Total No. of Questions : 6]

SEAT No. :

P4669

[Total No. of Pages : 2

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M.E. (Civil) (Structures)

ADVANCED DESIGN OF CONCRETE STRUCTURES

(2008 Pattern) (Semester - I) (Elective - I)

Time : 4 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Solve any two questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator and relevant IS codes is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Draw yield lines for the following : **[10]**

i) Triangular slab with fixed supports on two adjacent side with one side unsupported.

ii) Rectangular slab fixed at two adjacent sides, other two sides free and column at the corner at the junction of free sides.

iii) Circular slab with fixed support.

b) Design a RCC slab for a circular hall of diameter 6m using Yield Line Theory. Assume the peripheral support thickness 300mm. The slab is simply supported. Use M20 Fe500 take Live load = 4 kN/m^2 & floor finish load = 1.2 kN/m^2. Draw reinforcement details. **[15]**

Q2) a) Design a grid slab for a floor of hall 15 × 18m c/c having square grid of 1.5m. Use M25 Fe415 take Live load = 5kN/m^2 and floor finish load = 1.5kN/m^2. Apply the required check & draw reinforcement details. **[15]**

b) Design a flat slab for a hall with column spacing 6m × 6m c/c. The size of the column is 500 mm × 500 mm each. Use M20 Fe415 take Live load = 4kN/m^2 & floor finish load = 1.5kN/m^2. Draw reinforcement details. **[10]**

P.T.O.

Q3) Design a staging for circular type ESR for 2.5 lakh liters with staging height 10m using M25, Fe500 in earthquake zone III. Safe bearing capacity is 180 kN/m^2. Design of container is not required. Assume approximate dimension of container, wall, top, bottom slab thickness, beams sizes & number of columns. Design must include calculations of vertical loads and horizontal force calculations. Design the bracings, columns and foundations. Draw the reinforcement details. **[25]**

SECTION - II

Q4) Design deep beam of a hall for flexure and shear for the following : **[25]**

Clear span = 5m, width of support = 450mm, working UDL on the beam 1500kN/m. Take the total depth of beam = 3.5m. Use M40 & Fe500. Show all Analysis and Design calculations & draw the reinforcement details.

Q5) A two span prestressed concrete continuous beam ABC having cross section 300 × 750mm simply supported at A & C and continuous over B with M45 and multistrand cables 2 Nos 12T13 with f_y = 1900 N/mm^2 stressed to 75% of f_y, each span is of 15m, superimposed load on both the spans 12kN/m, Assume 15% loss of prestress. **[25]**

i) Determine primary secondary moment at support at prestress and dead load.

ii) Calculate shift and stress in extreme fibers at working load.

iii) Draw the resultant line of thrust at working load.

Q6) Design post tensioned prestressed concrete slab for a floor for the following Flat interior panel of 8m × 8m, live load on slab 4.5 kN/m^2, floor finish load on slab = 1kN/m^2, concrete grade M50HT steel is S3 cables of cross sectional area of each strand 150mm^2 with f_y = 1900N/mm^2. Design cables to serve as beams. Assume 3 panels in each direction (floor size 24m × 24m) width of the beam on periphery of floor 600mm and column size 600mm × 600mm. Design must include check fiber stresses in concrete and deflection. Draw sketches showing cable profiles. **[25]**

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