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Seventh Semester B.Arch. Degree Examination, Dec.2016/Jan.2017
Structures - VII

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. What is pre stressed concrete? What are the advantages of pre stressed concrete? (10 Marks)
b. Briefly discuss the load balancing concept in pre stressed concrete. (10 Marks)

- 2 a. What are the assumptions made in analysis of pre stressed concrete structural element? (05 Marks)
b. A rectangular concrete beam of cross section 30cm deep and 20cm wide is pre stressed by means of 15 wires of 5mm diameter located 6.5cm from the bottom of the beam and 3 – wires of 5mm diameters 2.5cm from the top. Assuming the pre stress in steel as 840 N/mm^2 , calculate the stresses at the extreme fibres of the midspan section when the beam is supporting its own weight over a span of 6m. If a uniformly distributed live load of 6 kN/m is imposed, evaluate the maximum working stress in concrete. The density of concrete is 24 kN/m^3 . (15 Marks)

- 3 a. Differentiate between pre tensioning and post tensioning. (06 Marks)
b. A pre stressed concrete beam of section 120mm wide by 300mm deep is used over an effective span of 6m to support a uniformly distributed load of 4 kN/m , 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 50mm. Determine the location of the thrust line in the beam and plot its position at Quarter and central span sections. (14 Marks)

- 4 a. What are the types of losses coming under pre tensioning and post tensioning sections? (08 Marks)
b. A rectangular concrete beam, 360mm deep and 200mm wide is pre stressed by means of 15 number of 5mm diameter wires located 65mm from the bottom of the beam and three 5mm dia wires, located 25mm from top of the beam. If the wires are initially tensioned to a stress of 840 N/mm^2 , calculate the percentage loss of stress in steel immediately after transfer, allowing for the loss of stress due to elastic deformation of concrete only. (12 Marks)

- 5 a. What is Grid floor? Mention its advantages. (10 Marks)
b. What are Space frames? What are the advantages of space frames? Give their field applications. (10 Marks)

- 6 a. What are the types of shell structures? Explain their structural behavior. (10 Marks)
b. What are the flat slabs? Explain their structural behavior. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 7 An isolated rectangular footing is provided for a column of section (600mm × 225mm) having following details :
- Column longitudinal reinforcement (8 nos, 16 mm dia).
 - Column transverse reinforcement (2 legged 6mm dia).
 - Plan size of footing (2.2m × 1.7m).
 - Depth of footing at column face is 525mm and reduced to 150mm at the edge.
 - Footing reinforcements (A mesh of 16mm ϕ @ 180mm C/C).
- Draw neatly showing the reinforcement details for column and footing.
- Plan
 - Sectional elevation.
- (20 Marks)
- 8 Two way slab of size 5m × 4m internal simply supported on 230mm thick wall, thickness of slab = 150mm.
- Steel along short span = # 10 mm @ 150mm C/C.
- Steel along long span = # 8mm @ 250 mm C/C.
- Draw neatly
- Plan showing reinforcements.
 - C/S along short span.
- (20 Marks)
