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09ENG7.5

Seventh Semester B.Arch. Degree Examination, December 2012
Structures – VII

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. What are the advantages of pre-stressed concrete? **(06 Marks)**

b. Explain the need of high strength concrete and high strength steel, in the PSC structures. **(06 Marks)**

c. Briefly explain the different system of pre-stressing, with neat sketch. **(08 Marks)**

2 A prestressed concrete beam of section 200 mm wide by 300 mm deep is used over an effective span of 6 m to support an imposed load of 4 kN/m. The density of concrete is 24 kN/m^3. At the centre of span section of the beam, find the magnitude of i) the concentric prestressing force necessary for the zero fibre stress at the soffit when the beam is fully loaded and ii) the eccentric pre-stressing force located 100 mm from the bottom of the beam which would nullify the bottom fibre stress due to loading. **(20 Marks)**

3 a. Explain "Load balancing concept" and "pressure line" in PSC. **(08 Marks)**

b. 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 udl of 4 kN/, which includes the self weight of the beam. The beam is pre-stressed by a straight cable carrying a force of 180 kN and located at an eccentricity of 50 mm. Determine the location of the thrust line in the beam and plot its position at quarter and central span sections. **(12 Marks)**

4 A prestressed concrete pile, 250 mm square, contain 60 pre-stressed wire each of 2 mm diameter, uniformly distributed over the section. The wires are initially tensioned on the prestressing bed with a total force of 300 kN. Calculate the final stress in concrete and the percentage loss of stress in steel after all losses, given the following data:

$E_S = 210$ kN/mm^2; $E_C = 32$ kN/mm^2. **(20 Marks)**

5 a. What is a flat slab? What are its advantages and disadvantages? **(10 Marks)**

b. What is grid floor? Mention its advantages. **(10 Marks)**

6 a. What are pneumatic structures? Explain their behavior. **(10 Marks)**

b. Write a note on: i) Spare structures ii) Tensile structures. **(10 Marks)**

7 Draw plan and cross section of one way slab. Internal dimensions 6m × 2.5m, wall = 230 mm. Main bar = 12 mm ϕ @ 210 mm c/c. Distribution bar = 6 mmϕ steel @ 240 mm c/c, Thickness of slab = 125 mm. **(20 Marks)**

8 Write short notes on:

a. Geodesic domes.

b. Folded plates.

c. Application of pre-stressed concrete.

d. Pre-tensioning and post-tensioning. **(20 Marks)**