Course Code: 1950121   Roll No: MLRS- R19

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
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MLRS

III B.Tech I Sem Regular End Examination, January 2022
Structural Engineering – I (RCC)
(CIVIL)

Time: 3 Hours.   Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.
2. In Part – A, answer all questions which carries 20 marks.
3. In Part – B, answer any one question from each unit.
   Each question carries 10 marks and may have a, b as sub questions.

PART- A
                                              (10*2 Marks = 20 Marks)

1.	a)	What are the different types of loads that have to be considered in the design of a building?	2M	CO1	BL1
	b)	What is balanced section?	2M	CO1	BL1
	c)	Give any two structural members subjected to torsion.	2M	CO2	BL1
	d)	Differentiate bond and anchorage.	2M	CO2	BL2
	e)	Write the various types of slab.	2M	CO3	BL1
	f)	Difference between one-way and two-way slabs.	2M	CO3	BL1
	g)	Write the expression for eccentricity of columns.	2M	CO4	BL1
	h)	Differentiate between uni-axial and bi-axial column.	2M	CO4	BL2
	i)	Define punching shear.	2M	CO5	BL1
	j)	Define footing. Mention the different types of footings.	2M	CO5	BL1

PART- B
                                              (10*5 Marks = 50 Marks)

2	a)	Discuss the terms of (i) Neutral axis (ii) Moment of resistance (iii) Lever Arm	5M	CO1	BL2
	b)	A doubly reinforced beam with b = 500 mm has to carry a dead load moment of 80 Nm and a live load moment of 10 Nm. Using M_{20} concrete and Fe-415 grade steel, calculate the required steel using Limit state method of design.	5M	CO1	BL3

<div align="center">OR</div>

3		Design a rectangular simply supported reinforced concrete beam over a clear span 6m. The super imposed load is 30KN/m and support width is 230mm each. Use M_{20} grade concrete and fe-415 grade steel. Check the design for deflection.	10M	CO1	BL6
4	a)	Differentiate shear failure and bending failure. Draw sketches for different types of shear reinforcement.	5M	CO2	BL2
	b)	A simply supported beam is 6m is span and carries a characteristic load of 60KN/m. if 6 numbers of 20 mm bars are provided at the center of the span and 4 numbers of these bars are continued into the supports, check the	5M	CO2	BL3

development length at the supports assuming grade M_{15} concrete and Fe 415 steel.

OR

5	Design the reinforcement required for a rectangular beam section for the following data. Size of the beam 300mmX500mm, factored moment = 80KN-m, Factored torsion = 40 KN-m, Factored shear force =70 KN. Use M_{20} concrete and Fe-415 steel. Also draw the details of the reinforcement.	10M	CO2	BL6
6	A simply supported RCC slab has to be provided for the roof of a room clear dimensions 3m x 8m. width of supporting wall is 300mm. The weight of weathering course over the slab is $1KN/m^2$. Take the live load on the slab as $2KN/m^2$. Design the slab using M_{20} grade concrete and HYSD bars. Check the design for stiffness.	10M	CO3	BL6

OR

7	Design one of the flight of a dog-legged stairs spanning between landing beams using following data. Number of steps in a flight = 10 Tread = 300 mm Rise = 150mm Width of landing beams = 300mm	10M	CO3	BL6
8	Design the uni-axial bending of rectangular RC column of size 300 x 400mm is subjected to a design ultimate load of 1200KN and ultimate moment of 200KN-m with respect to the major axis. Adopt M_{20} grade of concrete and fe-415 grade steel. Design the column by providing reinforcement in only two sides	10M	CO4	BL6

OR

9	Design the reinforcement required for a column which is restrained against sway using the following data. Size of column=530x450mm, l_{eff}=6.6m, unsupported length = 7.70m. Factored load =1600kN. Factored moment about major axis = 45KN-m at top and 30kNm at bottom. Factored moment about minor axis = 35KN-m at top and 20KN-m at bottom. Use M25 grade concrete and Fe 500 grade HYSD bars. Column is bent in double curvature and reinforcement is distributed equally on all the four sides of the section.	10M	CO4	BL6
10	A rectangular RCC column of size 400 mm x 600 mm carrying an axial load of 1800kN.If the safe bearing capacity of the soil is $150kN/m^2$. Design a suitable footing. Use M_{25} concrete and Fe415 steel. Sketch the design details also.	10M	CO5	BL3

OR

11	Design a combined footing for the two columns at a multi-storey building. The columns of size 400mmx400mm transmit a working load of 300KN each and they are spaced at 5m c/c . The safe bearing capacity of soil at site is $200KN/m^2$. Adopt M_{20} grade concrete and Fe415 grade steel. Sketch the details of reinforcements in the combined footing.	10M	CO5	CO6

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