

Code: 4G689

IV B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

**Pre-Stressed Concrete**

( Civil Engineering )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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**UNIT-I**

1. a) What is basic principle of prestressed concrete? 7M  
 b) What is the necessity of using high-strength concrete and high tensile steel in prestressed concrete? 7M

**OR**

2. a) List different system of prestressing and describe them 7M  
 b) Explain about pretensioning system and post tensioning system with neat sketches. 7M

**UNIT-II**

3. a) What are the types of losses in Pre-stressed concrete? What is the loss of stress due to elastic shortening? 7M  
 b) A prestressed concrete beam of rectangular section 150mm wide and 350mm deep is prestressed by 6 wires of 6mm diameter, provided at an eccentricity of 55mm. The initial stress in the wires is 1000 N/mm<sup>2</sup>. Find the loss of stress in steel due to creep of concrete. Take  $E_s=2 \times 10^5$  N/mm<sup>2</sup>,  $E_c=3 \times 10^4$  N/mm<sup>2</sup>,  $\mu=1.50$ . 7M

**OR**

4. A pretensioned beam 250 mm wide and 300 mm deep is prestressed by 12 wires each 7 mm diameter, initially stressed to 1200 N/mm<sup>2</sup> with their centroids located 100 mm from the soffit. Estimate the final percentage loss of stress due to elastic deformation, creep, shrinkage and relaxation using IS: 1343 code using the following data: Relaxation of steel stress = 90 N/mm<sup>2</sup>,  $E_s = 210$  kN/mm<sup>2</sup>,  $E_c=35$  kN/mm<sup>2</sup>, Creep coefficient = 1.6, Residual shrinkage strain =  $3 \times 10^{-4}$  14M

**UNIT-III**

5. A Rectangular concrete beam 150mm x 300mm deep spanning over a span of 9.0 m, is pressed by straight cable carrying an effective prestressing force of 280 KN located at an eccentricity of 50 mm. The beam supports a live load of 2 KN/m. compute the extreme stresses at mid span of the beam. 14M

**OR**

6. A prestressed concrete beam of section 120 mm wide by 300 mm deep is used over an effective span of 6 m to support a uniformly distributed load of 4 kN/m, which includes the self-weight of the beam. The beam is prestressed by a parabolic cable carrying a force of 180 kN and located at an eccentricity of 50 mm. compute the extreme stress at central span sections and end section. 14M

**UNIT-IV**

7. a) A Prestressed concrete beam of rectangular cross section 400mm x 800mm deep is Prestressed ,by 2 post tension cables area 500mm<sup>2</sup> each initially. Stressed to 1500N/mm<sup>2</sup>. The span of the beam is 8 m. if  $f_{ck} = 30$  N/mm<sup>2</sup>. Estimate the shear resistance of support section. Use IS 1343 code. 10M  
 b) Discuss the effect of Tendon profile on deflection of PSC beam 4M

**OR**

8. Explain the design procedure of rectangular section according to IS code 14M

**UNIT-V**

9. The end block of a post tensioned beam is 90mm wide and 180mm deep. A prestressing wire, 8 mm in diameter, stressed to 1400 N/mm<sup>2</sup> has to be anchored against the end block at the centre. The anchorage plate is 50mm x 50mm. The wire bears on the plate through a female cone of 20mm diameter. Given the permissible stress in concrete at transfer,  $f_{ci}$  as 20 N/mm<sup>2</sup> and the permissible shear in steel as 94.5 N/mm<sup>2</sup>, determine the thickness of the anchorage plate. 14M

**OR**

10. a) Explain analysis of end blocks by Guyon's method 8M  
 b) Explain about Anchorage Zone Reinforcement 6M

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**R-14**

**Code: 4G681**

IV B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

**Design and Drawing of Irrigation Structures**

( Civil Engineering )

Max. Marks: 70

Time: 3 Hours

Answer any one question from the following ( 1 x 70 = 70 Marks )

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1. Design and draw a sluice taking off from a tank irrigating 600 hectares at 3000 duty. The tank bund through which the sluice is taking off has a top width of 2 m with 2:1 side slopes. The top level of bank is +40.20 and the ground level at site is +34.50. Good hard soil for foundation is available at +33.50. The sill of the sluice at off-take is +34.00. The maximum water level in tank is +38.00. The full tank level is +37.00. Average low water level of the tank is +35.00. The details of the channel below the sluice are as under. Bed level +34.00, FSL +34.50, Bed width 1.25 m and side slopes are 1½ to 1 with top of bank at +35.50.

**OR**

2. Design and draw Trapezoidal notch fall with the following hydraulic particulars.

Description	Upstream	Downstream
Full supply discharge	6 Cumec	6 Cumec
Bed width	6 m	6 m
Bed level	+10	+8
Full Supply depth	2.00 m	2.00 m
Full Supply level	+12.50	+10.00
Tank bund level	+13.5	+11.00
Half supply depth	1.25 m	

Top width of bank is 2.00 m. Ground level at the site of work is +10.50. Good soil is available for foundations at +8.50

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