Total No. of Questions : 8]

SEAT No. :

P3845

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[5462]-543

M.E. (Civil) (Structures Engg.)

ADVANCED DESIGN OF CONCRTE STRUCTURES

(2017 Pattern) (Semester-II) (501009)

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

Instructions to the candidates:

1) ***Answer Q.No.1 or Q2, Q3 or Q4, Q5 or Q6 and Q7 or Q8.***
2) ***Draw neat diagrams.***
3) ***Figures to the right indicate full marks.***
4) ***Assume Suitable data if necessary.***

Q1) a) Draw yield lines for the following:

Right angled triangular slab fixed at two sides, making right angle, unsupported at third side. **[4]**

b) Design a grid slab for a floor of hall 14m x 10.5m having square grid of 1.75m Use M25 and Fe 500.(Design for flexure only). **[5]**

OR

Q2) a) Explain guidelines for establishing for axes of rotation and yield lines.**[5]**

b) Design a grid slab for a floor of hall 12m x 8m having square grid of 2m Use M25 and Fe 415.(Design for flexure only). **[4]**

Q3) a) Explain different methods to determine bending moment in flat slab. **[4]**

b) An open square tank is 4.5m×4.5m×2.53m deep and supported 5.6 meters above the ground level on beams and columns. Design the tank beams, and columns. Use M20 and Fe 415. **[5]**

OR

Q4) a) Design an interior panel of a flat slab for a live load of $4kN/m^2$ and floor finish$1kN/m^2$. The panels are 5.5m×5.5m. use M25 and Fe500.(Design for flexure only). **[5]**

b) Explain in detail wind load analysis of columns for a water tank supported on four identical columns with their lower ends fixed to the base. **[4]**

P.T.O.

Q5) a) Design a circular bunker to store 45 tonnes of coal. Density of cement =16kN/m^3, angle of repose 30°. Use M25 and TMT steel. Draw reinforcement details. **[8]**

b) A concrete bin is 3.5m×3.5m and contains wheat weighing 8.35kN/m^3. The coefficient of friction between grain and grain is 0.43. The coefficient of friction between grain and concrete is 0.41. if the depth of wheat is 3.2m, determine the lateral pressure per meter run of the bin wall. **[8]**

OR

Q6) a) Design a side wall and hopper bottom of circular bunker to store65 tonnes of cement. Take the unit weight of cement =16kN/m^3 angle of repose=28^0 use M20 and Fe 415.Draw reinforcement details. **[8]**

b) A concrete bin is 3.3m×3.3m and contains wheat weighing 8.3kN/m^3 The coefficient of friction between grain and grain is 0.45. The coefficient of friction between grain and concrete is 0.42. if the depth of wheat is 6.4m, determine the lateral pressure per meter run of the bin wall. **[8]**

Q7) a) For a 25 pile group in clay suggest the spacing of piles for the most efficient arrangement. **[8]**

b) Design the raft foundation for centre to centre distance of column in both directions is 2.2m, column size 275mm×275mm,working load on each column is 750kN The depth of the strata is 1.8m. Use M25 and Fe500.SBC 120kN/m^2 Draw reinforcement details. **[8]**

OR

Q8) a) A group of 24 piles is arranged with 4 rows and 6 piles each. The piles are 300mm in diameter and spaced 1m centers. Each pile can carry 200kN working load if it can act independently.Determine the carrying capacity of the pile group. **[8]**

b) Design the formwork for column 300mm×300mm having a height of 3m. it is proposed to deposit concrete in one stage. **[8]**