UNIT I

Syllabus : Types of sections used Tension member. Strength of tension member governed by yielding of section, rupture of net cross-section and block shear. Design of axially loaded single angle and double angle tension members with bolted and welded connections

UNIT II

Syllabus : Types of sections used as compression members. Calculation of effective length, radius of gyration and slenderness ratio. Permissible values of slenderness ratio as per IS 800. Design compressive stress.

Strength of axially loaded single and double angle struts connected by bolted and welded connections with gusset plate only. Limits of width to thickness ratios to prevent local buckling.

Design of axially loaded single angle and double angle compression members with bolted and welded connections.

Introduction to built up sections, lacing and battening (Meaning and purpose). Diagrams of single and double lacing and battening system. (No numerical problems).

UNIT III

Syllabus : Meaning and conditions for providing doubly reinforced Sections. Stress in steel (f_{sc}) for different values of d'/d ratio. Analysis of doubly reinforced sections : strain and stress diagrams, numerical problems on ultimate moment of resistance of a doubly reinforced beam. Design of doubly reinforced sections for given size and loading, calculation of A_{st} and A_{sc} only.

UNIT IV

Syllabus : Meaning and conditions for formation of flanged (T and L) beams, as per IS 456 : 2000, comparison with rectangular beams, effective width of flange. Analysis of singly reinforced flanged beams having neutral axis in flange or web. Determination of Moment of Resistance. Determination of reinforcement in a singly reinforced flanged beam for the given dimensions. (Neutral axis lies in flange only).

UNIT V

Syllabus : Various clauses in IS456-2000 regarding effective span and load calculation for typical flight of a dog legged staircase. Live load on staircase of different types of buildings such as residential, office, commercial, public, factory etc. Load calculation for a typical flight of a dog legged staircase with load distribution on landing slab as per IS 456-2000. Design of waist slab of a dog legged staircase for given rise, tread, width, and number of steps, with supporting beams at the ends of flight, parallel to steps, with supporting beams at the ends of flight, parallel to steps. Reinforcement detailing of typical flight of dog legged staircase.

UNIT VI

Syllabus : Introduction to rectangular and circular columns and related codal provisions in IS 456-2000. Procedure and numerical problems on design of axially loaded short circular columns with lateral and spiral ties. Procedure and numerical problems on design of axially loaded short rectangular and circular columns with lateral and spiral ties. Introduction to various types of RCC footings like isolated, stepped and sloped footings, combined footings, piles, raft, eccentric footing. Design of isolated rectangular footing of uniform depth. Flexural design with checks for one-way shear, two-way shear and bond.

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