CBCS SCHEME

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BCV703

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Prestressed Concrete

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:1343 is permitted.

		Module – 1	M	L	C
Q.1	a.	Define prestressed concrete. Mention it's applications.	07	L2	CO1
	b.	State the advantages and disadvantages of prestressed concrete.	08	L2	CO1
	c.	Explain the need for High strength concrete and High strength steel in PSC members.	05	L2	CO1
		OR			
Q.2	a.	Write a short note on the historical development of PSC.	08	L2	CO1
	b.	Write a short note on the different types of prestressing steel.	06	L2	CO1
	c.	Discuss the role of design codes in psc structures.	06	L2	CO1
		Module – 2			
Q.3	a.	List different types of losses in post tensioning system. Explain any two.	06	L2	CO2
	b.	A pre tensioned beam, 200 mm wide and 300 mm deep is prestressed by 10 wires of 7 mm diameter initially stressed to 1200 N/mm^2, with their centroids located 10 mm from the soffit. Find the maximum stress in concrete immediately after transfer, allowing only for elastic shortening of concrete. If concrete under grows a further shortening due to creep and shrinkage while there is a relaxation of 5% of steel stress, estimate final percentage loss of stresses using IS 1343 code and following data: $E_s = 210\ KN/mm^2$, $E_c = 5000\sqrt{fck}$ $fck = 42\ N/mm^2$, creep co-efficient (ϕ) = 1.6 Total residual shrinkage strain = 3×10^{-4}	14	L4	CO2
		OR			
Q.4	a.	Explain post tensioning anchorages devices and explain any one in details.	06	L2	CO2
	b.	Explain with sketch Hoyer's method of pretension system.	10	L2	CO2
	c.	Differentiate between mechanical, chemical and electrical prestressing methods.	04	L2	CO2
		Module – 3			
Q.5	a.	Discuss briefly load balancing concept in PSC design.	08	L2	CO3
	b.	A concrete beam of symmetrical "I" section spanning 8 m, the width and thickness of flanges are 220 mm and 60 mm respectively, the overall depth of beam is 410 mm, thickness of web is 80 mm, the beam is prestressed by a straight cable with an eccentricity of 150 mm with effective force of 150 KN, the live load on the beam is 2.5 KN/m. Draw the stress distribution diagram at central section for the loaded beam.	12	L4	CO3
		OR			
Q.6	a.	Explain stress distribution in End Block.	04	L2	CO3
	b.	Explain IS 1343 method for calculation of Bursting force.	04	L2	CO3
	c.	The end block of a post tensioned pre – stressed concrete beam 300 mm × 300 mm is subjected to a prestressing force 832.8 KN. Anchorage area 11720 mm^2. Design suitable anchorage reinforcement.	12	L4	CO3

		Module – 4			
Q.7	a.	Explain the types of prestressed concrete pipes.	10	L2	CO4
	b.	How is prestressing used in flat slab structures.	10	L2	CO4
		OR			
Q.8	a.	Describe the design considerations for one way slabs and two way slabs.	10	L2	CO4
	b.	Define partial prestressing and explain it's influence on serviceability and economy.	10	L2	CO4
		Module – 5			
Q.9	a.	Explain concept of composite construction in PSC Bridges.	10	L2	CO4
	b.	Explain the principle of balanced cantilever construction.	10	L2	CO4
		OR			
Q.10	a.	Explain the design procedure of a prestressed concrete I – girder bridge with cast in situ slab.	10	L2	CO4
	b.	Write short notes on Viaducts and Balanced cantilever bridges.	10	L2	CO4

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