18CV72

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023
Design of RCC and Steel Structures

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 permitted.
3. Assume missing data suitably.

Module-1

1   Design slab and beam type combined footing for two columns of size 300mm × 300mm and 400 × 400mm subjected to 500kN and 700kN respectively. The centre to centre spacing between columns is 3.50m. The width of the footing is restricted to 1.5m. Take SBC of soil = 150kN/m^2. Use M$_{25}$ and Fe415 grades. Also show reinforcement in L/S and C/S.

(50 Marks)

OR

2   Design a cantilever retaining wall to retain an earth embankment 4m high above ground level. The density of earth is 18kN/m^3 and its angle of repose is 30°. The embankment is horizontal at top. The S.B.C. of soil is 200kN/m^2. The coefficient of friction between soil and concrete is 0.5. Adopt M-20 and Fe415 grades. Draw C/S elevation of retaining wall.

(50 Marks)

Module-2

3   A line diagram of a roof truss with internal loads and forces in each members are shown in Fig.Q.3. Design the various members of the roof truss along with their end connection with bolt using property class 5.6 black bolts. Also design the bearing plate at the support for the reaction and anchor bolts for an uplift force of 15kN. Draw elevation of truss greater than half span.
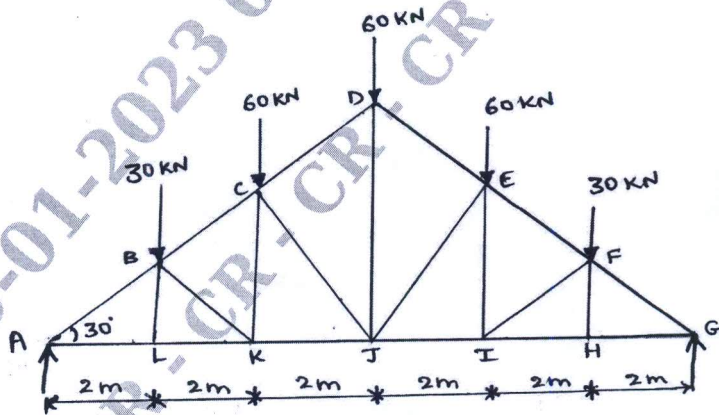
(50 Marks)

Fig.Q.3

Tabulation of member forces

Members	Length (m)	Force (kN)	Nature of Force
AB, GF	2.31	240.00	Compression
BC, FE	2.31	210.00	Compression
CD, ED	2.31	160.04	Compression
AL, GH	2.00	207.84	Tension
LK, HI	2.00	207.84	Tension
KJ, IJ	2.00	181.82	Tension
BL, FH	1.154	0.00	-
BK, FI	2.31	30.00	Compression
CK, EI	2.31	15	Tension
CJ, EJ	3.05	66.05	Compression
DJ	3.46	66.00	Compression

OR

4   Design a simply supported gantry girder to carry an electrically operated travelling crane with the following data:

Span of crane bridge = 25m

Column spacing = span of gantry girder = 8m

Wheel Base = 3.5m

Crane capacity = 200kN

Weight of crane bridge = 150kN

Weight of Trolley = 75kN

Min Hook Distance = 1.0m

Weight of Rail = 0.30kN/m

Height of Rail = 105mm

Also draw sectional elevation.   (50 Marks)

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