

Code No: R32015

**R10**

**Set No. 1**

**III B.Tech II Semester Supplementary Examinations, Dec - 2015  
DESIGN AND DRAWING OF CONCRETE STRUCTURES-II  
(Civil Engineering)**

**Time: 3 hours**

**Max. Marks: 75**

**Answer any ONE question from PART-A  
and THREE questions from PART-B  
Use of IS: 456-2000 and design charts from SP-16 is allowed.**

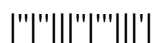
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**PART-A**

- 1 A flat slab system consists of 4 m × 6 m panels and is without drop and column head. It has to carry a live load of 4 kN/m<sup>2</sup> and a finishing load of 1 kN/m<sup>2</sup>. It is to be designed using M20 grade concrete and Fe 415 steel. The size of the columns supporting the system is 500 × 500 mm and floor to floor height is 405 m. Calculate design moments in interior and exterior panels at column and middle strips in both directions. [30]
- 2 Combined footing is to be provided for columns of sizes 400 × 400 mm and 600 × 600 mm carrying loads of 600 kN and 1200 kN. The centre to centre distance of the columns is 4 m. The property line is at a distance 0.3 m from the column carrying 600 kN. Length of footing is to be restricted to 5 m. Prepare the layout plan of the footing and show the loading on longitudinal section. Given SBC of soil = 150 kN/m<sup>2</sup>. [30]

**PART-B**

- 3 a) What is the basic principle of prestressed concrete? [7]  
b) Distinguish between creep and shrinkage of concrete. [8]
- 4 a) What are loop anchorages? Explain with sketches Baur-Leonhardt system of post-tensioning. [7]  
b) Explain the concept of internal resisting couple in a prestressed concrete beam supporting dead and live loads. [8]
- 5 a) "The Indian Standard Code IS: 1343 specifies different strains for pretensioned and post-tensioned members". Explain with reasons. [5]  
b) A concrete beam, 120 mm wide and 300 mm deep, is prestressed by a straight cable carrying an effective force of 200 kN at an eccentricity of 50 mm. The beam spanning over 6 m supports a total uniformly distributed load of 3 kN/m, which includes the self-weight of the beam. The initial stress in the tendons is 1000 N/mm<sup>2</sup>. Determine the percentage increase of stress in the tendons due to the loading on the beam. [10]  
 $E_s = 210 \text{ kN/mm}^2, E_c = 35 \text{ kN/mm}^2$



- 6 A pretensioned concrete sleeper 300 mm wide by 250 mm deep is prestressed using nine wires of 7 mm diameter. Four wires are located at top and five wires near the soffit. The effective cover being 40 mm. The initial stress in the wires is  $1200 \text{ N/mm}^2$ . Assuming the modular ratio as 6, estimate the percentage loss of stress in the top and bottom wires due to elastic deformation of concrete. [15]
- 7 a) What is the difference in the types of stress blocks adopted in Indian code specifications regarding flexural strength computations? [5]
- b) A concrete beam of rectangular section 250 mm wide and 650 mm overall depth, is subjected to a torque of 25 kN m and a uniform prestressing force of 150 kN. Calculate the maximum principal tensile stress. Assuming 15 percent loss of prestress, calculate the prestressing force necessary to limit the principal tensile stress to  $0.4 \text{ N/mm}^2$ . [10]

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