

PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)
IV B.Tech II Semester Supplementary Examinations, May-2024

PRESTRESSED CONCRETE
(CE)

Time: 3 hours

Max. Marks: 60

Question Paper Consists of **Part-A** and **Part-B**
 Answer **ALL** questions from **Part-A**,
 Answer any **FOUR** Questions from **Part-B**

PART-A					
[6x2=12M]					
Q.No.	Question		BTL	CO	Marks
1	a)	List the applications of prestressed concrete.	K1	CO1	[2M]
	b)	How the load transfer takes place in pre-tensioned and post-tensioned members.	K1	CO2	[2M]
	c)	What are the losses present in post-tensioned member.	K1	CO3	[2M]
	d)	What are the factors influencing deflection in prestressed members.	K1	CO4	[2M]
	e)	List different types of shear failures in prestressed concrete beams.	K1	CO5	[2M]
	f)	What is anchorage reinforcement.	K1	CO6	[2M]
PART-B					
[4x12=48M]					
2	a)	What is the need of using high strength steel in prestressed concrete.	K1	CO1	[6M]
	b)	Explain the Freyssinet system of prestressing.	K2	CO1	[6M]
3	a)	Explain the concept of load balancing method.	K2	CO2	[6M]
	b)	Find the magnitude of prestressing force with an eccentricity of 40mm can balance the stresses due to dead load & live load at the soffit of the centre span section of a rectangular concrete beam 100mm wide & 250mm deep spanning over 8m is prestressed by a straight cable carrying a effective prestressing force of 250kN located at an eccentricity of 40mm. The beam supports a live load of 12 kN/m.	K4	CO2	[6M]
4	a)	Compare concentric and eccentric tendons, indicating their practical applications.	K2	CO3	[6M]
	b)	Estimate the percentage loss of prestress in wires when the beam is post-tensioned 200 × 300 mm is prestressed with wires (area = 320 mm ²) located at 50 mm from the bottom carrying an initial stress of 1000 N/mm ² . The span of the beam is 10 m. Assume $E_s = 210 \text{ kN/mm}^2$, $E_c = 35 \text{ kN/mm}^2$, Relaxation of steel stress = 5% initial stress, shrinkage of concrete = 200×10^{-6} , creep coefficient = 1.6, slip at anchorage = 1 mm, friction coefficient = 0.0015 per metre.	K2	CO3	[6M]
5	a)	Illustrate the various modes of failure encountered in prestressed concrete beams subjected to bending.	K2	CO4	[6M]

	b)	Evaluate the ultimate flexural strength of a unbounded T section beam having a flange width of 1200 mm and flange thickness of 200 mm thickness of web being 300mm is post-tensioned by 2000 mm ² of tensile steel located at an effective depth of 1600mm. Assume $f_{ck}=40$ N/mm ² , $f_p=1600$ N/mm ² , $f_{pe}=1000$ N/mm ² and span/depth ratio as 20.	K5	CO4	[6M]
6	a)	Outline different types of shear cracks.	K1	CO5	[6M]
	b)	Estimate the amount of transverse reinforcement at the support section of a pre stressed concrete beam, 100mm wide and 250mm deep, is required to support an ultimate shear force of 80KN. The compressive prestress at the centroidal axis is 5 N/ mm ² . The cover to the tension reinforcement is 50 mm. if the characteristics tensile strength of steel in stirrups is 250N/mm ² .	K2	CO5	[6M]
7	a)	Explain transmission length in pretension members.	K2	CO6	[6M]
	b)	Estimate the transmission length at the ends of a pretensioned beam prestressed by 7-mm diameter wires. Assume the cube strength of concrete at transfer as 42 N/mm ² .	K2	CO6	[6M]