

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



09ENG7.5

**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/m<sup>3</sup>.  
 Determine the magnitude of the pre-stressing force required so 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/mm<sup>2</sup> 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 width = 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)

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.



09ENG7.5

- b. Draw the section elevation showing the details of reinforcement along longer span for a slab  $2\text{m} \times 2.5\text{m}$  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 :  $300 \times 300\text{mm}$   
ASC : 6 Nos - 12mm dia  
Lateral ties : 6mm dia @ 200mm c/c  
FOOTING :  $1400 \times 1400\text{mm}$   
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

- Post tensioning
- Load Balancing
- Effective pre-stressing force
- Domes.

(20 Marks)

\*\*\*\*\*