

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM
III B. Tech I Semester Regular Examinations November -2025
DESIGN OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

The Question paper consists of Part A & Part B.

Part A is compulsory, Answer all questions. Part B Answers any one question from each unit.

1		PART-A	(20Marks)
	a)	Differentiate between working stress and limit state method of RCC design	[2]
	b)	Define the term limit state serviceability of RCC sections. write the influential design parameters	[2]
	c)	Define the term bond strength of concrete.	[2]
	d)	Neatly sketch and show different configurations of reinforcement for shear provision in a beam	[2]
	e)	Define the term Two way RCC slab	[2]
	f)	Write the IS code provision for torsional reinforcement of RCC slab	[2]
	g)	Define the term slender column	[2]
	h)	Write the general type of failures in RCC short column	[2]
	i)	Neatly sketch and show the failure of rectangular section	[2]
	j)	Define the term effective length of RCC column.	[2]
		PART-B	(50Marks)
		Question from Unit - I	
2	a)	Neatly sketch the stress strain diagram of mild steel reinforcement and show the salient features .	[5]
	b)	Write the basic assumptions of RCC design in limit state method	[5]
		(OR)	
3	a)	Neatly sketch the stress block parameters of concrete and locate the salient features	[5]
	b)	Define the term characteristic load. Write its significance in design of concrete	[5]
		Question from Unit - II	
4		Design and detail the reinforcement of a concrete beam size 250x400mm depth, simply supported over a span of 5m. The beam carries UDL live load of 50kN/m. Assume moderate exposure conditions of steel reinforcement. Use steel grade Fe500 and concrete M30. Check the design for shear and bending and deflection. Use limit state method.	[10]
		(OR)	
5		Find the UDL load distributed over a span of 4m simply supported RCC T-beam section .The section has flange 600x80mm depth and web size 200x300mm depth. The tension reinforcement of beam 16mm ϕ - 2 no and compression	[10]

		reinforcement 12mm ϕ -2no. The shear reinforcement provided in the form of two legged stirrups 8mm ϕ @150c/c. Assume moderate exposure conditions of steel reinforcement. Use steel grade Fe500 and concrete M30. Use limit state method.	
		Question from Unit - III	
6		Find the moment and shear capacity of RCC cantilever beam of size 300x400mm depth and the span of cantilever projection is 3m. The tension reinforcement of beam 16mm ϕ -2 no and compression reinforcement 12mm ϕ -2no. The beam provided with shear reinforcement in the form of two legged stirrups 8mm ϕ @50c/c. Use steel grade Fe415, concrete grade M25 . The beam supported by column of size 300x300mm and reinforcement 12mm ϕ -4no. Neatly sketch the anchorage details of reinforcement at beam-column joint.	[10]
		(OR)	
7		Design and detail the reinforcement of a RCC rectangular beam of size 300x600mm depth that subjected to maximum shear force 230kN , bending moment 50 kN-m and torsional moment 30kN-m. The beam is span over 4m cantilever projection from a column of size 600x600mm. Assume moderate exposure conditions of reinforcement. Use steel grade Fe500 and concrete M30.	[10]
		Question from Unit - IV	
8		Design and detail the reinforcement of RCC slab of size 3x4m simply supported at all four sides. The slab carries UDL live load of 5kN/m ² . Use steel grade Fe415 and concrete grade M25. Check the design for shear , torsion, bending and deflection. Use limit state method.	[10]
		(OR)	
9		Design and detail the reinforcement of two span continuous RCC slab of size 2m width and each span length 5m. The slab was supported in short span direction. The slab carries UDL live load of 4kN/m ² . Use steel grade Fe415 and concrete grade M25. Check the for serviceability conditions. Use limit state method.	[10]
		Question from Unit - V	
10		Design and detail the reinforcement of rectangular RCC column of height 4m that was fixed at base and free at end. The column is subjected to axial load 350kN and biaxial moments of 50kN-m and 80kN-m along the minor and major axis of column. Use steel grade Fe500 and concrete grade M30. Assume moderate exposure conditions of steel reinforcement.	[10]
		(OR)	
11		Design a pedestal type RCC rectangular footing that was subjected to axial load of 2500kN and moment 60kN-m from a column of size 600x600mm. The column provided with main reinforcement 16mm ϕ -4no. The safe bearing capacity of soil at 1.50m depth of foundation is 250kN/m ² . Use steel grade Fe415 and concrete grade M30 for foundation. Assume moderate exposure conditions of steel reinforcement. Detail the reinforcement of foundation and establish connection between column and foundation.	[10]
