Register No.: .... Name: ....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER M.TECH DEGREE EXAMINATION (Regular), DECEMBER 2023
STRUCTURAL ENGINEERING AND CONSTRUCTION MANAGEMENT
(2021 Scheme)

Course Code: **21SC102**

Course Name: **Advanced Design of Concrete Structures**

Max. Marks: **60**   **Duration: 3 Hours**

of IS 456:2000, SP 16, IS 875, IS 13920, IS 2911 Part 1 are permitted

(Answer one full question from each module)

MODULE I

1. a) Write down design procedure of a slender column. (5)
   b) List the IS 456 recommendations for the lateral reinforcement in a column. (4)

OR

2. Design a RCC column for the following particulars: size of the column 400 mm x 300 mm, unsupported length =7m, L_{ex} =6.0 m, L_{ey}=5.0 m, factored load =1300 kN, factored moment in the direction of larger dimension 40 kNm at top 22.5 kN m at bottom, factored moment in the direction of shorter dimension 30 kNm at top 20 Knm at bottom. The column bends in single curvature, use M 30 grade concrete and Fe 415 grade steel. (9)

MODULE II

3. A beam AB of 4 m span and fixed at end, carries an uniformly distributed load of 30 kN/m at collapse. Draw maximum bending moment diagram as per IS 456:2000. (9)

OR

4. a) Explain the ductile detailing for flexural members as per IS 13920 with a neat sketch. (5)
   b) Explain the terms 'short term' and 'long term' deflection in beam (4)

MODULE III

5. A beam 3500mm deep and 250mm wide is continuous over two span of length 4.5m each carries a uniformly distributed load of 160kN/m. Design the beam using M20 concrete and Fe 415 steel. (9)

OR

6. Design a shear wall of length 4.3m, thickness 250mm subjected to the following forces

(9)

Loading	Axial force (kN)	Moment (kNm)	Shear (kN)
D.L + L.L	2000	650	25
Seismic load	250	4800	725

MODULE IV

7. Design an interior & exterior panel of a flat slab with panel size 6m × 6m and is without drop and column head supported by Columns of size 500mm × 500mm. Take live load as 4kN/m². Use M20 Concrete and Fe 415 steel.   (9)

OR

8. a) What is the difference between a drop panel and a column head?   (4)
   b) A walkway consists of a slab 5.4m between edges supported on a spandrel beams 200mm × 650mm in size, which in turn is carried on 300mm × 200mm columns spaced at 7.5m centres. Assuming that the total factored load on the walkway is 6kN/m2 and the slab thickness is 150mm, determine the torsional moment in the spandrel beam and the walkway slab.   (5)

MODULE V

9. a) Explain group efficiency in a pile group   (6)
   b) What are the different types of Piles?   (6)

OR

10. Design a pile cap for a group of 2 piles spaced at 1.5 meter apart. Piles are 300 mm in diameter. Size of the column is 500mm x 500 mm and transmits a factored load of 1000 KN. adopt M 20 concrete and Fe 415 steel.
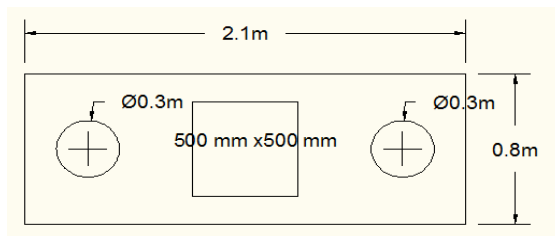
(12)

MODULE VI

11. a) Draw the ductile detailing of column and foundation.   (4)
    b) What are the conditions to be checked while fixing beams and columns in buildings?   (8)

OR

12. Design and sketch the reinforcements of slab, beam and column of the Portal frame of a hall 14m wide. The Portal frames are spaced at 4m interval with the base fixed. Height of frame from base to the centre of beam is 5.5m. Take thickness of slab as 110mm. Live load on slab is 2 kN/m. (12)

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