

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER M.TECH DEGREE EXAMINATION (Regular), FEBRUARY 2022*(Structural Engineering and Construction Management)***(2021 Scheme)****Course Code :** 21SC102**Course Name:** Advanced Design of Concrete Structures**Max. Marks :** 60**Duration: 3 Hours***Use 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 braced Column 300mm × 400mm is to carry a factored axial load 1200kN and a factored moment of 50kNm with respect to major and minor axis respectively at top end. The column is bend in double curvature in both direction in both direction with moment at the bottom is 40% of the corresponding moment at top. Design the longitudinal reinforcement for the column if its unsupported length 7.2m with an effective length ratio 0.85 in both direction. Use M20 concrete and Fe 415 steel. Effective cover =60mm. (9)

OR

2. a) Write down design procedure for Short Column under biaxial moment. (5)
b) What are the conditions to be verified in arrangement of transverse reinforcement in column. (4)

MODULE II

3. Design a continuous rectangular beam of span 8m to carry a dead load of 9kN/m and live load of 15kN/m. The beam is continuous over more than 4 spans and is supported by columns. Use M20 concrete and Fe 415 steel. Provide an effective cover of 40mm. (9)

OR

4. a) Explain the Inelastic behaviour of concrete beams (4)
b) Explain about the Limit State analysis of concrete beams (5)

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

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

(9)

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 415steel. (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

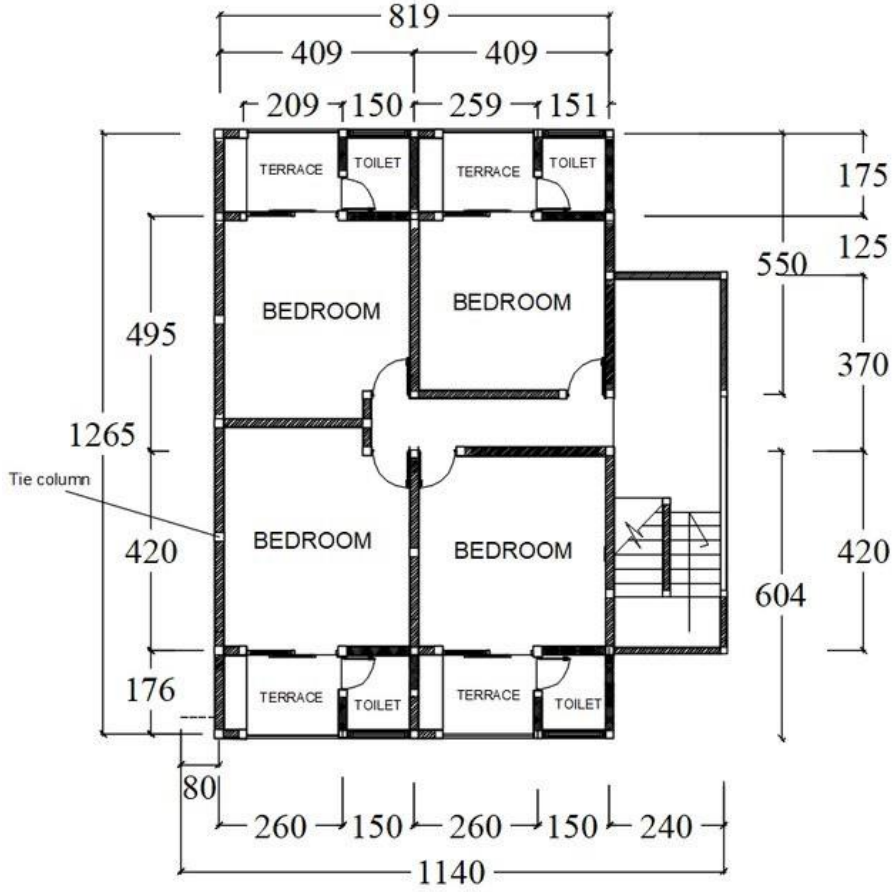
10. Design a pile under a column transmitting an axial load of 1000kN. The pile is to be driven to a hard stratum available at a depth of 8m. Use M20 Concrete and Fe 415 Steel. (12)

MODULE VI

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

OR

12. Create the beam layout, column position and column orientation for a plan shown in figure 1. Also calculate the preliminary loads, section dimensions with the following details (12)
 Building type: Residential
 Total Floor: G+3
 Beam type: Rectangular section
 Load: Dead load and Live Load only



All Dimensions in cm

Figure 1
