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17CV72

Seventh Semester B.E. Degree Examination, July/August 2021 Design of RCC and Steel Structures

Time: 3 hrs.

Max. Marks: 100

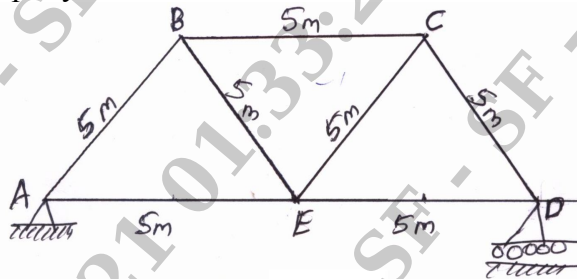
- Note:** 1. Answer any TWO full questions.
2. Use of IS456, IS800, SP(6), Steel tables are permitted.
3. Assume any Missing data suitably.

- 1 Two columns $230 \times 300\text{mm}$ and $300\text{mm} \times 230\text{mm}$ are spaced 2m apart and carry service loads of 280 kN and 350kN respectively. If the SBC of soil is 140 kN/m^2 design a Rectangular slab type RCC combined footing. The projection of the footing beyond the centre line of column measuring $230\text{mm} \times 300\text{mm}$ is limited to 500mm. Use M_{20} grade of concrete and Fe – 415 grade steel. (50 Marks)

- 2 Design a Cantilever Retaining Wall to retain Earthen embankment of 3.5m high. The density of earth is 18 kN/m^3 . And its angle of repose is 30° . The Embankment is horizontal at its top. The SBC of soil is 200 kN/m^2 . The Coefficient of friction between soil and concrete is 0.5. Adopt M_{20} grade concrete and Fe-415 grade steel. (50 Marks)

- 3 Design a Bolted Roof truss, for an Industrial building as shown in Fig. Q3. The forces in the members of the truss due to dead load, live load and wind load are given in the table below. Consider M16 bolts of property class 4.6. (50 Marks)

Fig. Q3



Member	D.L (KN)	L.L (KN)	W.L (KN)
AB	+ 9.2	+ 8.2	- 37
BC	+ 9.2	+ 8.2	- 32.6
CD	+ 9.2	+ 8.2	- 37
AE	+ 7.4	+ 6.6	- 32.6
BE	- 7.9	- 7.0	+ 26.6
CE	- 7.9	- 7.0	+ 26.6
DE	+ 7.4	+ 6.6	- 32.3

NOTE : Sign : + Compression
- Tension.

- 4 Design a welded plate girder for a supply supported span of 36m. Factored UDL load on the girder is 79.5 kN/m . In addition of two concentrated factored loads of each 870 kN placed at a distance of 9m on either side of the support of the girder. (50 Marks)

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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.