Sanjay Ghodawat University, Kolhapur

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

Year and Program: Final Year B.Tech	**School of Technology**	**Department: Civil**
Course Code: CET 439	**Course Title: Prestressed Concrete Structures** Program vertical-IV	**Semester : VII**
Day : **Date :**	**End Semester Examination**	**Time : 2 Hrs.** **Max Marks : 50**

Question Paper

Instructions: 1) All Questions are compulsory.
2) Assume suitable data wherever necessary.
3) Use of & IS: 1343:2012 is Permitted.

		Marks	Bloom's Level	CO
Q.1	**Answer the following (any Two)**			
a)	Distinguish between posttensioned and pretensioned members.	8	L_2	1
b)	A concrete beam of 10m span , 100mmx300mm deep is pretressed by 3 cables. The area of each cable is 200mm^2 and initial stress in the cable is 1200N/mm^2. Cable 1 is parabolic with an eccentricity of 50mm above centroid of support and 50mm below the centre of span. Cable 2 is also parabolic with zero eccentricity at support and 50mm below the centroid at the centre of span. Cable 3 is straight with uniform eccentricity of 50mm below the centroid. If the cables are tensioned from one end only, estimate the percentage loss of stress in each cable due to friction. Assume μ=0.35 and K=0.0015/m.	8	L_3	2
c)	A prestressed concrete pile 250mm squre, contains 60 pretensioned wires, each 2mm dia. Uniformly distributed over the section. The wires are initially tensioned on prestressing bed with total force 300 kN. Calculate the final stress in concrete and percentage loss of stress in steel after all losses, given data- E_s = 210 kN/mm^2, E_C = 32 kN/mm^2, shortening due to creep = 30 x10^{-6} mm/mm per N/mm^2 of stress. Total shrinkage = 200x 10^{-6} per unit length, relaxation of steel = 5% of initial stress, Prestressing force P= 300 kN.	8	L_4	2
Q.2	**Answer the following (any two)**			
a)	A prestress concrete beam of section 200 x 300mm deep is used over an effective span 6m to support an imposed load 4 Kn/m. The density of concrete is 24 kN/m^3. At the centre of span of the beam	9	L_4	3

find the magnitude of

i)The concentric prestressing force necessary for zero fibre stress at the soffit when the beam is fully loaded and

ii)The eccentric prestressing force located 100mm from the bottom of the beam which would nullify the bottom fibre stresses due to loading.

b)	A post tensioned beam with unbounded tendons is of rectangular section 400x800mm(effective) . The cross sectional area of prestressing steel is 2840mm^2. The effective prestress in steel after all losses 900 N/mm^2 . The effective span of beam is 16m. If fck=40 N/mm^2, estimate the ultimate moment of resistance of the section using IS: 1343.	9	L_4	3
c)	A pre-tensioned prestressed concrete beam of rectangular section is required to support a design ultimate moment of 100 kN-m. Design the section if concrete grade M50 and steel of fp=1600N/mm^2 is used.	9	L4	4
Q.3	**Answer the following (any two)**			
a)	Explain the terms (i) End block , (ii) Anchorage zone (iii) Bursting tension with reference to post tensioned pretressed concrete members	8	L2	5
b)	Explain the concordant cable profile and sketch a typical concordant cable profile in case of a two span continuous beam.	8	L2	6
c)	Explain the terms with example (i)Primary Moment (ii) secondary Moment.	8	L2	6

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