

BACHELOR OF ENGINEERING (CIVIL ENGG.) 3RD YEAR 1ST SEMESTER 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

		17+8+8+17=50
1.	A simply supported RCC beam having effective span 4.25 m. subjected a live load 20 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.	17
2.	A simply supported beam is 300 mm by 500 mm and has 2 no. 20 TOR bars going into support. If the shear force at the center of support is 115 kN at working loads, determine the anchorage length and draw the necessary sketch. Assume M25 mix and Fe 415 grade TOR steel.	8
3.	Deduce the formula for the moment resistance of Limit State method with neat sketch.	8
4.	Design a two-way slab for an office floor to suit the following data. Size of office floor =4 m by 6 m Edge conditions = Two adjacent edge discontinuous Live load =4 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)	17

[Turn over

EX/CE/5/T/301/2024

BACHELOR OF ENGINEERING (CIVIL ENGINEERING)

THIRD YEAR, 1ST SEMESTER 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

- 25**
1. Design a continuous beam with four spans of 6 m, 5.1m, 5.5m and 6m respectively which carries a uniformly distributed dead load (including self weight) 30 KN/M and uniformly distributed live load 10 KN/M. Consider grade of concrete M25 and grade of steel Fe415. Width of beam to be considered as 250mm. IS code coefficient as per IS 456 for bending moment and shear force to be used. Apply 'Limit State Method' as per IS 456. Draw detail arrangement of reinforcements.
- 25**
2. Design a concrete short column section of size 400mm x 500mm using the following data
i) Factored Axial Compressive load 2000 KN ii) Factored Moment along X axis 100 KN-m. iii) Factored Moment along Y axis 90 KN-m iv) Unsupported length of Column is 3m.
Apply 'Limit state method' as per IS 456.
Grade of steel Fe 415 & Grade of concrete M25.
Show detail of reinforcement through neat sketches.
- 25**
3. Design an isolated footing using the following data.
i) column size 400mm x 400mm ii) Axial Compressive load 1900 KN iii) Moment along X axis 170 KN-m. iv) Net safe bearing capacity 200 KN/sqm at a depth of 1m 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.