

**BACHELOR OF ENGINEERING (CIVIL ENGG.) 3RD YEAR 1ST SEMESTER
SUPPLEMENTARY EXAM 2024**

Subject: DESIGN OF STRUCTURES -I PART -I TIME:3HRS Full Marks: 100

(50 marks for each part)

Use Separate Answer scripts for each Group / part
Assume necessary data if required
IS 456:2000 allowed in the exam hall

		14+18+18=50
1.	Write down the assumptions of limit state method and the deduce the formula for the moment resistance of Limit State method with neat sketch	6+8=14
2.	A simply supported RCC beam having effective span 7.75 m. subjected a live load 25 kN/m. design the beam for maximum bending moment and maximum shear force and draw the section. Assume M25 grade of concrete and Fe 415 grade of steel.	18
3.	Design a two-way slab for an office floor to suit the following data. Size of office floor =4.5 m by 6.5 m Edge conditions = Two adjacent edge discontinuous Live load =4.5 kN/m Floor finish=1.5 kN/m Material = M20 grade concrete and Fe-415 HYSD bars. Draw the necessary reinforcement detail (both top and bottom reinforcements)	18

[Turn over

EX/CE/5/T/301/2024(S)

BACHELOR OF ENGINEERING (CIVIL ENGINEERING)
THIRD YEAR, 1ST SEMESTER SUPPLEMENTARY EXAM 2024
DESIGN OF STRUCTURES-I

Time : 3 hours

Full Marks : 100

PART-II (50marks)

(use separate answer script for each part)
The figures in the margin indicate full marks

Assume reasonable value of any data if required.
IS code No. 456 & SP 16 are allowed in examination hall

Answer any two question

1. Design a concrete column of size 400mm x 700mm using the following data. Apply 'Limit state method' as per IS 456. Grade of steel Fe 415, Grade of concrete M30. i) Factored Axial Compressive load 1600 KN ii) Factored Moment along X axis 250 KN-m.
Show detail of reinforcement through neat sketches. 25
2. Design a continuous beam of five equal spans of 5.0 m each which carries an uniformly distributed dead load (including self-weight) 25KN/M and uniformly distributed live load 7 KN/M. Consider grade of concrete M25 and grade of steel Fe415. Width of beam to be considered as 250mm. IS code coefficient for bending moment and shear force to be used. Apply 'Limit State Method' as per IS 456. Draw detail arrangement of reinforcements. 25
3. Design an isolated footing using the following data.
i) column size 500mm x 500mm ii) Axial Compressive load 2000 KN iii) Moment along X axis 150 KN-m. iv) Net safe bearing capacity 200 KN/sqm at a depth of 1.5m from GL. v) Partial safety factor = 1.2.
Apply 'Limit state method' as per IS 456.
Grade of steel Fe 415 & Grade of concrete M25.
Draw detail arrangement of reinforcements. 25