Total No. of Questions : 6]

SEAT No. :

P5814

[Total No. of Pages : 2

BE/Insem./Oct.-503
B.E. (Civil)
STRUCTURAL DESIGN & DRAWING - III
(2015 Pattern) (Semester - I)

Time : 1.30 Hours] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6***
2) ***Neat sketches must drawn wherever necessary.***
3) ***Figures to right indicate full marks.***
4) ***Assume suitable data if necessary.***
5) ***IS 1343:2012, IS 456:2000 are allowed in examination.***
6) ***Use of electronic pocket calculator is allowed.***
7) ***Use of cell phone is prohibited during examination.***

Q1) A post tensioned prestressed concrete beam with top flange 750mm × 200mm, web 150mm × 500mm and bottom flange 400mm × 300mm. It is simply supported over a span of 30m and carries a superimposed load of 10kN/m exclusive of self-weight. It is prestressed with 10 numbers of 12/5 Freyssinet cables with their C.G. at 100mm from soffit at midspan section varying linearly with zero eccentricity at ends. Prestress at transfer is 1000 N/mm^2 and loss ratio 0.85. Calculate extreme fiber stresses at midspan under initial and final conditions. Unit weight of prestressed concrete 25 kN/ m^3. **[10]**

OR

Q2) a) Explain Freyssinet system of prestressing. **[4]**

b) A pretension prestressed concrete beam, 200mm wide and 300mm deep, prestressed with wires (area = 320 mm^2) located at a constant eccentricity of 50mm and carrying an initial stress of 1000N/mm^2. The span of the beam is 10m. Calculate the percentage loss of stress in wires E_s = 210kN/mm^2 and E_c = 35 kN/mm^2. Relaxation of steel stress = 5% of initial stress. Shrinkage of concrete 300 $\times 10^{-6}$ for pretensioning. Creep coefficient = 1.6. Frictional coefficient for wave effect = 0.00 15 per m. **[6]**

Q3) A post tensioned prestressed concrete one way slab is spanning over 8 m, to support an imposed load of 20kN/m. The stresses in concrete should not exceed 19.6 N/mm^2 in compression and 1.2 N/mm^2 in tension. Calculate the minimum possible depth and minimum prestressing force required. Also find corresponding eccentricity. **[10]**

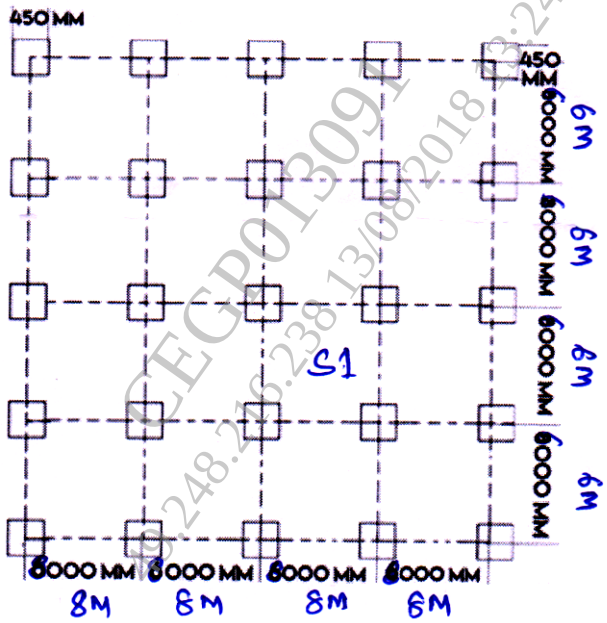
P.T.O.

OR

Q4) The cross of prestress concrete beam is unsymmetrical T section with following dimension: Overall depth 1600 mm, web 300 mm and flange 1200mm × 300mm. At a particular section the beam is subjected to ultimate moment and shear force of 2400 kNm and 400 kN respectively. Design the beam with following data : **[10]**

Grade of concrete-M40, effective depth 1200mm, A_p= 2420 mm^2, F_p = 1600 Mpa effective prestress at extreme tensile in the beam is 20.5 Mpa.

Q5) Continuous Flat slab with drop for a shopping mall is as shown in figure.l below. The size of column is 450mm × 450 mm. Use M30 grade of concrete and Fe415 steel. Calculate total design moments for S1 as shown in below figure. Take LL= 4 kN/m^2 and FFL = 1.0kN/m^2. **[10]**



OR

Q6) a) Briefly outline the salient design features of continuous prestressed concrete flat slab. **[6]**

b) What is the necessary two way shear in flat slab **[4]**

● ● ●