Total No. of Questions : 8]

SEAT No. :

P4113

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M.E. (Civil) (Structures)

ADVANCED DESIGN OF CONCRETE STRUCTURES

(2013 Credit Course) (Semester - II)

Time : 3Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
2) ***Answers should be written in same book.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of IS 456, IS 1343, IS 1893, IS 3370 & non programmable calculator is allowed.***
5) ***Neat diagrams must be drawn wherever necessary.***
6) ***Assume suitable data if necessary.***

Q1) a) Draw yield line patterns for the following: **[6]**

i) Rectangular slab with fixed at supports on three sides with the remaining longer side unsupported.

ii) Right angled triangular slab, fixed at two sides making right angle, unsupported at third side.

b) Write short note with sketches on Characteristics of yield lines. **[4]**

Q2) Design a RCC slab for a square hall of clear dimensions 4.5 × 4.5 m using Yield Line Theory. Assume the support thickness 230 mm, the slab is fixed on all sides Use M20 Fe 500 take Live load = 5 kN/m^2 & floor finish load = 1.2 kN/m^2. Draw details of reinforcement. **[10]**

Q3) Design a grid slab for a floor of hall 12 × 15 m c/c having square grid of 1.5 m using M25 Fe 500. Take the live load = 4.5 kN/m^2 & floor finish load = 1.2 kN/m^2. Apply the required checks & draw details of reinforcement. **[10]**

Q4) Design a interior panel of RCC flat slab for a hall with column spacing 6.2 m × 6.2 m c/c. The diameter of the column is 550 mm each. Use M20 Fe 500 take Live load = 5 kN/m^2 & floor finish load = 0.9 kN/m^2. Draw details of reinforcement. **[10]**

P.T.O.

Q5) Design a staging for square type ESR for 3 lakh liters with staging height 12 m using M25, Fe500 in earthquake zone III. Safe bearing capacity is 180 kN/m^2. Design of container is not required. Calculate the inner dimension of container considering the depth of the as 3.3m including free board of 0.3 m, Take approximate dimensions for, wall, top, bottom slab thickness, beams sizes & nine equispaced columns. Design must include calculations of vertical loads and earthquake force. Design the bracings and columns. Draw the reinforcement details. **[10]**

Q6) Design a side wall and hopper bottom of circular bunker to store 40 tonnes of cement. Take the unit weight of cement = 16 kN/m^3, Angle of repose = 29º. Use M20 & TMT steel. Draw the details of reinforcement. **[10]**

Q7) Design Raft foundation for the following: **[10]**

Centre to centre distance of column in both directions = 2.5 m, Column size = 350 × 350 mm, working axial load on each column = 620 kN. The depth of the strata = 1.5m Use M20 & Fe 500.

The safe bearing capacity of the strata = 85 kN/m^2. Show all Analysis and Design calculations & draw the reinforcement details.

Q8) a) Write detailed note on design of formwork for flat slab. **[5]**

b) Write detailed note on Bar bell shear wall. **[5]**