

SYLLABUS FOR COMPUTER BASED RECRUITMENT TEST (CBRT)
FOR THE POST OF LECTURER IN CIVIL ENGINEERING
UNDER
DIRECTORATE OF TECHNICAL EDUCATION
(Advt No.5 Year 2023)

I. General English including Grammar - 05 marks

II. General Knowledge, Current Affairs and Events of National and International Importance - 10 marks

III. Logical Reasoning and Analytical Ability - 10 marks

IV. Core: - 50 marks

Structural Engineering

Engineering Mechanics: System of forces', free-body diagrams, equilibrium equations; internal forces.in structures; Frictions and Its applications;. Centre of mass; Free Vibrations of undamped SDOF system.

Solid Mechanics: Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Simple bending theory, flexural and shear stresses, shear center; Uniform torsion, Transformation of stress; buckling of column, combined and direct bending stresses..

Structural Analysis: Statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis.

Construction Material and Management :-Construction Materials- Structural Steel - Composition, material properties and behavior; Concrete - Constituents, mix design, short-term and long-term properties.

Construction Management:. Types of construction projects; Project planning and network analysis - PERT and' CPM; Cost estimation.

Concrete Structures: Working stress and Limit state design concepts; Design of beams, slabs, columns; Bond end development length; Prestressed concrete beams.

Steel Structures: Working stress, and Limit state design concepts ; Design of tension and compression members, beams and beam- column, column bases, Connection - simple and eccentric, beam-column connections, plate girders and trusses; Concept of plastic analysis - beams and frames.

Geotechnical engineering

Soil Mechanics: Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability - one dimensional flow, Seepage. through soils - two - dimensional flow, flow nets, uplift pressure, piping, capillarity, seepage force; Principle of effective stress and quicksand condition; Compaction of soils: One-dimensional consolidation, time rate of consolidation; Shear Strength, Mohr's circle, effective and total shear strength parameters, Stress-Strain characteristics of clays and sand; Stress paths.

Foundation Engineering: Sub surface investigations - Drilling bore holes, sampling, plate load test , standard penetration and cone penetration tests; Earth pressure theories - Rankine. and Coulomb; Stability of slopes - Finite and infinite slopes.

Water Resources Engineering

Fluid Mechanics: Properties of fluids, fluid statics; Continuity, momentum and energy equations and their applications; Potential flow Laminar and turbulent flow. Flow in pipes, pipe networks; Concept of boundary layer and its growth; Concept of lift and drag.

Hydraulics: Flow measurement in channels and pipes; Dimensional analysis and hydraulic similitude, Channel Hydraulics - Energy-depth relationships, specific energy. critical flow, hydraulic jump, uniform flow, gradually varied flow and surface profiles.

Hydrology: Hydrologic cycle, precipitation, evaporation, evapo-transpiration, watershed, infiltration, unit hydrograph, hydrograph analysis, reservoir capacity, flood estimation and routing, surface run-off models, ground water hydrology - steady state well hydraulics and aquifers; Application of Darcys Law.

irrigation: Types of irrigation systems and methods; Crop water' requirements - Duty, delta, evapo- transpiration; Gravity Dams and Spillways; Lined and unlined canals, Design of weirs on permeable foundation; cross drainage structures.

Environmental Engineering

Water and Waste Water Quality and Treatment: Basics of water quality standards - Physical, chemical and biological parameters; Water quality index . Unit processes and operations; Water requirement; Water distribution system; Drinking water treatment.

Sewerage system design: quantity of domestic wastewater, primary and secondary treatment. Effluent discharge standards; Sludge disposal; Reuse of treated sewage for different applications.

Air Pollution: Types of pollutants, their sources and impact, air pollution control, air quality standards.

Municipal Solid Waste: Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).

Transportation Engineering

Transportation Infrastructure: Geometric design of highway - cross-sectional elements, sight distances, horizontal and vertical alignment.

Geometric design of railway Track - Speed and Cant.

Concept of airport runway length, calculations and corrections; taxiway and exit taxiway design.

Highway Pavements: Highway materials - desirable properties. And tests; Desirable properties of bituminous. paving mixes; Design factors for flexible and rigid pavements; Design of flexible and rigid pavement using IRC codes.

Geomatics Engineering

Principles of surveying : Errors and their adjustment; Maps - scale, coordinate system; Distance and angle measurement - Levelling and trigonometric leveling, Traversing and triangulation survey; Total station Horizontal and vertical curves.

Photogrammetry and Remote Sensing - Scale, flying height; Basics of remote sensing and GIS

Note:

Duration for C.B.R.T : 90 Minutes

Maximum Marks for C.B.R.T : 75 Marks