

# CRASH COURSE

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09ENG7.5

## Seventh Semester B.Arch. Degree Examination, May 2017 Structures – VII

Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer any FIVE full questions.**

**2. Use of IS1343-1980 and IS456-2000 is permitted.**

- 1 a. What are the advantages of prestressed concrete over reinforced concrete? (06 Marks)  
b. Briefly explain the application of pre-stressed concrete. (04 Marks)  
c. A rectangular concrete beam 250 mm wide and 600 mm is prestressed by means of four 14 mm diameter high tensile bars located 200 mm from the soffit of the beam. If the effective stress in the wires is  $700 \text{ N/mm}^2$ , what is the maximum bending moment that can be applied to the section without causing tension at the soffit of the beam? (10 Marks)
- 2 a. Differentiate between pre-tensioning and post-tensioning. (06 Marks)  
b. A rectangular concrete beam 250 mm wide by 300 mm deep is prestressed by a force of 540 kN at a constant eccentricity of 60 mm. the beam supports a concentrated load of 68 kN at the centre of span of 3 m. Determine the location of the pressure line at the centre, quarter span and support sections of the beam. Neglect the self weight of the beam. (14 Marks)
- 3 a. What are losses encountered in pre-tensioning and post tensioning? (06 Marks)  
b. A concrete beam of 10 m span, 100 mm wide and 300 mm cable is  $200 \text{ mm}^2$  and the initial stress in the cable is  $1200 \text{ N/mm}^2$ . Cable 1 is parabolic with an eccentricity of 50 mm above the centroid at the supports and 50 mm below at the centre of span. Cable 2 is parabolic with zero eccentricity at supports and 50 mm below the centroid at the centre of span. Cable 3 is straight with uniform eccentricity of 50 mm below the centroid. If the cables are tensioned from one end only, estimate the percentage loss of stress in each cable due to friction  $\mu = 0.35$ ,  $K = 0.0015/\text{m}$ . (14 Marks)
- 4 a. Explain the advantages of shell roofs over the conventional flat roofs. (10 Marks)  
b. What are pneumatic structures? Explain their behavior. (10 Marks)
- 5 a. Explain the structural behavior of (i) Domes, (ii) barrel vaults. (10 Marks)  
b. How are grid structures different from load bearing structures? (10 Marks)
- 6 a. Give the detailing of typical one way slab, simply supported on the walls. Sketch the plan and cross-section. (10 Marks)  
b. Give a typical detailing of a square column supported on a square footing. Sketch the plan and cross-section. (10 Marks)
- 7 Draw typical sectional details of single straight span flight with reinforcement details, rise tread and landing. (20 Marks)
- 8 Write short notes on:
  - a. Dome structures
  - b. Folded plates
  - c. Space structures
  - d. Grid floor(20 Marks)

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