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15CV72

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/m^2. **(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/m^3. Angle of internal friction ϕ = 30°. SBC of soil = 180 kN/m^2. 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)**

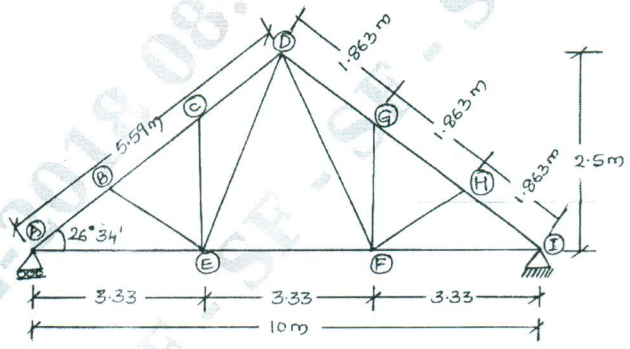

Fig. Q3

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 300mm × 450mm . Size of column 300mm × 600mm . **(40 Marks)**

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