rectangular and T-beam sections – Cantilever, simply supported, continuous beams – One way and two way slabs – Lintels and Sunshades – Staircases – Rectangular

and Circular short Columns – Isolated column footings. (All designs by Limit State Method only). Steel structures – Design of simple beams by Limit state method – Types of welded connections.

UNIT-VII: CONSTRUCTION MANAGEMENT AND COMPUTER APPLICATIONS(20 Questions)

Planning of a project – Factors to be considered – Project reports – Organization structure of construction departments – Construction planning – CPM and PERT networks – Contracts – Tenders and Tender documents – Bill- Supervision and Quality control – Arbitration.

Safety measures in construction sites – Labour legislations - Banking practice – Cash flow diagrams - Financial Management -Ethics.

Disaster Management – Types of Natural calamities – Causes – Preparedness – Response and Recovery.

Use of Computers – Application of CAD softwares– Project management softwares – Use of MS word, Excel, PowerPoint – Application of Analysis and Design softwares.

UNIT–VIII: BUILDING SERVICES (20 Questions)

Water Supply & Sewage Disposal, Mechanical Systems – Pumps & Motors, Electrical Systems – Generation & Distribution - Ventilation & Lighting - Air Conditioning – Principles, systems & applications - Vertical Transportation systems - Fire Hazards, Safety & Design Regulations - Acoustics – Building Management Systems – Renewable Energy – Rain water Harvesting – Strom Water Management.

UNIT–IX: TOWN PLANNING AND TRANSPORTATION (20 Questions)

Town Planning Principles – Master Plan - Road and Street Planning – Parks & Open Spaces – Landscape Architecture – Historic and contemporary Landscape – Soft & Hard Landscaping – Indoor & Outdoor

Plants - Housing – Economy, Society, Environment and Transport Policy and Planning –Tamil Nadu Combined Development Building Rules, 2019 (TNCDBR, 2019) – Barrier free Design.

Roads – Different types – methods of formation of water bound macadam Road, bituminous and concrete roads – Hill roads –Camber, gradient, super elevation, carriageway, pavements, drainage system, sight distance - Traffic Engineering- Bridges – Classifications – Site selection and alignment – Foundation, substructure and super-Structure.

Railways – Formation of Tracks – Rails – Ballasts – Sleepers – Characteristics of materials – Rail Joints.

UNIT-X (20 Questions)

UNIT–X(A): HISTORY& THEORYOFARCHITECTURE

History of Architecture

Prehistoric - Egyptian Architecture – Greek Architecture–Roman Architecture –Early Christian & Byzantine Architecture – Romanesque and Gothic Architecture – Renaissance Architecture.

Indian Architecture – Indus Valley Civilization, Buddhist Architecture, Hindu Architecture – Islamic Architecture in India.

Modern Architecture, Postmodernism, Contemporary World Architecture-Philosophy and works of Post Modern Indian Architects.

Theory of Architecture

Definition of Architecture–Architecture as satisfying functional, aesthetic & psychological human needs- Anthropometrics.

Elements of Architecture–Form, Space, Light, colour, etc.

Principles of Architecture–Proportion, Balance, Scale, Symmetry, etc.

UNIT-X(B): HYDRAULICS ENGINEERING & SOIL MECHANICS

Soil mass as a three phase system – Grain size classification - Atterberg limits – Properties - IS Classification of soils–Compaction – Shear strength – Safe Bearing Capacity.

Measurement of pressure in liquids – Pressure distribution and total pressure on immersed surfaces – Types of flow (Laminar, turbulent, steady, unsteady, uniform, non- uniform) – Flow through pipes –Losses, Frictional losses – Hydraulic gradient and total energy lines -Bernoullis theorem – use of Orifice, Mouthpiece, Hydraulic Coefficient Cd, Cc, Cv Orifice meter and Venturimeters –Flowthroughchannels – Chezy's formula–Bazin'sandManning'sformula –Economicalsectionsforopen channels -Conditions for Maximum discharge - Pumps – Reciprocating pumps – Centrifugal pumps – Characteristics – Selection and choice for pump - Discharge – Power and efficiency - Ground water – Types of well – Test for yield of wells.

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