

**Syllabus for Online Examination to the post of Assistant Engineer (Civil)**

<b>Sr. No.</b>	<b>Syllabus</b>
1	<p><b>Strength of materials &amp; Theory of Structures, Structural analysis, Design of RCC &amp; Steel Structures:</b></p> <p>Stresses, strains, principal stresses, bending moments, shear forces and torsion theory, bending theory of beam, deflection of beam, theories of buckling of columns. Analysis of beams, frames and trusses, slope deflection method, moment distribution method.</p> <p>Analysis of arches and suspension cables, influence lines, Stiffness and flexibility, matrix methods. Plastic Analysis, Design of bolted and welded connections, columns, footings, trusses, steel beams, plate girders. Computer aided analysis and design of structures, Computer-aided analysis and design of structures, application of computer programming to structures. numerical methods such as:</p> <ul style="list-style-type: none"> <li>i. Finding area by Simpson's rule, trapezoidal rule;</li> <li>ii. Finding root of an equation by             <ul style="list-style-type: none"> <li>a) Newton-Raphson techniques</li> <li>b) Bisection method</li> </ul> </li> <li>iii. Solution of simultaneous equations by             <ul style="list-style-type: none"> <li>a) Gauss elimination method,</li> <li>b) Gauss Jordan method,</li> <li>c) Iteration method.</li> </ul> </li> </ul> <p>Design of Reinforced concrete Structures (WSM and Limit State)            Design of slab, beams, columns, footing, Foundations            Retaining walls, tanks, building frames, staircases.</p>
2	<p><b>Construction Planning and Contract Management:</b></p> <p>Functions of management, Elements of material management, safety engineering, CPM,PERT network analysis, construction equipment, site layout, quality control, agreement, PPP investment models, EPC, various Labour Acts related to Construction workers and industry (workmen compensation Act, Factories Act, Minimum wages Act, etc.), New Labour Codes, Insurances (CAR Policy, EC Policy, etc.),RERA Act</p>
3	<p><b>Bridge Engineering:</b></p> <p>Selection of site, types of bridges, discharge, waterway, spans, afflux, Scour, standards, specifications, loads and forces, erection of superstructure, strengthening cofferdams, caissons.</p>
4	<p><b>Concrete Technology:</b></p> <p>Properties of wet and hardened concrete, test on concrete, factors affecting concrete, water cement ratio, aggregate cement ratio, mix design, additives, design of form work, types of formwork.</p>

5	<p><b>Prestressed concrete:</b></p> <p>Principles of pre-stressing, materials used and their properties, permissible stresses as per I.S. codes, systems of pre-stressing, losses in pre-stress, design of pre-tensioned and post-tensioned beams- simply supported, rectangular and T- beams, cable profile, end block design, bridge girder.</p>
6	<p><b>Geotechnical Engineering:</b></p> <p>Geotechnical properties, stresses in soil, shear resistance, compaction, consolidation and earth pressure, stability of slopes, bearing capacity, settlements, shallow and deep foundations, basic engineering geology.</p>
7	<p><b>Surveying:</b></p> <p>Classification of surveys, measurement of distances-direct and indirect methods, optical and electronic devices, prismatic compass, local attraction; plane table surveying, levelling, volume calculation, contours, theodolite, theodolite traversing, omitted measurements, trigonometric levelling, tachometry, Curves, photogrammetry, geodetic surveying, hydrographic surveying, advanced instruments in surveying, Dron Survey</p>
8	<p><b>Engineering Materials:</b></p> <p>Properties of wet and hardened concrete, tests on concrete, factors affecting strength of concrete, water-cement ratio, aggregate-cement ratio, mix design, additives, design of form work, types of form work, bitumen, mastic asphalt, emulsion, cutback, stone matrix asphalt, fly ash, sustainable building materials, stones, bricks, cement, lime, mortar, timber, plastic, concrete, steel, paints and varnishes.</p>
9	<p><b>Building Planning and Construction:</b></p> <p>Principles of building planning and design, integrated approach, building byelaws, building services such as vertical transportation, water supply sanitation, thermal ventilation, lighting, acoustics, fire protection, electrical fittings. Types of foundations, stones, brick and block masonry, steel and reinforced cement concrete structures, floors, doors and windows, roofs, finishing works, water proofing.</p>
10	<p><b>Engineering hydrology &amp; Fluid Mechanics:</b></p> <p>Hydrological cycle, precipitation, evaporation, infiltration, runoff, hydrographs, reservoir planning &amp; sediment control, floods, flood routing, ground water. Hydraulics, Properties of fluids, fluid statics and buoyancy, kinematics and dynamics, flow measurement, flow in open channel, flow in closed conduits, dimensional and model analysis, losses in pipe flow, cavitation's and separation, siphon, water hammer, boundary layer and control, pipe network. Hydraulic turbines, centrifugal pumps, reciprocating pumps, power house, classification and layout.</p>
11	<p><b>Irrigation Engineering:</b></p> <p>Water requirement of crops, methods of irrigation, lift irrigation, water logging, dams, spillways, energy dissipation, diversion head works, canal and canal structures, cross drainage works, river training works, lake tapping.</p>

12	<p><b>Roads &amp; Highway Engineering:</b></p> <p>Planning of highway systems, alignment and geometric design, horizontal and vertical curves, grade separation, cross sectional elements of highway, thin and ultra thin white topping, overlays, rigid and flexible pavement, traffic engineering.</p>
13	<p><b>Tunnel Engineering:</b></p> <p>Surveys, criteria for selection of size and shapes, driving in soft and hard grounds, mucking, dust control, ventilation, lighting and drainage, special methods of tunneling, cut and cover method, TBM, NATM, tunnel lining, Irrigation and highway tunneling, metro tunneling.</p>
14	<p><b>Estimation, costing ,valuation and Tendering:</b></p> <p>Specification, estimation, costing, tenders and contracts, rate analysis, valuation, Claims, Arbitration, Conciliation, Dispute Settlement, CVC tender/contract Guidelines</p>
15	<p><b>Environmental Engineering:</b></p> <p><u>Water supply Engineering</u> Sources of supply, design of intakes, estimation of demand, water quality standards, primary and secondary treatment, maintenance of treatment units, conveyance and distribution of treated water, rural water supply.</p> <p><u>Wastewater Engineering and Pollution Control</u></p> <p>Quantity, collection and conveyance and quality, disposal, design of sewer and sewerage systems, pumping, characteristics of sewage and its treatment, rural sanitation, sources and effects of air and noise pollution, monitoring, standards. Recycling and Reuse of treated sewage water.</p> <p><u>Solid waste management &amp; Waste to Energy</u> Sources, classification, collection, treatment and disposal. Waste to Energy.</p>
16	<p><b>Metro, Railway, Horticulture &amp; Airport Engineering</b></p>