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CBCS SCHEME

USN | | | | | | | | | | |

BCV601

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2026
Design of RCC Structures

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Use of IS456-2000, SP-16 is permitted.

		Module – 1	M	L	C
Q.1	a.	Compare Working Stress Method and Limit State Method of Design of R.C section.	4	L2	CO1
	b.	Briefly explain Under reinforced , Over reinforced and Balanced section with neat sketches.	4	L1	CO1
	c.	Develop the expression for stress block parameter.	12	L3	CO1
		OR			
Q.2	a.	Explain : i) Short term deflection ii) Long term deflection.	6	L1	CO1
	b.	A simply supported beam of C/S 250 mm × 450 mm supported over effective span of 4 m. The beam is reinforced with 3 – 20 mm dia at bottom and 2 – 10 mm dia at top with effective depth of 400 mm. The beam supports 4 kN/m (Dead load) and 10 kN/m (live load). Using M – 25 concrete and Fe415 steel , determine Short term and Long term deflection.	14	L5	CO1
		Module – 2			
Q.3	a.	A singly reinforced concrete beam 250 mm × 450 mm deep is reinforced with 3 – 16 mm dia at an effective cover 50 mm , effective span 6 m , M_{20} concrete Fe415 steel. Determine central point load that can be supported in addition to the self weight.	10	L5	CO2
	b.	A reinforced concrete beam has C/S 250 mm × 500 mm (effective depth). The section is reinforced with 3 – 20 mm dia bars and 8 mm dia 2 legged vertical stirrups at 200 mm C/C. use M_{20} grade concrete and Fe415 steel. Estimate shear strength of the section.	10	L5	CO2
		OR			
Q.4	a.	A doubly reinforced beam section is 250 mm × 500 mm (effective depth) , reinforced with 2 – 16 mm dia as compression steel and 4 – 20 mm dia as tension steel. Effective cover for both is 50 mm. Use M_{20} grade concrete and Fe415 steel. Estimate ultimate moment of resistance.	10	L5	CO2
	b.	Determine the ultimate moment of resistance of the T – beam with the following data : Width of flange = 1200 mm , Depth of the slab =110 mm , Effective depth = 600 mm , Width of the web = 300 mm , Area of Tension steel = 4 - 25 mm dia. Use fck = 20 N/mm^2 and Fy = 415 N/mm^2.	10	L5	CO2

		Module – 3			
Q.5		Design a rectangular singly reinforced beam supported on two walls 300 mm thick , spaced at distance 5 m apart. The beam carries super imposed load of 10 kN/m. Use M_{20} grade concrete and Fe415 steel. Sketch the reinforcement details.	**20**	**L6**	**CO3**
		OR			
Q.6		A T – beam slab floor system has a slab of 125 mm thick spanning between T – beams which are spaced at 3.5 mt apart. The beam have clear span of 8.15 m and end bearings are 300 mm walls. The live load on floor is 3 kN/m^3 and floor finish is 0.6 kN/m^2. Design intermediate T – beam for bending and shear. Sketch the reinforcement details. Use M_{20} grade concrete and Fe415 steel.	**20**	**L5**	**CO3**
		Module – 4			
Q.7	**a.**	Distinguish One way and Two way slab.	**4**	**L4**	**CO4**
	b.	Design a simply supported slab for panel of size 3m × 4m to carry live load 4 kN/m^2 and Floor finish 1000 N/m^2. Use M_{20} grade concrete and Fe415 steel. The corners are free to lift.	**16**	**L5**	**CO4**
		OR			
Q.8		Design a dog legged stair for an office building in a room measuring 2.8m x 5.8m clear, Vertical distance between the floor is 3.6 mt. Width of flight is to be 1.25 mt. Allow a live load of 3 kN/ m^2. Sketch the details of reinforcement. Use M_{20} grade concrete and Fe415 grade steel. Assume the stairs are supported on 230 mm walls at the end of outer edges of landing slab.	**20**	**L5**	**CO4**
		Module – 5			
Q.9	**a.**	A rectangular reinforced concrete column of cross section 300 mm × 600 mm is to be designed to support an ultimate axial load of 2000 kN. Design suitable reinforcement in the column using M_{20} grade concrete and Fe415 steel. Sketch the reinforcement details.	**10**	**L5**	**CO5**
	b.	Design the reinforcements in a rectangular column of size 300 mm × 500 mm to support a design ultimate load of 500 kN. Factored moment of 200 kN-m. Adopt fck = 20 N/mm^2 , fy = 415 N/mm^2. Sketch the reinforcement details.	**10**	**L5**	**CO5**
		OR			
Q.10		Design a square footing for a column size 400 mm × 400 mm to carry a load of 1200 kN. The SBC of the soil is 220 kN/m^2. Use M_{20} grade concrete and Fe415 steel. Sketch the reinforcement details.	**20**	**L5**	**CO5**

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