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18CV72

## Seventh Semester B.E. Degree Examination, July/August 2022 Design of RCC & 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 IS456, IS-800, SP(6) and steel tables are permitted.

### Module-1

- 1 Design a combined footing slab beam type for two RCC column A and B separated by a distance of 4 m C/C. Column A is  $500 \times 500$  mm and carries a load of 1250 kN and column B is  $600 \times 600$  mm and carries a load of 1600 kN. Take SBC of soil is  $200 \text{ kN/m}^2$ . Use M20 concrete and Fe415 steel. Draw the sectional elevation. (50 Marks)

OR

- 2 Design a Cantilever retaining wall to retain earth embankment 5 m high above ground level. The density of earth is  $18 \text{ kN/m}^3$  and its angle of repose is  $30^\circ$ . The embankment is horizontal at its top. The SBC of may be taken as  $200 \text{ kN/m}^2$  and the co-efficient of friction between soil and concrete is 0.5. Adopt M20 grade concrete and Fe415 steel. Also draw cross sectional elevation showing reinforcement details. (50 Marks)

### Module-2

- 3 A line diagram of a roof truss with internal loads and forces in each member are shown in Fig. Q3. Design the various members of the roof truss along with their end connection with bolt of property class 5.6. Also design the bearing plate at support for the reaction and anchor bolts for an uplift force of 15 kN. Also draw the Elevation of truss greater than half plan.

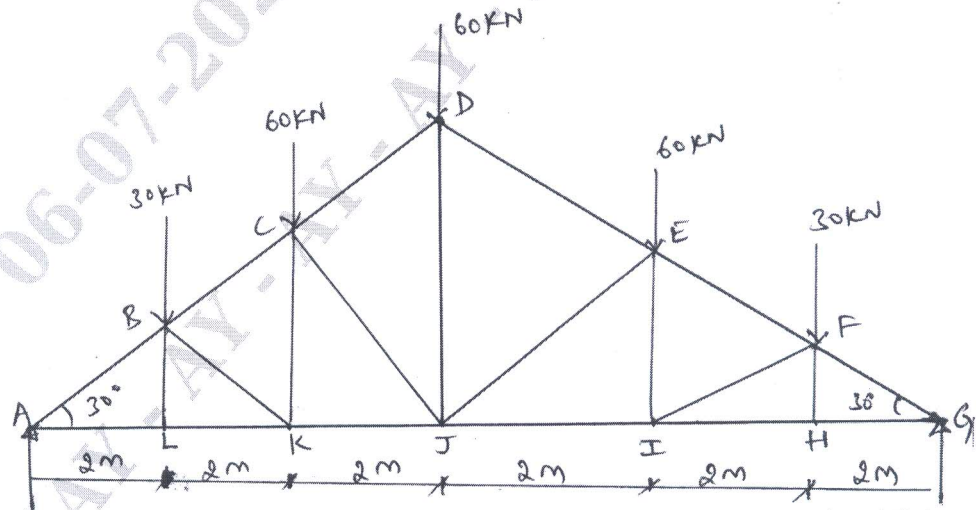


Fig. Q3  
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Members	Length (m)	Force (kN)	Nature of force
AB, GF	2.31	240	C
BC, FE	2.31	210	C
CD, ED	2.31	160.04	C
AL, GH	2.0	207.84	T
LK, HI	2.0	207.84	T
KJ, IJ	2.0	181.82	T
BL, FH	1.154	0	-
BK, FI	2.31	30	C
CK, EI	2.31	15	T
CJ, EJ	3.05	66	C
DJ	3.46	60	C

(50 Marks)

OR

- 4 Design a simply supported gantry girder to carry an electrically operated crane with the following data:
- Span of Crane bridge = 25 m
  - Span of gantry girder = 8 m
  - Wheel base = 3.5 m
  - Crane capacity = 200 kN
  - Weight of crane bridge = 150 kN
  - Weight of trolley = 75 kN
  - Min Hook distance = 1.0 m
  - Weight of rail = 0.30 kN/m
  - Height of rail = 105 mm
- Draw the sectional elevation.

(50 Marks)

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