M-49

PROFORMA

DETAILS OF ENTRANCE TEST - 2020

Name of the Faculty: Faculty of Engineering & Technology

Department/Centre: Civil Engineering

Name of the Program: M. Tech. (Earthquake Engineering)

About Program's Prospects:

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Summary of Entrance Test

S. No.	Test-Component (Strike off, if not applicable)	Test Duration (in minutes)	Max. Marks	Passing Marks	Negative Marking (Yes/No)
	Objective/ Multiple Choice Questions	90	100	15%	Yes

Any Other Information about the Entrance Test:

Important Instructions for Test (Pl. Add/modify as required):

Permissible Material/equipment for Entrance Test (as required):

- Black/Blue Ball Pen,
- Pencil

Details Syllabus for the Entrance Test

Please see Annexure

SYLLABUS FOR M.TECH. (EARTHQUAKE ENGINEERING) ENTRANCE TEST

Mechanics of Solids (30)

Stress and Strain, Stress-Strain diagrams for different materials; Mechanical Properties of materials, Saint Vainant's principle, principle of superposition, bars of uniform and variable cross sections, compound/ composite bars, temperature stresses. Analysis of stress & strain, plane stress & plane strain, Mohr's circle; Strain Rosettes; Hooke's law, elastic constants and their relationships.

Shear Force and Bending Moment; Thin and thick cylindrical shells. Torsion: circular and non circular shafts; simple theory of bending, shear stresses in beams, Unsymmetrical bending, Short compression members: middle third rule, core or kernel; Long columns: Euler's Rankings and Secant formulae; Deflection: Double integration and Macaulay's method, moment area method, conjugate beam method, energy methods, Law of conservation of energy, virtual work on rigid and elastic bodies; Betti's law and Maxwell's law of reciprocal deflection; Method of virtual work, unit load method, Castigliano's theorems.

Civil Engineering Materials (10)

Cement: types of Portland cement, pozzolanic cement, hydration mechanism and hydration products, grade of cement, tests on cements, relevant IS codes.

Plain concrete; additives and their types, concrete mix design; Reinforced cement concrete, pre-stressed concrete, polymer concrete, fiber reinforced concrete; Ferro-cement; ready mix concrete; self compacting concrete; Other Materials: Fly-ash, smart materials, composite materials.

Timber: structure of wood, defects in timber, seasoning, preservation

Structural Analysis (30)

Stability and static determinacy & indeterminacy; 3-hinged parabolic & circular arches, spandrel braced arches, 2-hinged arches and fixed arches; Deflection of pin jointed plane trusses, rigid frames, due to loads and temperature variation; fabrication error and camber; Influence Line Diagrams and Muller Breslau Principle for determinate and indeterminate structures.

Analysis of cables and suspension bridges with three and two hinged stiffening girders; Three Moment Theorem; Slope deflection method; Moment distribution method; Column analogy method, Substitute frames; Cantilever and Portal method; Force/ flexibility method, Stiffness/ displacement methods, Plastic analysis of steel structures, yield moment and plastic moment, shape factor and methods of analysis, Gable frames or frames with inclined members, two bay portal frames; Structural dynamics: simple harmonic motion, free vibration, damping, mass and stiffness

Design of Structures (20)

Steel: Limit State Design; bolted and welded connections; Design of tension and compression members; Design of slab base and gusseted base; Design of beams; Design of plate girder, gantry girder and roof trusses.

Concrete: Design philosophies – Working stress and limit state; Design of singly/ doubly rectangular and flanged beam sections in flexure, shear and torsion; Design of one way and two way slabs; Flexural and anchorage bond stress, development length and anchorage length; Design of short columns under axial compression and uni-axial bending: design of isolated and combined footings, pre-stressed concrete: methods and systems, anchorages, pre-stress losses, analysis and design of sections for flexure by working stress method.

Geotechnical Engineering (10)

Origin and formation of soils, classification of soils, permeability of soils, stress distribution, shear strength lateral earth pressure, stability of slopes, site investigations, soil stabilization, bearing capacity of soils, types of foundation.