O.P.Code: 20CE1021	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
M.Tech. II Year I Semester Supplementary Examinations April-2026
DESIGN OF PRESTRESSED CONCRETE STRUCTURES
(Structural Engineering)

Time: **3 hours** Max. Marks: **60**

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Explain Pretensioning and Post tensioning of concrete members. What are the advantages of prestressed concrete members over reinforced concrete members.	CO1	L2	6M
	b	What is the need for using high tension steel instead of mild steel in PSC?	CO1	L1	6M
		OR			
2	a	Explain Hoyer systems of pre tensioning with sketches	CO1	L5	6M
	b	Explain Freyssinet system of pre tensioning with sketches.	CO1	L2	6M

UNIT-II

3		A post tensioning member of 250mm wide and 400mm deep is prestressed by a area of cables 250mm2 is located at a distance of 125mm from soffit. Te prestressing force applied for a cable is 300kN. What is the loss of stress developed in friction? Take co-efficient of friction between cable and duct is 0.35 and friction co-efficient is 0.0015/m.	CO2	L1	12M
		OR			
4		A post-tensioned concrete beam, 100mm wide and 300mm deep, is prestressed by three cables, each with a cross-sectional area 50mm2 and with an initial stress of 1200=mm2 . All the cables are straight and located 100mm from the soffit of the beam. If the modular ratio is 6, calculate the loss of stress in the three cables due to elastic deformation of concrete for the only the following cases. Simultaneous tensioning and anchoring of all three cables and successive tensioning of the three cables, one at a time. Assume μ =0.35 and K=0.0015/M.	CO2	L4	12M

UNIT-III

5		A concrete beam having a rectangular section of 100mm wide and 300mm deep is prestressed by a parabolic cable carrying an initial force of 240KN. The cable has an eccentricity of 50mm at the center of the span and is concentric at the supports. If the span of the beam is 10m and the live load is 2KN/m, estimate the short time deflection at the center of the span. Assuming E=38KN/mm2 and creep co-efficient is 2.0, loss of prestress =20 percent of the initial stress after 6 months. Estimate the long time deflection at the center of span at this stage, assuming that the dead and live loads are simultaneously applied after ate release of prestress.	CO3	L4	12M
		OR			
6	a	Explain short term deflections of un-cracked members.	CO3	L2	6M
	b	Explain about prediction of long time deflections.	CO3	L4	6M

UNIT-IV

7		A prestressed T-section has flange 1200mm wide and 150 mm thick. The width and depth of rib are 300 and 1500 mm respectively. The high tensile steel has an area of 4700 mm2 and is located at an effective depth of 1600mm. if the characteristic cube strength of the concrete and tensile strength of steel are 40 and 1600N/mm2 , calculate the flexural strength of the T-section.	CO4	L2	12M
		OR			
8		Explain briefly about shear and principal stresses due to torsion in members.	CO4	L5	12M

UNIT-V

9		Explain briefly about shear strength of composite sections.	CO5	L2	12M
		OR			
10		Explain the general method for the determination of concordant tendon profile.	CO5	L5	12M