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 : Friday **Date : 05.03.2021**	**End Semester Examination**	**Time : 2 Hrs.** **Max Marks : 50**

Instructions: 1) All Questions arecompulsory.
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)	Enumerate load balancing concept.	8	L_2	1
b)	A prestressed concrete pile 300mm X 300 mm in section and is provided with 40 wires of 3 mm diameter distributed uniformly over the section. Initially the wires are tensioned in the prestressing beds with a total pull of 450 kN. Determine the final stress in concrete and the percentage loss of stress in the wires. given data- E_s= 2.08 X 10^5N/mm^{2,} E_C= 3.2 X10^4 N/mm^2, Creep shortening = 32 x10^{-6} mm/mm per N/mm^2 of stress. Total shrinkage = 200x 10^{-6} per unit length, relaxation loss of steel = 4.5% of initial stress.	8	L_3	2
c)	A prestressed concrete beam 400 mm X 600 mm in section has a span 6 m and is subjected to a UDL of 16 kN/m including the self-weight of the beam. The prestressing tendons which are located along the longitudinal centroidal axis provide an effective prestressing force of 960 kn. Determine the extreme stresses in concrete for mid span section.	8	L_4	2
Q.2	**Answer the following (any TWO)**			
a)	A pretensioned T- section has a flange 1200 mm wide and 150 mm thick. The width and depth of the rib are 300 mm and 1500 mm resp. The high tensile steel has an area of 4700 mm^2 and is located at an effective depth of 1600 mm. If the characteristic cube strength of the concrete and the tensile strength of steel are 40 and 1600 N/mm^{2,} resp. Calculate the flexural strength of the T section.	9	L_4	3
b)	A concrete beam having a rectangular section 150 mm wide and 300 mm deep is prestressed by a parabolic cable having an eccentricity of 100 mm at the center of span, reducing to zero at the supports. The span of the beam is 8 m. The beam supports a live load of 2 kN/m.	9	L_4	3

	Determine the effective force in the cable to balance the dead and live loads on the beam. Estimate the principal stress at the support section.			
c)	A prestressed beam 80 mm wide and 120 mm deep is to be designed to support working load of 4 kN, each concentrated at the third point over a span of 3m. If the permissible stresses in tension are zero at transfer and 1.4 N/mm^2 under working load, Design the number of 3 mm wires and the corresponding eccentricity required at the mid span section. Permissible tensile stress in wires is 1400 N/mm^2. The loss of prestress is 20 % and the density of concrete is 24 kN/m^3	9	L5	4
Q.3	**Answer the following (any two)**			
a)	Describe I.S. code provision for analysis and design of end blocks.	8	L2	5
b)	Demonstrate the concept of P-Line & C – Line with sketch	8	L3	6
c)	Explain the advantages and disadvantages of continuous PSC beams.	8	L2	6