Total No. of Questions : 6]

SEAT No. :

P11

[Total No. of Pages : 2

TE/INSEM/APR-14
T.E. (Civil) (Semester - II)
301010 : STRUCTURAL DESIGN - II
(2015 Pattern)

Time : 1½ 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) ***Figures to the right indicate full marks.***
3) ***Use of IS 456-2000 and non programmable calculator is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Mere reproduction from IS Code as answer, will not be given full credit.***
6) ***Assume any other data, if necessary.***

Q1) a) Explain the meaning of balanced section with respect to WSM & LSM. **[3]**

b) A beam of size 230 mm × 600 mm with effective cover of 50mm is simply supported over a span of Span 5m. The reinforcement consists of 4 bars of 20mm diameter at tension face. Find safe intensity of uniformly distributed load that can be placed on beam. Use WSM. Materials are M25 & Fe415. **[7]**

OR

Q2) a) Explain need of under reinforced section in LSM design. **[3]**

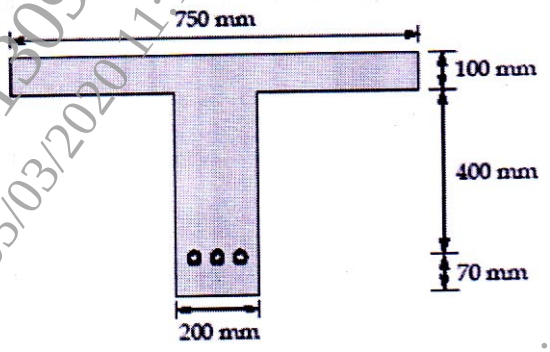
b) Using stress and strain diagrams for a balanced singly reinforced section as per WSM, derive the design constants (k = Neutral axis constant, j = Lever arm constant, and Q = Moment of resistance constant). Use M20 grade of concrete and Fe 415 grade steel. **[7]**

Q3) a) Determine minimum strain at yielding in tension steel having yield stress 500 MPa and Young's modulus E_s = 210 GPa, as per LSM. **[2]**

P.T.O.

b) A T-beam of span 6m has cross-section as shown in the figure. It consists of 3-#16 bars as shown. Calculate ultimate moment, of resistance and find the safe superimposed load that can be carried by the beam. Use M20 concrete and Fe415 reinforced steel. **[8]**

(All dimension are in mm)



OR

Q4) Design a RC slab for a store room having clear dimensions as 4.8m × 3.8m. The slab is supported by 230mm wide beam along all the four edges with corners of slab held down. The slab carries live load of 3 kN/m^2 & floor finish of 1.5 kN/m^2. Use M25 grade of concrete and Fe 500 grade of steel. Also show details of reinforcement. Use LSM. Neglect check for shear. **[10]**

Q5) A simply supported slab of clear dimensions 3.2 m × 8.4m is to be provided for a corridor. The slab carries live load of 4 kN/m^2 & floor finish of 2.0 kN/m^2. Design the slab using M20 grade of concrete and Fe500 grade of steel. Draw neat sketches showing details of reinforcement. Use LSM **[10]**

OR

Q6) Design the second flight (midlanding level to first floor level) of a dog legged staircase of public building with the following data : **[10]**

a) Floor to floor height = 3.6m
b) Rise = 150mm; Tread = 300mm; Width of flight = 1.5m
c) Width of mid level landing = 1.5 m
d) Width of floor level landing =2.0m
e) Width of supporting beams = 300mm
f) Supporting beams are provided at the outer edges of both landings
g) Material = M30, Fe 500
h) Draw details of reinforcement

Use LSM approach. Neglect check for shear.

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