

SYLLABUS FOR COMPUTER BASED TEST (CBT) FOR RECRUITMENT OF
MANAGEMENT TRAINEE (CIVIL)

A. Subject Knowledge (80%): 160 Nos. of Multiple Choice Questions (MCQs)		
SL. NO.	SUBJECT	TOPICS
1	ENGINEERING SURVEY	Linear measurements and chain surveying-Compass Traversing Levelling and contouring-Theodolite Survey-Modern Surveying Instruments
2	FLUID MECHANICS	Flow through pipes-Orifices and mouthpieces-Laminar flow through pipes-Turbulent flow through pipes
3	MECHANICS OF SOLID	Stress and Strain-Two Dimensional State of Stress - and Strain-Shear Force and Bending Moment Diagram-Pure bending-Torsion of solid circular shafts-Buckling of columns
4	STRUCTURAL ANALYSIS	Concept of determinate and indeterminate structures-determination of degree of static and kinematic indeterminacy in plane frame and continuous structures-Methods of Analysis-Analysis of propped cantilever by consistent deformation method-Analysis of fixed and continuous beams by Moment-Area method-Conjugate beam method and theorem of three moments-Energy theorems and its application-Strain energy method-Virtual work method- unit load method-Betti's and Maxwell's laws-Castigliano's theorem-concept of minimum potential energy-Theories of failure-Maximum normal stress theory-maximum normal strain theory-maximum shearing strain theory-maximum strain energy theory-maximum distortion energy theory-maximum octahedral shearing stress theory-Analysis of redundant plane trusses-Deflection of pin jointed plane trusses using strain energy method-unit load method-Analytical method and Williot -Mohr diagram. Introduction to space truss-Arches-Suspension Cables-Rolling loads and influence lines for determinate structures-simply supported beams, cantilever, Influence Line Diagram for reaction, shear force and bending moment at a section, Influence Line Diagram for wheel loads, point loads and uniformly distributed loads, maximum bending moment envelope-Influence Line Diagram for Bending Moment, Shear Force, normal thrust and radial shear for three hinged arches.
5	FLUID DYNAMICS	Momentum equation and its applications-Impact of free jets-Reciprocating Pump-Centrifugal Pump-Turbines-Pelton wheel-Radial flow impulse turbine-Uniform flow in open channels-Non-uniform flow in open channel-Flow over notches and weirs-Measurement of depth of flow
6	GEOTECHNICAL ENGINEERING	Introduction-Permeability-Seepage analysis-Soil compaction-Soil consolidation-Shear strength of soils-Stabilization of soil

7	WATER SUPPLY & SANITARY ENGINEERING	Quantity of water-General requirement for water supply-Quality of water-Basic unit operations and unit processes for surface water treatment-Domestic waste water treatment-Sedimentation aided with coagulation-Solid waste management
8	DESIGN OF RCC STRUCTURES	Properties of concrete and reinforcing steel-philosophy-concept and methods of reinforced concrete design-introduction to limit state method-limit state of collapse and limit state of serviceability-application of limit state method to rectangular beams for flexure-shear-bond and torsion-Design of doubly reinforced beams-design of T and L beams-Design of one way and two way slabs-design of staircases-design of short and long columns with axial and eccentric loadings-Design of isolated and combined column footings-retaining walls-various forces acting on retaining wall-stability requirement-design of cantilever and counterfort retaining walls-Design of water tanks-design requirements-design of tanks on ground-underground and elevated water tanks.
9	TRANSPORTATION ENGINEERING	Transportation System-Geometric Design of Highways-Traffic Engineering-Highway Pavements materials-Economic aspects and analysis.
10	ADVANCED STRUCTURAL ANALYSIS	Introduction to Force and Displacement methods of structural analysis-Analysis of continuous beam and plane frame by slope deflection method-moment distribution method and Kani's method-Two hinged arches and analysis of suspension cable with two hinged stiffening girders-Influence lines for indeterminate beams-influence lines for two hinged arches and stiffening girders-Plastic Analysis-Matrix method of analysis.
11	ADVANCED GEOTECHNICAL ENGINEERING	Stress distribution in soil-Shallow foundation Subsoil exploration-Lateral earth pressure and retaining structures.
12	ENVIRONMENTAL ENGINEERING	Water-Sewage-Air-Noise
13	INDUSTRIAL SAFETY ENGINEERING	Industrial safety-Fundamentals of maintenance engineering-Wear and Corrosion and their prevention-Fault tracing -Periodic and preventive maintenance
14	DESIGN OF STEEL STRUCTURES	Introduction-advantages/disadvantages of steel,-structural steel-rolled steel section-various types of loads-design philosophy-Limit state design method-limit states of strength and serviceability-probabilistic basis for design Riveted-bolted and pinned connections-Welded connections-assumptions-types-design of fillet welds-intermittent fillet weld-plug and slot weld-failure of welded joints-welded joints vs bolted and riveted joints-Tension members-types, net cross-sectional area-types of failure-slenderness ratio-design of tension members-gusset plate-Compression members-effective length-slenderness ratio-types of cross-section-classification of cross section-Design of axially loaded compression members-lacing, battening-design of column bases and foundation bolts- Design of beams-types of c/s-lateral stability of beams-lateral torsional buckling-bending and shear strength-web buckling and web crippling-deflection, design procedure- Plate girders- various

		elements and design of components Eccentric and moment connections-roof trusses.
15	FOUNDATION ENGINEERING	Lateral Earth Pressure and Retaining Structures-Bearing Capacity-Deep Foundation-Subsoil Exploration
16	DESIGN OF CONCRETE STRUCTURES-II	Design of Foundations-Design of Water tanks-Earthquake Engineering -Prestressing systems-Bridge Engineering.
17	ESTIMATING, COSTING AND PROFESSIONAL PRACTICE	Quality estimation-Specifications-Rate analysis-Tender-Objective and functions of management in construction-Project management-Cost Model-Quality Control
18	GREEN TECHNOLOGY	Global warming and its effect-Opportunities in Control of Carbon Emissions and Accumulation-Green Technologies for personal and Citywide Application-Some High-tech Measures for Reducing Carbon Emissions.
19	DISASTER MANAGEMENT	Understanding Disaster-Disaster Management Mechanism-Capacity Building-Coping with Disaster-Planning for disaster management.
20	GROUND IMPROVEMENT	Introduction-Chemical modification-Hydraulic modification-Soil reinforcement and Application of soil reinforcement

B. NUMERICAL / GK & REASONING (10%): 20 NOS. OF MULTIPLE CHOICE QUESTIONS (MCQS)

C. ENGLISH KNOWLEDGE (10%): 20 NOS. OF MULTIPLE CHOICE QUESTIONS (MCQS)

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