RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR COMPETITIVE EXAMINATION FOR THE POST OF LECTURER IN CIVIL ENGINEERING FOR TECHNICAL EDUCATION DEPARTMENT

PAPER - I

A. **STRENGTH OF MATERIALS:** Behaviour of engineering materials in tension, compression and shear, elastic limit, yield stress, proof stress, nominal stress, actual stress and ultimate stress, factor of safety, load factor and elastic constants. Principal stresses and strains, Strain energy, Theories of elastic failure.

Bending moment and shear force in statically determinate beams, stress due to bending moment and shear force, design of section, section modulus, elementary theory of torsion, combined bending and torsion.

B. **SOIL AND FOUNDATION ENGINEERING:** Soil Exploration: Methods of site exploration, boring, sampling, standard penetration test.

Preliminary definitions and relationship: Water content, unit, weight, specific gravity, void ratio, porosity and degree of saturation, density index, phase relationship.

Index Properties: Specific gravity, particle size distribution, consistency of soils. Classifications of soils, field identification.

Soil water: Inter-granular and pore water pressure, Quick sand phenomenon, permeability, Flow net and its uses.

Consolidation: Concept of one-dimensional consolidation. Laboratory consolidation test, over- consolidated normally consolidated soils, settlement analysis.

Shear Strength: Basic concept, Mohr-Coulomb Failure theory and measurement of shear strength. Earth Pressure: Lateral earth pressures (Active and Passive), Rankine's and Coulomb's theory.

Bearing Capacity: Definitions, Terzaghi's method, general shear and local shear failures, plate load test.

Compaction: Field Compaction method, water content, field compaction control and factors affecting compaction.

C. **THEORY OF STRUCTURES:** Statically Indeterminate Structures: Static and kinematics indeterminacy, Energy theorems, Stiffness and flexibility methods elementary analysis of structures, methods of consistent deformation, slope deflection and moment distribution. Analysis of beams (including continuous) and portal frames, Influence lines, Influence lines for moment, shear and reaction for statically determinate beams and planner trusses.

D. **STRUCTURAL DESIGN-I: RCC:** Specifications for loads on buildings and bridges. Reinforce cement concrete: Limit state theory, resistance to bending, shear and bond. Design of singly and doubly reinforced beams, one way, two way and flat slabs, columns with axial and uniaxial moment loading, footing, cantilever and counter-fort retaining walls.

E. **STRUCTURAL DESIGN-II: Steel Structures:** Tension and compression members, single and built up sections, connection and splices, roof trusses, simple beams and Purlin connections, columns, lacing and batten, Grillage, Gusseted and slab base foundation.

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Note :- <u>Pattern of Question Paper</u>

1. **Objective type paper**
2. **Maximum Marks : 75**
3. **Number of Questions : 150**
4. **Duration of Paper : Three Hours**
5. **All questions carry equal marks.**
6. **Medium of Competitive Exam : English**
7. **There will be Negative Marking.**