

Register No: Name:



SAINTGITS COLLEGE OF ENGINEERING KOTTAYAM, KERALA

(AN AUTONOMOUS COLLEGE AFFILIATED TO
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER M.TECH. DEGREE EXAMINATION(R), MARCH 2021 GEOMECHANICS AND STRUCTURES

**Course
Code:
Course
Name:**

20CEGST107

ADVANCED DESIGN OF CONCRETE STRUCTURES

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

(Answer all full questions)
MODULE I

1. An RC braced column 300 x 400mm is subjected to $P_u=1500\text{kN}$, ultimate moment $M_y=60\text{kNm}$ at top and ultimate moment $M_y=8\text{kNm}$ at bottom. The column is bent in double curvature about minor axis. Determine the design moment. The total unsupported length is 8m, effective length is 6m about both axes. Assume $K_a=1$. (9)

OR

2. A corbel is to be attached to an RC column of size 250 x 400mm at its shorter side. The corbel is to carry a factored load of 400kN at a distance of 200mm from the face of the column. Design the corbel using M25 concrete and Fe415 steel. Sketch the detailing. (9)

MODULE II

3. (a) A walkway consists of a slab 5.4m between edges supported on spandrel beams 200mm x 600mm in size, which in turn is carried on 300mm x 200mm columns spaced at 7m centres. Assuming that the total factored load on the walkway is 6kN/m^2 and the slab thickness is 150mm, determine the design torsional moment in the spandrel (edge) beams and the walkway slab. (5)
- (b) Draw the Yield line pattern of
- Square Slab with simply supported edges acting udl of $W/\text{unit area}$.
 - Rectangular slab with two edges simply supported and other two adjacent edges are fixed acted upon a udl of $W/\text{unit area}$ (4)

OR

4. Calculate design moments in interior and exterior panel of flat slab with panel size 5m x 6m supported by columns of size 500mm x 500mm, floor to floor height is 4.5m. Provide suitable drop. Take live load as 4kN/m^2 and a finishing load of 1kN/m^2 . Use M25 concrete and Fe415 steel. (9)

MODULE III

5. (a) Bring out the differences between ordinary RCC wall and shear wall, with sketches (3)
- (b) Discuss the detailed design procedure of RCC grid floor. (6)

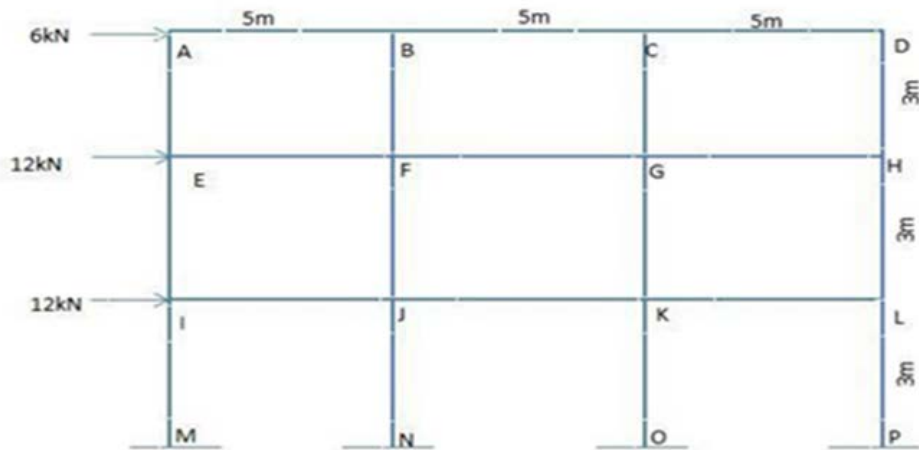
OR

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6. A reinforced concrete waffle slab for a hall of size 9mx12m. It is made of precast funicular shells so that the ribs are spaced at 1.5m center to center. The LL on the floor is 2KN/m². Use M20 concrete and Fe415 steel. Analyze the baffle slab by Rankine Grasshoff for moment and shear. Design the completely and sketch the reinforcement. (9)

MODULE IV

7. Analyse the building frame subjected to horizontal forces as shown in the figure below using Portal method and determine the Moments at the columns in each storey. (9)



OR

8. (a) Write down the assumptions made in Cantilever method (3)
(b) Discuss the detailed analysis procedure of multi-storey building using Cantilever method (6)

MODULE V

9. A Continuous beam ABC of span 6m each, A & B simple supported and its continuous over support B, carries a uniformly distributed service load of DL= 25kN/m and LL= 15kN/m. Draw the bending moment envelop diagram as per recommendations of IS 456:2000. (12)

OR

10. (a) Briefly describe about the inelastic behaviour of beam (6)
(b) Explain moment rotation curve (6)

MODULE VI

11. (a) What are the measures to be adopted for ensuring quality of concrete structures? (6)
(b) Explain the different procedures for strengthening of existing structures. (6)

OR

12. Draw the Ductile detailing diagram of beam, beam-column junction, column-footing. (12)
