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^2 and a finishing load of 1 kN/m^2. 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^2. [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^2. Determine the percentage increase of stress in the tendons due to the loading on the beam. [10]
E_S = 210 kN/mm^2, E_c = 35 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 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 N/mm^2. [10]

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