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09ENG7.5

Seventh Semester B.Arch. Degree Examination, June/July 2018
Structures - VII

Time: 3 hrs. Max. Marks:100

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

1 a. Define prestressed concrete. state its advantages over RCC. **(06 Marks)**
b. Distinguish between " Pre Tensioning" and "Post Tensioning" with neat sketches. **(08 Marks)**
c. Explain Load Balancing Concept. **(06 Marks)**

2 The cross section of a cantilever beam of span 5m has the following details. Top flange 300mm × 100mm, web 80mm × 400mm and bottom flange 500mm × 150mm. The beam is prestressed with effective force of 600kN, which is located at 60mm from top edge. What concentrated load should be applied at the free end so that resultant stress at the top layer is zero? Also draw stress distribution diagram. **(20 Marks)**

3 a. Explain loss of prestress due to Elastic Deformation of concrete. **(05 Marks)**
b. A pre tensioned beam 250mm×300mm is prestressed by 12 wires of 7mm ϕ each initially stressed to 1200N/mm^2 with their centroids located 100mm from the bottom. Estimate the total loss of prestress and percentage loss. Use
$E_s = 210 \times 10^3$ N/mm^2, $E_c = 35 \times 10^3$N/mm^2
Relaxation of steel stress = 4%
Creep coefficient $\phi = 1.6$
Shrinkage strain = 3×10^{-4} **(15 Marks)**

4 a. Explain why high strength steel and high strength concrete is used in PSC. **(06 Marks)**
b. A post tensioned simply supported beam of 8m span is provided with a curved cable of area 800mm^2 with a slope of 1 in 20 at each end and is initially stressed to 1200N/mm^2. $E_s = 210 \times 10^3$N/mm^2. Calculate loss of prestress due to anchorage slip and friction only. Using coefficient of friction = 0.55, wave effect = 0.0015/m and anchorage slip = 3mm. Assume cable is pulled from one end. **(14 Marks)**

5 a. Explain different types of shell roof with neat sketches. **(10 Marks)**
b. Explain types and advantages of folded plates with neat sketches. **(10 Marks)**

6 a. Distinguish between grid structures and Flat slab (RCC) and give their reinforcement details. **(10 Marks)**
b. Distinguish between Tensile structures and pneumatic structures with neat sketches. **(10 Marks)**

7 a. Distinguish between one way and Two way slabs. **(06 Marks)**
b. When doubly reinforced beams are used. **(04 Marks)**
c. Draw reinforcement details for Isolated square column and footing shown plan and sectional elevation. **(10 Marks)**

8 a. Explain the functions of vertical stirrups in beams. **(05 Marks)**
b. Give design specifications in staircase. **(05 Marks)**
c. Draw typical plan and sectional elevation of dog legged stair case with reinforcement details. **(10 Marks)**

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