B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E.   **Semester: V**

Branch: CIVIL ENGINEERING   **Duration: 3 hrs.**

Course Code: 23CV5PCDRC / 22CV5PCDRC   **Max Marks: 100**

Course: Design of RC Structures

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

			UNIT - I	CO	PO	Marks
1	a)		Discuss the concept of failure of RCC members subjected to flexure.	Co1	Po1, Po2	**10**
	b)		A RCC beam is 230mm x 450mm in section. The beam is reinforced with 4 bars of 16 mm diameter in the tension zone.Calculate the maximum intensity of imposed UDL the beam can carry safely over a simply supported span of 6m. Use M25 grade Concrete. Assume exposure level as severe.	Co1	Po1, Po2	**10**
			OR			
2	a)		From first principles, calculate the depth of limiting neutral axis and stress block parameters using Limit state of collapse method of design.	Co1	Po1, Po2	**8**
	b)		A RCC beam simply supported over a span of 5m. The width of flange is 600 mm x 100 mm and the web is 500 mm deep and 200 mm thick. Calculate the maximum allowable flexural moment the beam can carry safely if the tension reinforcement is equal to limiting steel. Assume M20 grade Concrete and Fe415 steel.	Co1	Po1, Po2	**12**
			UNIT - II			
3			A RCC beam is required to carry an imposed UDL of intensity 45kN/m over a simply supported span of 7m. The architectural requirements have restricted the depth of beam to 500mm. Design the beam and sketch the reinforcement details. Use M20 grade Concrete and Fe500 grade steel.	CO2	Po1, Po3	**20**
			OR			
4			A RCC beam 230mm x 500mm in section is subjected to a maximum bending moment of 125kN-m together with a torsional	CO2	Po1, Po3	**20**

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		moment of 15 kN-m and a shear force of 20 KN. Design the beam and sketch the reinforcement details. Assume M25 concrete and Fe500 steel.			
		UNIT - III			
	5	Design a RCC slab measuring 4.2m x 5.75m to carry a live load of 4 kN/m^2. The slab is supported on beams with two adjacent edges discontinuous. Assume M20 grade concrete and Fe415 steel. Sketch the reinforcement details	*CO2*	*Po1, Po3*	**20**
		OR			
	6	A RCC slab is proposed for a room measuring 3.5m x 5m resting on 230mm thick BBM walls. The live load on the slab is 3kN/m^2. Design the slab and sketch the reinforcement details. Use M25 grade Concrete and Fe500 grade Steel. The slab is discontinuous on all edges and corners are held down.	*CO2*	*Po1, Po3*	**20**
		UNIT - IV			
	7	A RCC Column 230mmx 450mm is required to carry an axial load of 900kN together with bending moments of 25kN-m and 60kN-m about the two orthogonal axes. Design the column and sketch the reinforcement details.	*CO2*	*Po1, Po3*	**20**
		OR			
	8	a) A RCC column 200mm x 500mm is required to carry an axial load of 1200kN together with a bending moment of 50kN-m about major axis. The height of the Column is 7m. Design the column and sketch the reinforcement details. Use M25 grade Concrete and Fe500 grade steel.	*CO2*	*Po1, Po3*	**12**
		b) Explain the necessity of providing longitudinal and transverse reinforcement in columns.	*CO2*	*PO1*	**8**
		UNIT - V			
	9	A dog legged stair is proposed given the following details. Design the stair and sketch the reinforcement details. i). Room dimension 2.8m x 5.0m ii). Floor to floor height = 3.0m iii). Live load =4kN/m^2 iv). Use M20 grade concrete and Fe415 steel	*CO2*	*Po1, Po3*	**20**
		OR			
	10	Design an isolated RCC footing for a column of size 230 mm x 450 mm is reinforced with 8 bars of 20 mm diameter & 8 mm laterals at 200 mm c/c to carry an axial load of 750 kN. Assume SBC of soil to be 180kN/m^2. Use M20 concrete and Fe415 steel. Sketch the reinforcement details.	*CO2*	*Po1, Po3*	**20**

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