CBCS SCHEME

USN | | | | | | | | | |

BCV601

Sixth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.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 IS 456 : 2000 Code is permitted.

		Module – 1	M	L	C
Q.1	a.	Compare working stress and limit state method.	08	L2	CO1
	b.	Explain : i) Partial safety factor for loads ii) Partial safety factor for materials iii) Characteristic loads iv) Characteristic strength.	12	L2	CO1
		OR			
Q.2	a.	Explain the terms: Balanced, Under reinforced and Over – reinforced sections.	06	L2	CO1
	b.	A simply supported beam of rectangular section 200 mm × 450 mm overall is reinforced with 3 no. of 16 mm diameter, having an effective span of 5 m. The beam supports a load of 10 KN/m. Determine the short term deflection using M20 grade concrete and Fe 415 grade steel.	14	L3	CO1
		Module – 2			
Q.3	a.	Derive from fundamentals the expression for the area of stress block 0.36 f_{ck} x_u	08	L4	CO2
	b.	A singly reinforced beam 250 mm × 500 mm in section is reinforced with 4 bars of 16 mm. diameter with an effective cover of 50 mm. The effective span of the beam is 6 m. Assuming M20 grade concrete and Fe – 250 grade steel, determine the central concentrated load "p" that can be carried by the beam in addition to its self weight.	12	L3	CO2
		OR			
Q.4	a.	Determine the MOR of the beam using the following data. i) Size of the beam = 300 mm × 550 mm ii) Effective Cover = 50 mm iii) Tension reinforcement = 2500 mm^2 iv) Compression reinforcement = 500 mm^2 Use M25 Grade concrete and Fe – 500 grade steel.	10	L2	CO2
	b.	A RCC beam 300 mm wide and 500 mm deep is reinforced with 4 bars of 16 mm diameter. It is freely supported on effective span of 6 m. Determine the maximum permissible imposed load. Assuming M20 Grade concrete and Fe – 500 grade steel.	10	L4	CO2
		Module – 3			
Q.5		Design a singly reinforced SSB of clear span 5 m to support a working live load of 15 KN/m run. Use M20 grade concrete and Fe 415 grade steel. Assume the support thickness is 230 mm.	20	L5	CO3

		OR			
Q.6		A cantilever beam of 4 m span carries a load of 40 KN/m (Factored load). The width of beam is 230 mm. Design the beam for flexure and shear. Sketch the details of reinforcement. Use M20 concrete and Fe 415 grade steel.	**20**	**L5**	**CO3**
		Module – 4			
Q.7		Design a cantilever portion slab projecting 1.5 m from the beam supporting a live load of 3 KN/m^2 . Adopt M20 grade concrete and Fe 415 grade steel.	**20**	**L5**	**CO3**
		OR			
Q.8		Design a dog-legged staircase of an office building in a room measuring 2.8 m × 5.8 m clear. The vertical distance between the floors is 3.6 m. The width of the flight is to be 1.25 m. Allow a live load of $3KN/m^2$. Sketch the details of reinforcement. Use M20 grade concrete and Fe 415 grade steel. Assume the stairs are supported on 230 mm walls at the end of the outer edges of the landing slabs.	**20**	**L5**	**CO3**
		Module – 5			
Q.9		A column of size 300 mm × 400 mm has an effective length of 3.6 m and is subjected to P_u = 1100 KN and M_u = 150 KN – m about the major axis. Design the column using M25 grade concrete and Fe 415 grade steel. Providing the steel i) on two sides ii) On four sides Assume d' = 60 mm.	**20**	**L5**	**CO3**
		OR			
Q.10		Design a square footing to carry a column load of 1200 KN from a 400 mm square column. The SBC of soil is 120 KN/m^2. Use M20 grade concrete and Fe 415 grade steel.	**20**	**L3**	**CO3**

* * * * *