

CBCS SCHEME

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18CV72

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 Design of RCC and Steel Structure

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any TWO full questions, choosing ONE full question from each module.
2. Use of IS-456, IS-800, SP-16, SP(6) – steel tables are allowed.*

Module-1

- 1 Design RCC rectangular combined footings for two columns which are 3.6 m apart carrying a load of 1000 kN and 1500 kN. Sizes of column are 400 mm × 400 mm and 600 × 600 mm. Width of footing is 1.8 m SBC of soil is 280 kN/m². M20 concrete and Fe415 steel is used. Assume beam and slab type combined footing, sketch the details of reinforcement. (50 Marks)

OR

- 2 Design a cantilever retaining wall to retain an earth embankment with a horizontal top 3.50 m above ground level. The unit weight of back fill is 18 kN/m³. Angle of internal friction $\phi = 30^\circ$, SBC of soil = 180 kN/m². Take coefficient of friction between soil and concrete = 0.55. Adopt M20 grade concrete and Fe415 grade steel. Depth of foundation = 1.0 m. (50 Marks)

Module-2

- 3 The centre line of a roof truss is as shown in Fig.Q3. The magnitude and nature of forces under service conditions are:
Top chord members = 120 kN compression
Bottom chord members = 100 kN Tension
Interior members = 60 kN Tension and 50 kN compression.
For all the interior members use similar single angle sections. Design all the members and joints using M16 turned bolts of grade 4.6. Also design bearing plate, base plate and anchor bolts to connect the truss to an RCC column 300 mm × 300 mm of M20 grade concrete.

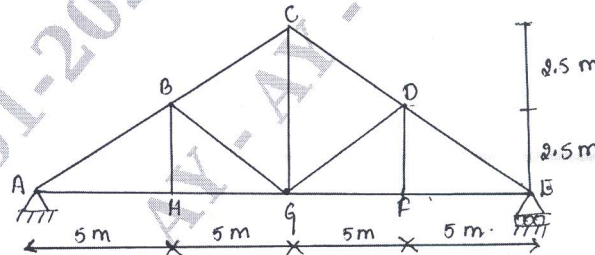


Fig.Q3

(50 Marks)

OR

- 4 Design a plate girder for an effective span 14 m. Load on the girder consist of UDL 45 kN/m in addition to two point loads each of magnitude 400 kN placed at a distance of 3m, on either side of mid span point of girder. Design Mid span cross section curtailment of flange, intermediate stiffness and end bearing stiffness.
Draw sketch showing detail of longitudinal section cross section at mid span and support and plan of girder. (50 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.