

**DEPARTMENT OF CIVIL ENGINEERING
ALIGARH MUSLIM UNIVERSITY, ALIGARH
SYLLABUS OF STRUCTURAL ENGINEERING FOR PHD ENTRANCE TEST 2017-18**

**SECTION - A
Multiple Choice Questions**

Part I - Multiple Choice Questions on Research Methodology (40 marks)

Writing Skill: Tenses, parts of speech, clauses, subject- verb agreement, Idioms and phrases, reading comprehension, word-meaning, synonyms-antonyms, hyponyms,

Logical and Analytical Reasoning.

Programming Skills: Data types, assignments, conditional statement, branching and looping, input and output statements.

Mathematics and Statistics: Algebra, Ordinary Differential Equation (ODE), Numerical Analysis, Real and Complex Analysis, Vector Analysis, Measure of Central Tendency, Probability Distribution Function.

Part II - Multiple Choice Questions from Syllabus of Civil Engineering (10 marks)

SECTION - B Subjective Questions (30 Marks)

Engineering Mechanics: System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Friction and its applications; Kinematics of point mass and rigid body; Centre of mass; Euler's equations of motion; Impulse-momentum; Energy methods; Principles of virtual work.

Solid Mechanics: Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Theories of failures; Simple bending theory, flexural and shear stresses, shear centre; Uniform torsion, buckling of column, combined and direct bending stresses.

Structural Analysis: Statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis.

Construction Materials and Management: Construction Materials: Structural steel – composition, material properties and behaviour; Concrete – constituents, mix design, short-term and long-term properties; Bricks and mortar; Timber; Bitumen. Construction Management; Types of construction projects; Tendering and construction contracts; Rate analysis and standard specifications; Cost estimation; Project planning and network analysis – PERT and CPM.

Concrete Structures: Working stress, Limit state and ultimate load design concepts; Design of beams, slabs, columns; Bond and development length; Pre-stressed concrete; Analysis of beam sections at transfer and service loads.

Steel Structures: Working stress and Limit state design concepts; Design of tension and compression members, beams and beam- columns, column bases; Connections – simple and eccentric, beam-column connections, plate girders and trusses; Plastic analysis of beams and frames.

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