Course Code: 23CE5T01

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

III B. Tech I Semester Regular Examinations (BR23) NOV/DEC-2025

DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES

CIVIL ENGINEERING

Time: 3 hours Max. Marks: 70

Answer any ONE Question from **Part–A**, and any THREE Questions from **Part–B**

Please specify the IS codes to be allowed to the student in the Examination hall.

PART A (1 X 28 = 28M)

SN	QUESTION	MARKS	CO	BL
1	Design the reinforcements in a short column 230 mm by 300 mm subjected to an ultimate axial load of 340 kN together with ultimate moments of 30 kN.m and 18 kN.m about the major and minor axis respectively. Adopt M-20 grade concrete and Fe-415 HYSD bars. Sketch the reinforcement details.	28 M	CO4	BL6
	(or)			
2	A simply supported roof slab for room of 6.5m x 5m clear dimension is resting on RC beam 230 mm of width. Design the slab if it carries live load of 5 kN/m2. Use M20 grade concrete and Fe 500 grade steel. Apply necessary design checks and neatly sketch the detailing of slab reinforcement. (Use limit state method)	28 M	CO5	BL6
	PART B			
3	A reinforced concrete beam of size 250mmX 450mm effective depth is reinforced with 2no. 16mm diameter bars at top and 3no. 16mm diameter bars at bottom. Find out the moment of resistance of the section. The materials are M20 concrete and Fe415 HYSD bars using working stress method.	14 M	CO1	BL4
4	A R.C. beam of rectangular section 250mm wide and 600mm deep is reinforced on tension side by 4bars of 20mm diameter. The chacteristic strengths of concrete and steel used are 25N/mm2 and 460N/mm2. a) Calculate the ultimate moment of resistance of the section, b) determine the maximum uniformly distributed load a simply supported beam of this section can carry over a span	14 M	CO2	BL5
5	A simply supported beam with clear span 6000mm , b=400mm,d=560mm carries a limit state load of 175kN/m (including self weight, dead load and live load). It is reinforced with 4 bars of 28mm diameter tension steel (Ast=2464mm2) which continue right into the support. Take M20 concrete and Fe415 steel. Design the shear reforcement.	14 M	CO3	BL6
6	Design an isolated footing for a column 500mm X 500mm, transmitting an axial load of 1200kN. The column is reinforced with 8 bars of 20mm diameter. The safe bearing capacity of soil is 120kN/m2 . Use M20 concrete and Fe415.	14 M	CO4	BL6
7	Design the stairs for a public building, supported on wall on one side and stringer beam on the other side. The horizontal span of stairs is 1.4m. The risers are 120mm and tread are 300mm. Use M20 mix and Fe415	14 M	CO5	BL6