Seventh Semester B.Arch. Degree Examination, Dec.2017/Jan.2018
Structure - VII

Time: 3 hrs.   Max. Marks:100

Note: 1. *Answer any FIVE full questions.*
2. *Use of IS 1343 allowed.*

1   a.   What are the materials used for pre-stressed concrete? Explain each of them (principal materials and supplementary materials).   **(10 Marks)**
     b.   What are the advantages and disadvantages of PSC structures?   **(10 Marks)**

2   The mid-span section of a post-tensioned PSC girder of span 20m has top flange 500×100mm, Bottom Flange 250×150mm and web 100×750mm. Location of the pre-stressing force is 75mm above the bottom flange. IL on the girder is 15kN/m. unit wt. of concrete is 24kN/m³.
      Determine the magnitude of the pre-stressing force required 80 that no stress is developed at the bottom fibre at final stage.
      Also calculate the corresponding stress at top fibre.   **(20 Marks)**

3   A PSC beam of rectangular section 300×600mm has a span of 10m. The pre-stressing force is 980kN at an eccentricity of 120mm. The DL on the beam is 4.5 kN/m and IL is 7.5 kN/m. Determine the extreme fibre stresses.
        i)   At end section
        ii)   At mid section without action of IL
        iii)   At mid section with action of IL.   **(20 Marks)**

4   a.   Explain the concept of "Loss of pre-stress in a PSC member. Explain the its importance.   **(08 Marks)**
     b.   A post tensioned beam 400×600mm is 10m long. It is provided with straight cables which are tensioned to 1050 N/mm² at the jacking end.
        Calculate the percentage loss of pre-stress due to friction at the end of the beam remote from the jacking end. K = 0.3 per 100m.   **(12 Marks)**

5   Explain the following with neat sketches and structural concept.
     a.   Shells
     b.   Folded plates
     c.   Flat slabs
     d.   Grid structures.   **(20 Marks)**

6.   a.   Draw the sectional elevation showing the reinforcement details along shorter span for a slab 2m×8m with following data support with = 200mm
       Slab thickness   :   160mm
       Main steel   :   10mm dia at 180 mm c/c
       Distribution steel   :   6mm dia at 160 mm c/c
      M20 concrete, Fe 250 Steel codal provisions are to be followed.   **(10 Marks)**

b. Draw the section elevation showing the details of reinforcement along longer span for a slab 2m×2.5m with following data :

Support thickness	=	180mm
Slab thickness	=	120mm
Reinforcement along L_x	=	8mm at 120 mm c/c
L_y	=	8mm at 200 mm c/c

Mark middle strip, edge strip and provide reinforcement as per codal provisions. **(10 Marks)**

7   Draw plan of column, plan of footing and section elevation of column and footing showing the reinforcement details with following data : **(10 Marks)**

Column	:	300×300mm
ASC	:	6 Nos – 12mm dia
Lateral ties	:	6mm dia @ 200mm c/c
FOOTING	:	1400×1400mm
Thickness	:	350mm
Reinforcement	-	10mm dia bars @ 160mm c/c both ways
Depth of footing below G.L	:	1200mm

Codal provisions are to be followed. **(10 Marks)**

8   Write short notes on
   a.   Post tensiong
   b.   Load Balancing
   c.   Effective pre-stressing force
   d.   Domes.   **(20 Marks)**

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