

RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR SCREENING TEST FOR THE POST OF JUNIOR ENGINEER (CIVIL) (DEGREE HOLDERS), PUBLIC HEALTH ENGINEERING DEPARTMENT

Part – A

- 1 प्राचीन सभ्यताएं – कालीबंगा, आहड़-बैराठ
- 2 मुगल शासन और राजपूत राज्य (1526–1707)
- 3 राजस्थान में स्वतंत्रता संग्राम एवं राजस्थान का एकीकरण (1857 से 1956)
 - वास्तुशिल्प एवं स्थापत्य – मन्दिर, दुर्ग व हवेलियां
 - राजस्थान के भक्त एवं संत
 - राजस्थान की संस्कृति – रीति-रिवाज, मेले, त्यौहार, उत्सव, व्रत एवं उपवास
 - राजस्थान की लोक परम्पराएं – नृत्य, गीत, संगीत व कलाएं
 - राजस्थान के सन्दर्भ में समसामयिक घटनाएं
 - राज्य प्रशासन – कार्यपालिका, व्यवस्थापिका एवं न्यायपालिका
 - जिला प्रशासन – जिलाधीश, उपखण्ड अधिकारी एवं तहसीलदार – कार्य एवं भूमिका
 - स्थानीय प्रशासन – ग्रामीण एवं नगरीय
 - राजस्थान का सामान्य भूगोल – स्थिति, आकार, विस्तार, प्रशासनिक विभाजन, स्थलाकृतिक स्वरूप, जलवायु, वनस्पति, अपवाह व कृषि
 - सर्वेक्षण – तलेक्षण (लैवलिंग) सर्वेक्षण की विशेषताएं व समस्याएं
 - राजस्थान के हस्तशिल्प, लघु उद्योग, वृहद् उद्योग, राज्य में संचालित योजनाएं ।

Part – B

Civil Engineering

Building Technology and Construction Management

Building materials; stone, Brick, Tiles, Lime, Surkhi, Cement, Mortar, Concrete, Steel and Wood; Reinforced and Fiber reinforced cement concrete; Ferro cement, Self compacting concrete and Ready Mixed Concrete.

Brick and stone masonry, brick bonds and type of walls; Lintels and Arches; flat and pitched roofs; Damp, sound and fire proofing, Expansion and construction joints, Centering and shuttering, Stairs & Lifts, Doors & Windows.

Bar charts, Milestone charts, preparation of construction schedules; CPM & PERT.

Fluid Mechanics

Properties of fluids; Newtonian and non-Newtonian fluids; Principles of fluid statics; kinematics of flow; Equations of motion; Energy and momentum-applications; Flow measurement in pipes and open channels; Dimensional analysis and similitude; Introduction to boundary layer theory, Laminar and turbulent flow through pipes. Performance parameters and maintenance of pumps and turbines.

Surveying, Estimating Costing & Field Engineering

Basic principles, Level, Theodolite, Tacheometer, Compass and other instruments; Introduction to Total Station; Temporary and permanent adjustments; Measurement of distances and directions; Levelling; Contouring; Traversing; Adjustment of survey data; Computation of coordinates; Plane Table survey; curves, Introduction to Triangulation, Topographic, Remote sensing, GIS, GSS & GPS.

Estimation for quantities for various types of construction; like building construction, road construction. Rate Analysis, Preparation of Tender & contract documents.

Environmental Engineering

Water supply; Demand, Sources, Quality standards, Water treatment, Coagulation, flocculation, settling, filtration. Water softening; Iron, Manganese, Fluoride and Nitrate removal, Electro-dialysis, R.O, Ion exchange process and desalination.

Water distribution system, design and storage, Pumping stations and their operations.

Sewerage system; Layout and design, Characteristics of municipal wastewater, Wastewater Treatment: Treatment scheme, Activated sludge process, Trickling filters, RBC, UASB, Stabilization ponds and lagoons, Septic tank, Sludge handling and disposal.

