



CBCS SCHEME

17CV72

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022

Design of RC and Steel Structures

Time: 3 hrs.

Max. Marks: 100

- Note:** 1. Answer any TWO full questions choosing one from each module.
 2. Use of IS456, IS800, SP(6), Steel tables are permitted.
 3. Assume any Missing data suitably.

Module-1

- 1 Design a slab type rectangular combined footing for two columns of size 300mm × 450mm and 300mm × 600mm, subjected to axial loads of 650kN and 900kN respectively. The columns are spaced at 3.6m C/C. The width of the footing is restricted to 1.8m. Use M₂₀ grade concrete and Fe415 grade steel. Assume SBC of soil ⇒ 160 kN/m². (50 Marks)

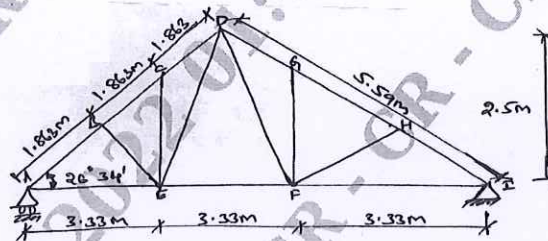
OR

- 2 An RC portal frame with a hinge base is required to suit the following data :
 Spacing of portal frames ⇒ 4m C/C ; Height of column ⇒ 4m
 Difference between column centers ⇒ 10m ; Live load on roof ⇒ 1.5 kN/m².
 The RC slab is continuous over the portal frame, SBC of soil ⇒ 200 kN/m².
 Materials : M₂₀ and Fe415 steel are used. Design the slab, portal frame and foundation. (50 Marks)

Module-2

- 3 Design a roof truss shown in Fig. Q3, with forces in each member of the truss is given in table 1. 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. (50 Marks)

Fig.Q3



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

Table - 1.

OR

- 4 Design a simply supported crane gantry girder for the following data :
 Span of crane girder ⇒ 20m ; Span of gantry girder ⇒ 7m ; Capacity of the crane ⇒ 220kN
 Self weight of crane excluding the crab ⇒ 200 kN ; Weight of crab ⇒ 60kN
 Wheel base distance ⇒ 3.4m ; Min hook approach ⇒ 1.10m ; Self weight of rail ⇒ 0.3kM/mm
 Height of rail ⇒ 70mm. (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.