

BACHELOR OF ENGINEERING (CIVIL ENGINEERING)
FOURTH YEAR, 2ND SEMESTER 2025
DESIGN OF STRUCTURES-III

Time : 3 hours

Full Marks : 100

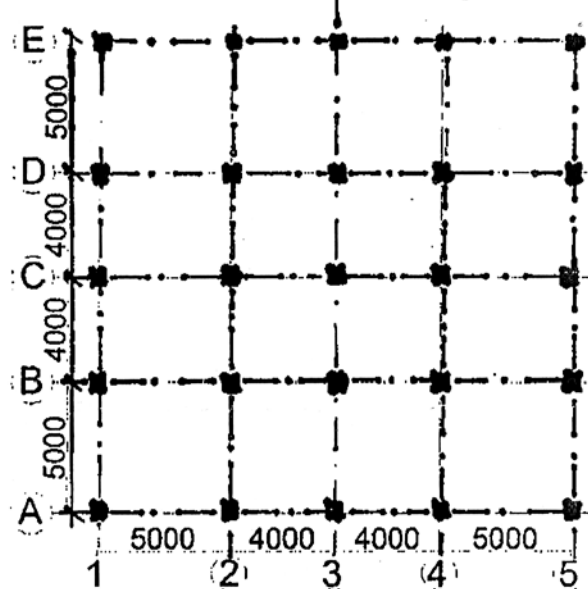
The figures in the margin indicate full marks

Assume reasonable value of any data if required.

IS code No.1893(Pt. 1), 875 (Pt. 3), 456 & SP 16, IS 3370 (Pt.2 & 4) and IRC 6 & 21 are allowed in examination hall

Answer any four question

1. Center line plan of a six storied Institutional building as shown in fig.



Floor to floor height = 4m, Plinth height = 0.6m, Column size = 400mm x 400mm,
 Beam size = 450mm (depth) x 250mm (wide)

Outer wall = 250mm thick brick wall all round.

Calculate designed wind force of the building and calculate joint loads in each storey for frame C1-C5.

25

2. Design a suitable pile cap for a RCC column of size 500mm x 500mm with
 total vertical load = 1200 KN, moment in both X and Y direction = 75 KNM
 Pile diameter = 450 mm, Vertical capacity = 450KN, Lateral capacity = 80KN
 Uplift capacity = 100 KN

Apply 'Limit State Method' as per IS 456. Grade of concrete M25 and
 Grade of steel Fe 500

Draw the reinforcement arrangement of the pile cap.

25

3. Design a cantilever retaining wall (T type) to retain earth for a height of 4m. The backfill is horizontal. The density of soil is 19 KN/m³. Safe bearing capacity of soil is 220 KN/m². Take the co-efficient of friction between concrete and soil as 0.6. The angle of repose is 30°. Use M25 concrete and Fe500 steel.
Draw the reinforcement arrangement of retaining wall 25.

4. Design deck slab of a RCC T beam girder bridge with following data:
Clear width of road = 7.5m, Kerb = 600mm wide, Number of long girders = 3 @ 2.5m c/c,
Span of long girder (c/c of bearing) = 20.0m, cross girders @ 5m c/c, breadth of long and cross girder = 300mm, wearing coat = 80mm.
Loading – IRC Class 70R Tracked.
Grade of concrete M30 and Grade of steel Fe 500
Draw the detail of reinforcement of the deck slab. 25

5. Design a rectangular water tank 5m x 4m with depth 3m resting on unyielding ground and tank walls are rigidly jointed with vertical and horizontal edges. Design the tank using IS code method.
Grade of concrete M25 and Grade of steel Fe 500.
Draw the detail of reinforcement of the tank. 25

6. Design a rectangular combined footing with two column 'A' of size 500mm x 500mm and column 'B' 400mm x 400mm. A load of 750kN is acting on A column and 600 KN load is applied on B column. Column center to center distance 3000mm. Safe bearing capacity of soil is 175 KN/sqm. Boundary line is 300mm away from column B.
Grade of concrete M25 and Grade of steel Fe 500.
Draw the reinforcement arrangement of foundation. 25