

Time: 3 Hours

Maximum Marks-80

Please Note:

- (1) All questions carry equal marks.
- (2) Question No. 1 is compulsory, attempt any three out of the remaining five questions.
- (3) Use of IS 456:2000 is permitted
- (4) Assume suitable data if required and state it clearly.

Q1) Attempt any 4 out of 6 from following questions. Each question carries 5 marks.

20

- (a) What is Raft footing? When it is provided? Draw section and plan of raft footing.
- (b) Differentiate between One Way slab and Two way slab also give IS recommendation.
- (c) Write short note on Limit State of Collapse and Limit State of Serviceability.
- (d) What is necessity of providing shear reinforcement?
- (e) Explain function of transverse reinforcement in a column with IS Specification.
- (f) Discuss the Codal recommendation for curtailment of reinforcement in Slab, Column and beam.

Q2) (a) A rectangular beam of width 350 mm subjected to uniformly distributed load of 15kN/m over an effective span of 8m. Design the singly reinforced beam. Use M20 and Fe 250. Adopt Working Stress Method

10

(b) Calculate the limiting moment of resistance area of steel for an Isolated reinforced T-beam having:-

Flange width= 1600mm

Effective depth= 350mm

Thickness of flange= 100mm

Width of web= 250mm; Use M20 and Fe500. Adopt Limit State Method.

7

(c) What are advantages of T-beam over rectangular beam

3

Q3) (a) Design doubly reinforced beam for: Size of beam = 250 mm x 450 mm (effective), Bending Moment = 65000 N.m & effective cover = 50 mm. Use M20 and Fe415. Adopt

8

Working Stress Method.

(b) Design a rectangular beam 230mm x 600 mm over an effective span of 5m. The superimpose load on the beam in 50 kN/m. Effective cover to reinforcement is take as 50mm. Use M20 concrete and Fe 415 steel. Sketch details (plan & section at midspan and section at support).

12

Adopt Limit State Method.

Fy (N/mm ²)	d'/d			
	0.05	0.1	0.15	0.2
415	355	353	342	329

Q.P. Code
86537

Program Code:
1T00635

- Q4) (a)** A simply supported beam 300 mm x 600 mm (effective) is reinforced with 5-25mm ϕ bars. It carries a uniformly distributed load of 80kN/m including its self-weight over an effective span of 6m. Out of 5 bars 2 are bent up near support. Design shear reinforcement of beam. Use M20 and Fe415. Let width of bearing be 400mm. Sketch the details. 10
- (b)** A simply supported slab of a corridor of hospital building has a clear span of 2.5 m and is supported on beam 230mm width. Design the slab, if beam carrying a live load of 5kN/m². Use M20 and Fe 415. Sketch the details (plan and section) 10
- Q5) (a)** Design the reinforcement for column of size 300 mm x 400 mm having an effective length of 3.5m. An axial load of 1000kN and moment of 150 kN-m about the major axis of column are acting on the column. Use M25 and Fe 415. $d'=40$ mm 12
- (b)** Explain the Combined rectangular pad footing and slab beam footing and draw reinforcement details (Plan and section of bottom and top reinforcement). 8
- Q6) (a)** Design rectangular footing of uniform thickness for an axially loaded column of size 300 mm x 600 mm load on column is 1150kN. Safe bearing capacity of soil is 200kN. Use M20 concrete and Fe 415 steel. 12
- (b)** Design a short RCC column to carry axial load of 1600 kN. It is 4m long, effectively held in position and restrained against rotation at both the ends. Use M20 concrete and Fe 415 steel 8

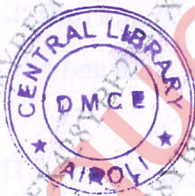


Chart 13.4. (Chart 44 of Design Aids) Compression With Bending—Rectangular Section—Reinforcement Distributed Equally on Four Sides