Basics of noise pollution, Measurement of noise, standards, noise abatement.

Transportation Engineering

Properties of sub-grade soil, stone aggregates & bituminous material, significance, method & application of various tests on soil, stone aggregate and bitumen. Highway classification, design, cross-sectional elements, horizontal & vertical alignment, sight distance, types of road crossings, grade-separated intersections.

Design of pavements; C.B.R. and G.I. method; I.R.C. design method for concrete pavement.

Methods of constructing different types of roads viz. earth roads, gravel roads, WBM and WMM roads, bituminous and concrete roads.

Water Resources Engineering

Introduction, need for harnessing water resources, Irrigation practices, Irrigation; its importance and impact on environment, assessment of water requirements for crops; Methods of irrigation; canal and well irrigation, Design principles of irrigation canal, energy dissipation, salient features of diversion head works, Falls, Regulators and cross drainage structures. Reservoir and flood routing through reservoir; basic principles for design of dams and spillway,

Hydropower; General features and components of a hydropower stations. Water Harvesting and Ground Water Recharging systems.

Hydrological cycle and hydrologic budget; Precipitation, measurement and analysis, Stream flow, Rainfall-Runoff relationship, frequency analysis and Flood Routing.

Solid Mechanics

Elastic constants, plane stress and strains, Mohr's circle method, combined stress; elastic theories of failure; stress due to simple bending, shear and torsion in circular and rectangular sections.

Structural Analysis

Slopes and deflections of beams and portals using; conjugate beam method, moment area method, Maxwell's reciprocal theorem, Betti's theorem, Castigliano's theorems, Strain energy, virtual work (unit load), Three moment theorem and Muller Breslau's principle.

Soil Mechanics and foundation Engineering

Soil-mass constituents, weight volume relationships, index properties, classification of soils, Capillarity, permeability and seepage through soils, shearing strength of soil; direct shear box, tri-axial, unconfined compression test, vane shear test, etc., Determination of pore pressure coefficients, Liquefaction of soils, piping phenomenon. Soil compaction; laboratory tests and field control. Introduction to mechanical stabilization, cement, lime, bitumen stabilization. Consolidation, geo-textile & reinforced earth work,.

Types of foundations; Selection criteria, bearing capacity, settlement, laboratory and field tests, Types of piles and their design and layout. Foundations on expansive soils, swelling and its prevention, foundation on swelling soils.

Design of Concrete and Masonry Structure

Materials for cement concrete; properties and testing of cement, water, fine and coarse aggregates, brief introduction to admixtures. Concrete mix design, properties and testing of fresh and hardened concrete.

Limit state design : Design for flexure, shear, compression, torsion and combined forces. Codal provisions for slabs, beams, walls, columns and footings. Design of cantilever and counterfort retaining walls. Introduction to working stress method. Design of liquid retaining structures : Underground, resting on ground and elevated tanks; Intze tanks (Membrane analysis only).

Deterioration & durability of concrete, corrosion of reinforcement, repair and rehabilitation of RCC structures.

Prestressed concrete : Principles, Design, materials, methods & losses of pre-stressing.

IS code Provisions for Earthquake Resisting Structures.

Design of brick masonry as per IS Codes.

Design of Steel Structures :

Mild steel and high tensile steel, working stress, factor of safety, imposed loads on various types of floors and roofs, introduction to IS:875 with respect to dead loads and imposed loads. Design of riveted, welded and bolted joints. Design of tension members. Compression members; axially and eccentrically loaded columns, built up columns, Design of beams; simple and built up sections, laterally restrained and unrestrained beams, design of beam column connections. Plate girders, Design of roof trusses, column bases, column footing and grillage foundation.

Pattern of Question Papers :

- 1 Objective Type Question Paper.
- 2 Maximum Marks : 100
- 3 Number of Questions : 100
- 4 Duration of Paper : Two Hours.
- 5 All Questions carry equal marks.
- 6 There will be **Negative Marking**.
- 7 20% Questions will be from Part-A and 80% questions from Part-B.
