USN ☐☐☐☐☐☐☐☐☐☐   **09ENG7.5**

Seventh Semester B. Arch Degree Examination, June/July 2016

Structures - VII

Time: 3 hrs.   Max. Marks: 100

Note: 1. *Answer any FIVE full questions.*
2. *Use of IS – 1343 is permitted.*
3. *Missing data, if any may be suitably assumed.*

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. 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 700 N, what is the maximum bending moment that can be applied to the section without causing tension @ soffit of the beam? **(08 Marks)**

2   a. Explain 'pressure line' in PSC. **(05 Marks)**
   b. A pre stressed concrete beam with a rectangular section 120mm wide by 300mm deep supports a udl of 4 kN which includes the S.W of the beam. The effective span of the beam is 6m. The beam is concentrically pre-stressed by a cable carrying a force of 180kN. Locate the position of pressure line in the beam. **(15 Marks)**

3   a. Explain the Losses of pre-stress in pre-tensioning and post tensioning. **(05 Marks)**
   b. A post tensioned cable of beam 10m long is initially tensioned to a stress of $1000N/m^2$ @ one end. If the tendons are curved so that the slope is 1 in 24 @ each end, with an area of $600mm^2$, Calculate the loss of pre-stress due to friction given the following data. Coefficient of friction between duct and cable = 0.55, frictional coefficient for wave effect = 0.0015/m During anchoring, if there is a slip of 3mm @ the sacking end, calculate the final force in the cable and the % loss of pre-stress due to friction and slip, $E_s = 210kN/mm^2$. **(15 Marks)**

4   A pre-stressed concrete pile, 250mm square contains 60 pre-tensioned wires each of 2mm diameter, udl over the section. The wires are initially are tensioned on the pre-stressing bed with a total force for 300kN. Calculate the final stress in concrete and the percentage loss of stress in steel after all losses, given $E_s = 210$ kN/mm^2, $E_c = 32$ kN/mm^2, shortening due to creep = 30×10^{-6} mm/mm/N/mm^2. Total shrinkage = 200×10^{-6}/unit length Relaxation of steel stresses = 5% of initial, Pre-stressing force P = 300kN. **(20 Marks)**

5   a. What are the different types of shell roof? Explain briefly with sketches. **(10 Marks)**
   b. What is flat slab and explain its advantages. **(10 Marks)**

6   a. What are Pneumatic structures? Differentiate between air inflated of air supported structures. **(10 Marks)**
   b. Explain structural behavior of Domes and Barrel vaults. **(10 Marks)**

7   Draw plan and C/S of one way slab. Internal dimension 6m×2.5m wall = 230mm. **(20 Marks)**

8   Write short notes on :
   a. Grid floor
   b. Folded plates
   c. Space structures
   d. Pre-tensioning and post tensioning   **(20 Marks)**

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