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09ENG75

Seventh Semester B.Arch. Degree Examination, Feb./Mar. 2022
Structures - VII

Time: 3 hrs. Max. Marks:100

Note :1. ***Answer any FIVE full questions.***
2. ***Use of IS – 1343 – 1980 is permitted.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

1 a. What are the advantages of PSC over RCC? **(06 Marks)**

b. A rectangular concrete beam 250mm wide and 600mm deep is prestressed by means of four 14mm diameter high tensile bars located 200mm from the soffit of the beam. If the effective stress in the wires is 700N/mm^2, what is the maximum bending moment that can be applied to the section without causing tension @ the soffit of the beam? **(14 Marks)**

2 a. Briefly explain the different systems of prestressing , with neat sketches. **(08 Marks)**

b. A prestressed concrete beam of section 120mm wide and 300mm deep is used over an effective span of 6m to support a udℓ of 4kN/m, which includes the self weight of the beam. The beam is prestressed by a straight cable carrying a force of 180kN and located at an eccentricity of 50mm. Determine the location of the thrust line in the beam and plot its position at quarter and central span sections. **(12 Marks)**

3 a. Briefly discuss the concept of load balancing in pre-stressed concrete. **(08 Marks)**

b. Explain with formula and in detail the different losses taking place in prestressed concrete. **(12 Marks)**

4 A prestressed concrete pile, 250mm square , contains 60 pre-tensioned wires, each of 2mm diameter , uniformly distributed over the section. The wires are initially tensioned on the prestressing bed with a total force of 300kN. Calculate the final stress in concrete and the percentage loss of steel after all losses. Given the following data :
$E_s = 210$ kN/mm^2 ; $E_c = 32$kN/mm^2 ; Shortening due to creep = 30×10^{-6}nn/mm/N/mm^2.
Total shrinkage = 200×10^{-6}/unit length ; Relaxation of steel stress = 5% of initial stress. **(20 Marks)**

5 a. What are the different types of Shell roof? Explain briefly. **(10 Marks)**

b. What is Flat Slab? Explain its advantages. **(10 Marks)**

6 a. What are Pneumatic structures? Differentiate between Air inflated and Air supported structure. **(10 Marks)**

b. Explain briefly Geodesic Domes. **(10 Marks)**

7 Draw typical sectional details of Single Span flight with reinforcement details of rise, thread and landing. **(20 Marks)**

8 Write short note on :
a. Dome structure.
b. Folded plates.
c. Space structures.
d. Need of high strength concrete and high strength steel in PSC. **(20 Marks)**

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