INDIAN INSTITUTE OF TECHNOLOGY MADRAS, CHENNAI-600036.

Advertisement No. IITM/R/5/2025 dated 24.09.2025

Syllabus & Scheme of Examination for the post of SENIOR TECHNICAL OFFICER

LEVEL-1 OBJECTIVE / DESCRIPTIVE TEST

Stream: Civil Engineering

(Candidate should attempt questions from any THREE of the following modules)

Module 1. Construction Materials and Construction Practice:

Bricks, Cement and Concrete, Steel, Glass – Material properties and laboratory experiments to determine the properties of materials; Masonry; Flooring; Plastering and Painting; Waterproofing; Formwork and scaffolding; Testing of materials for buildings; Principles of building planning and design; Building bye laws; Repair and rehabilitation.

Module 2. Soil Mechanics and Foundation Engineering:

Three-phase system, Phase relationships, Index properties of soils and their determination; classification of soils; Engineering properties of soils and their determination; compaction of soils; Determination of field density of soils; Types of foundations (shallow, deep), bearing capacity, settlement analysis.

Module 3. Structural Engineering:

Relation between force and stress, displacement and strain. Design philosophies – limit state design and working state design. Axial members, truss analysis, columns – short and long column, Euler buckling load, Design of reinforced concrete columns, steel columns. Relationship between shear force, bending moment and applied load. Design of reinforced concrete beams. Connections and joints – Welded, riveted, bolted joint design. One way and two way reinforced concrete slab design and detailing.

Operation and testing of structural systems; contact and non-contact instrumentations - LVDTs, strain gauges, load cells, displacement transducers, and optical/vision-based systems; setup and calibration of data acquisition systems.

Module 4. Basic Transportation Engineering:

Geometric Design: Classification of highways and terrain; design speed and vehicle; cross-sectional elements; sight distances (stopping, overtaking, intersection); horizontal alignment including curves, superelevation, widening, and setback; vertical alignment with summit and valley curves; Highway Materials: Properties and tests for aggregates, soils, bitumen, and cement concrete; specifications as per IS/IRC codes; material characterization for pavementsPavement Design: Flexible and rigid pavement components and functions; IRC:37–2018 method for flexible pavement design; IRC:58–2015 for rigid pavements. Traffic Engineering: Traffic volume, speed, and delay studies.

Module 5. Hydraulics and Water Resources Management:

Basics of fluid mechanics; Measurement of pressure; flow of fluids; flow through orifices, mouthpieces, and pipes; flow through notches and weirs; flow through open channels; Basics of hydrology and ground water; storage and distribution works; canal irrigation; water harvesting and recycling.

Module 6. Environmental Engineering:

Water supply engineering – estimation of water requirements, water quality parameters, analytical methods, methods of water treatment, water transmission and distribution; wastewater engineering – methods of collection and conveyance of sewage, primary, secondary treatments; tertiary treatments, treated wastewater reuse, Solid waste management, air and noise pollution; basics and control, Hazardous waste: definition, basics of waste management. Environmental impact assessment. Resource recover from waste.

LEVEL-2 PRESENTATION & PERSONAL INTERVIEW

The Candidates should make a brief presentation, approximately 6 slides, to the Selection Committee covering a brief profile of the applicant, contributions to research project(s) / Academic activities, Future Plans, & Contributions for IIT Madras as a Senior Technical Officer. The candidate should complete the presentation within 6 minutes.

Scheme of Examination:

Level	Type of Test	Weightage for final result
Level-1	Objective / Descriptive Test	50%
Level-2	Presentation & Personal Interview	50%

Based on the performance in the Level-1 Objective / Descriptive Test, the candidate will be shortlisted for the Level-2 Presentation & Personal Interview.

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Date: 13.01.2026

Sd/-
Registrar