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

Autonomous Institute Affiliated to VTU

July 2024 Semester End Main Examinations

Programme: B.E.
Branch: Civil Engineering
Course Code: 22CV5DCDRC
Course: Design of RC Structural Elements

Semester: V
Duration: 3 hrs.
Max Marks: 100

Instructions:
1. Answer any FIVE full questions, choosing one full question from each unit.
2. Use of IS:456-2000, SP-16 Design charts for columns are permitted
3. Missing data, if any, may be suitably assumed.

			UNIT - I	CO	PO	Marks
1	a)		Explain the significance of bond in RC members and list the factors influencing bond resistance.	CO1	PO1	**07**
	b)		Calculate the development length for a bar of 25mm diameter to carry 75% of its full design strength. Assume bar is Fe 415 grade and concrete grade as M20.	CO1	PO1	**04**
	c)		A rectangular RCC beam 230x500mm in size is reinforced with 2 bars of 16mm diameter and 2 bars of 20mm diameter as tension reinforcement. Calculate the intensity of imposed load the beam can carry over a cantilevered span of 2.5m. Assume Fe 415 grade steel, M20 concrete and exposures level as moderate.	CO1	PO1, PO2	**09**
			OR			
2	a)		Using the concepts of Limit state of collapse for flexure, derive expressions for depth of limiting Neutral axis and stress block parameters.	CO1	PO1	**08**
	b)		An RCC T-beam simply supported over a span of 6.5m (effective span) is reinforced with 6 nos. of 20mm diameter steel bars. The flange is 600mm wide and 110 mm deep and the web is 200mm wide and 600mm deep. Calculate the moment of resistance of the section. Assume Fe 415 grade steel and M20 concrete.	CO1	PO1, PO2	**12**
			UNIT - II			
3			A rectangular RCC beam 300x550mm in size is simply supported over an effective span of 6m. The beam carries a safe imposed udl of 38kN/m along with an ultimate torsional moment of 30kN-m. Design the beam and sketch the reinforcement details. Assume exposure level as mild. Assume Fe 415 grade steel and M20 concrete are used.	CO2	PO1, PO3	**20**

			UNIT - III			
4			A RCC slab is proposed for a corridor measuring 3.5m x 5m resting on 230mm thick BBM walls along the longer edges. The live load on the slab is $3kN/m^2$, partition load is $1.5kN/m^2$. Design the slab and sketch the reinforcement details. Use M20 Concrete and Fe415 grade steel.	*CO2*	*PO1, PO3*	**20**
			OR			
5			Design a RCC slab measuring 4.25m x 6.5m to carry a live load of $3kN/m^2$. The slab is supported on beams 300mm wide with one long edge discontinuous. Assume M20 concrete, Fe415 steel and exposure level as mild. Sketch the reinforcement details.	*CO2*	*PO1, PO3*	**20**
			UNIT - IV			
6			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. The length of the column is 5.5m. Design the column and sketch the reinforcement details.	*CO2*	*PO1, PO3*	**20**
			UNIT - V			
7			Design an isolated RCC column footing for a RCC column 230mm x 450mm in size reinforced with 8 bars of 20mm diameters to carry an axial load of 1000kN. Assume SBC of soil as $180kN/m^2$.	*CO2*	*PO1, PO3*	**20**

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