

Syllabus of Technical Paper for the Post of JE-Civil

Part-A:

Reason Ability, Simple Arithmetic Mean, General Knowledge/Awareness, Current Affairs, Language – Proficiency in English & Hindi and Knowledge of Computer Applications, Indian Knowledge System

Part-B:

Estimating, Costing and Valuation:

Estimate, analysis of rates, methods and unit of measurement, Items of work— earthwork, Brick work (Modular & Traditional bricks), RCC work, Shuttering, Painting, Flooring, Plastering, Boundary wall, Brick building, Bar bending schedule, Centre line method, Mid-section formula, Trapezoidal formula, Simpson's rule, Cost estimate of Septic tank, flexible pavements. Valuation – Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolescence, methods of valuation, PAR, DSR, CPWD specification and manual.

Surveying:

Principles of surveying, measurement of distance, chain surveying, working of prismatic compass, compass traversing, bearings, local attraction, plane table surveying, theodolite traversing, adjustment of theodolite, Levelling, contouring, curvature and refraction corrections, temporary and permanent adjustments of dumpy level, methods of contouring, uses of contour map, tachometric survey, curve setting, advanced surveying equipment.

Building Materials:

Physical and Chemical properties of cement, Tests for cement, Types of cement, their properties and uses, with specific reference to pozzolana and OPC, grades of OPC, Coarse Aggregates, Fine Aggregates, Concrete, Water - Cement Ratio, Classification of bricks, standard tests for bricks, types of Steel, timber and Plywood, bituminous materials, paints, varnishes.

Water Resources Engineering:

Definition, necessity, benefits, Ill-effects of irrigation, types and methods of irrigation, Duty & Delta, Hydrology — Measurement of rainfall, Run off coefficient, Rain gauges, losses from precipitation — evaporation, infiltration, water logging, River Training Works, Gravity dam, Earth dam, spillways

Transportation Engineering: Highway Engineering — cross sectional elements, geometric design, types of pavements, pavement materials — aggregates and bitumen, different tests, Design of flexible and rigid pavements — Water Bound Macadam (WBM) and Wet Mix Macadam (WMM). Gravel Road, Bituminous construction, Rigid pavement joint, Highway drainage, Traffic Engineering — Different traffic survey, speed-flow-density and their interrelationships, intersections and interchanges, traffic signals, traffic operation, traffic signs and markings, road safety

Soil Mechanics:

Origin of soil, phase diagram, Definitions-void ratio, porosity, degree of saturation, water content, specific gravity of soil grains, unit weights, density index and interrelationship of different parameters, Grain size distribution curves and their uses, Index properties of soils, Atterberg's limits, ISI soil classification and plasticity chart, Permeability of soil, coefficient of permeability, Unconfined and confined aquifers, effective stress, quick sand, consolidation of soils, Principles of consolidation, degree of consolidation, pre-consolidation pressure, Shear strength of soils, direct shear test, Vane shear test, Soil compaction, Laboratory compaction test, Maximum dry density and optimum moisture content, earth pressure theories, active and passive earth pressures, Bearing capacity of soils, plate load test, standard penetration test

Environmental Engineering:

Quality of water, source of water supply, purification of water, distribution of water, need of sanitation, sewerage systems, circular sewer, sewage treatments, Surface water drainage, Solid waste management — types, effects, engineered management system, Air pollution — pollutants, causes, effects, control Noise pollution — cause, health effects.

Theory of structures:

Elasticity constants, types of beams — determinate and indeterminate, bending moment and shear force diagrams of simply supported, cantilever and over hanging beams, Moment of area and moment of inertia for rectangular & circular sections, bending moment and shear stress for different sections, eccentric loads, slope deflection of simply supported and cantilever beams, critical load and columns, Torsion of circular section.

Steel Design: Steel design and construction of steel columns, beams roof trusses, purlins, IS 800.

RCC Design: RCC beams-flexural strength, shear strength, bond strength, design of singly reinforced and double reinforced beams, cantilever beams, lintels, One way and two way slabs, isolated footings, Reinforced brick works, columns, staircases, retaining wall, IS 456.

Concrete Technology: Properties, Advantages and uses of concrete, cement aggregates, importance of water quality, water cement ratio, workability, mix design, storage, batching, mixing, placement, compaction, finishing and curing of concrete, quality control of concrete, hot weather and cold weather concreting, repair and maintenance of concrete structures.