

Total No. of Questions : 8]

SEAT No. :

P6117

[Total No. of Pages : 2

[5562]-143

M.E. (Civil) (Structural Engineering) (Semester - II)
ADVANCED DESIGN OF CONCRETE STRUCTURES
(2017 Pattern)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Neat diagrams must be drawn wherever necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *Assume suitable data, if necessary.*
- 4) *Use suitable IS codes.*

- Q1)** a) Explain guidelines for establishing axes of rotations and yield lines. [4]
b) Design a grid slab for a floor of hall 12m x 15m c/c having square grid of 1.5m. Use M20 Fe 500 take live load 4kN/m² and floor finish load 1.5kN/m². Design for flexure only. [5]

OR

- Q2)** a) Draw yield lines for 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 10m x 14m c/c having square grid of 2m. Use M25 concrete and Fe 500 steel. [5]
- Q3)** a) Explain the different types of flat slab and its advantages. [4]
b) An open square tank 6m×6m×3m deep and supported 7m above the ground level on beams and columns. Design the tank, beam and columns. Use M25 concrete and Fe 415 steel. [5]

OR

- Q4)** a) Design an interior panel of a flat slab 7m × 7m for a live load of 4 kN/m² and F.F. of 1 kN/m². Use M25 and Fe 415. Design for flexure. [5]
b) Explain in detail wind load analysis of columns for water tank supported on four identical columns with their lower end fixed to the base and braced at intermediate levels. [4]

P.T.O.

Q5) a) Design a square bunker to store 400 kN furnace slag. Unit weight of slag is 8000N/m^2 . Angle of repose is 24° . Use M25 and Fe500. Draw reinforcement details. [8]

b) A concrete bin is $3.5\text{m} \times 3.5\text{m}$ and contains wheat weighing 8.75kN/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 4m, determine the lateral pressure per meter run of the bin wall. [8]

OR

Q6) a) Design a circular bunker to store 350 kN cement. Density of cement is 30kN/m^3 . Angle of repose is 30° . Use M25 and Fe500. Draw reinforcement details. [8]

b) A concrete bin is $4\text{m} \times 4\text{m}$ and contains wheat weighing 9kN/m^3 . The coefficient of friction between grain and grain is 0.42. The coefficient of friction between grain and concrete is 0.38. If the depth of wheat is 5m, determine the lateral pressure per meter run of the bin wall. [8]

Q7) a) A group of 25 piles is arranged with 5 rows and 5 piles each. The piles are 350mm diameter and spaced 1 m centers each pile can carry 250kN working load, if it can act independently. Determine the carrying capacity of the pile group. [8]

b) Design the formwork for slab $4\text{m} \times 4\text{m}$ having thickness of 150mm. It is proposed to deposit concrete in one stage. [8]

OR

Q8) a) In a group of 30 piles of diameter 400mm and c/c spacing of piles is 2m. The piles are arranged in square area. Ascertain whether the failure will occur with the piles acting individually or as a group. Each pile is 10 m long. Take $m = 0.7$ and $c = 50\text{kN/m}^2$. [8]

b) Design raft foundation for center to center distance of columns in both directions is 3m, column size $400\text{mm} \times 400\text{mm}$, working axial load on each column is 750kN. The depth of strata is 2m. Use M20 and Fe500. The safe bearing capacity of strata is 120kN/m^2 . Draw reinforcement details. [8]

