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Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019 Design of RCC and Steel Structures

Time: 3 hrs.

Max. Marks: 80

Note: 1. Answer any TWO full questions, choosing one full question from each module.
2. Use of IS-456, IS-800 SP (6) and Steel tables are permitted.

Module-1

- 1 Design a slabtype rectangular combined footing for two columns of size 300mm × 450mm and 300mm × 600mm, subjected to axial loads of 650 kN and 900 kN respectively. The columns are spaced at 3.6 m c/c. The width of the footing is restricted to 1.8 m. Use M20 grade concrete and Fe415 grade steel. Assume SBC of soil = 160 kN/m². (40 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. (40 Marks)

Module-2

- 3 Design a roof truss shown in Fig. Q3 with forces in each member of the truss are given in table Q3. The size of RC column supporting the truss is 300mm × 300mm. Use M20 grade concrete for column. Design the truss using bolt of M16, property class 4.6 for connections and also design anchor bolts. (40 Marks)

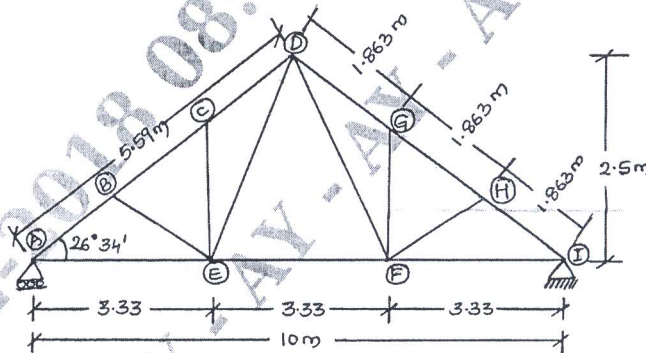


Fig. Q3

Member	Design force in kN	
	Compression	Tension
Top chord member	54.25	-
Bottom chord member	-	48.31
Diagonal member (DF, DE)	14.35	-
Member BE, HF	-	24.50
Member CE, GF	12.40	-

OR

4 Design a simply supported crane gantry girder for the following data: The crane is electrically operated. Yield stress of steel is 250 N/mm^2 .

- (i) Span of Crane girder = 20 m
- (ii) Effective span of gantry girder = 7.4 m
- (iii) Capacity of crane = 220 kN.
- (iv) Self weight of Crane girder excluding crab = 200 kN.
- (v) Weight of Crab = 60 kN.
- (vi) Wheel base distance = 3.4 m
- (vii) Minimum hook approach = 1.2 m.
- (viii) Self weight of rail = 300 N/m
- (ix) Height of rail = 75 mm

Gantry girder is to be supported on RCC column bracket of size $300\text{mm} \times 450\text{mm}$. Size of column $300\text{mm} \times 600\text{mm}$.

(40 Marks)

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