RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR SCREENING TEST FOR THE POST OF

JUNIOR ENGINEER (CIVIL)

(DEGREE HOLDERS),

RURAL DEVELOPMENT & PANCHAYATI RAJ 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; Introduction to Glass, Paint, Plastics, Aluminum, Reinforced and Fiber reinforced cement concrete; Ferro cement.

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; Load bearing and framed structure construction.

Bar charts, Milestone charts, preparation of construction schedules; **CPM & PERT**. Crashing on networks.

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; Laminar and turbulent flow through pipes. Performance parameters 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.

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; Electro-dialysis, R.O. and Ion exchange process desalination.

Wastewater Treatment: Treatment scheme; Activated sludge process; Trickling filters; RBC, UASB; Stabilization ponds and lagoons; Sludge handling and disposal.

Rural Water Supply & Sanitation :

Importance of village community in India, Traditional Sources of water in rural areas. Hand pump technology, its operation and maintenance, water harvesting techniques. Design consideration for rural water supply systems. Simple techniques for iron removal, deflouridation and disinfection of water, water quality surveillance.

Simple techniques for disposal and treatment of solid waste, village latrines, septic tank, soak pits, storm water and sullage problems.

Animal waste, method of composting, Biogas, Collection and disposal of waste. Health benefits of sanitation. Problem of bio-medical waste, Dairy farms and cattle shed sanitation.

Planning of Communication support in rural supply and sanitation projects.

Transportation Engineering :

Highway Material & Testing : Properties of sub-grade soil, stone aggregates & bituminous material, significance, method & application of various tests on soil, stone aggregate and bitumen.

Geometric Design : Highway classification, design, cross-sectional elements, horizontal & vertical alignment, sight distance, types of road crossings.

Highway construction and pavement design : Design of Highway Pavements : Design of pavements; C.B.R. and G.I. method; I.R.C. design method of concrete pavement and flexible pavement, Road Construction : Methods of constructing different types of roads viz. earth roads, gravel roads, WBM and WMM roads, bituminous and concrete roads with special reference to rural 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 earthen dams and spillways.

Hydrological cycle and hydrologic budget; Precipitation; measurement and analysis; Stream flow; Rainfall-Runoff relationship; frequency analysis; and flood disaster management.

Solid Mechanics

Elastic constants, stress, plane stress, Mohr's circle of stress, strains, plane strain, Mohr's circle of strain, combined stress; Elastic theories of failure; Simple bending, shear; Torsion of circular and rectangular sections and simple members.

Structural Analysis :
Slopes and deflections of determinate beams using conjugate beam method and moment area method; Maxwell's reciprocal theorem; Betti's theorem; Castigliano's theorems; Strain energy expression; Strain energy method and virtual work (unit load). Static indeterminacy; Force method, Three moment theorem; Column analogy method; Application to statically determinate structures; Muller breslau's principle.

Soil Mechanics and Foundation Engineering :

Soil and soil-mass constituents; weight-volume relationships, index properties, classification of soils, soil structure and clay minerals. Capillarity, permeability and seepage through soils, piping phenomenon, shearing strength of soil; determination of parameters by direct shear box, tri-axial and unconfined compression test, vane shear test, typical stress-strain curves for soils; determination of pore pressure coefficients. Liquefaction of soils, Soil compaction, laboratory tests and field control. Ground improvement techniques: mechanical stabilization, cement, lime and bitumen stabilization.

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

Limit state design for bending, shear, axial compression and combined forces. Codal provisions for slabs, beams, walls, columns and footings. Working stress method of design of R.C. members. Design of cantilever and counterfort retaining walls. Analysis of stresses in R.C.C. domes design of domes for axi-symmetric loading. Design of brick masonry as per I.S. code.

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. Design of roof trusses. Column bases; column footing; grillage foundation.

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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.

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