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18CV72

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

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any TWO full questions, selecting at least ONE questions from each module.*
2. Use of Is 456, Is – 800 SP(16) and Steel tables are permitted.

Module-1

1 Two columns (230 × 300) and (300 × 230) are spaced 2m apart and carry loads of 280kN and 350kN (service loads) respectively. If the SBC of soil is 140kN/m^2. Design a rectangular combined footing, the projection of the footing beyond centre line of column carrying lowest load is limited to 500mm. Use M20 grade of concrete and Fe-415 grade steel. **(50 Marks)**

OR

2 Design a cantilever retaining wall to retain as earth embankment with a horizontal 3.5m above ground level. Density of earth = 19 kNm^3. Angle of internal friction = ϕ = 30° safe bearing capacity of soil = 200 kN/m^2. The co-efficient of friction between soil and concrete is 0.5. Adopt M_{20} grade of concrete and Fe-415 grade steel. **(50 Marks)**

Module-2

3 Design a bolted roof truss for an industrial building as shown in Fig.Q3, consider M_{16} bolts of property class 4.6. Also design the support for a pull of 40 kN. The forces are as given in Table Q.3 **(50 Marks)**

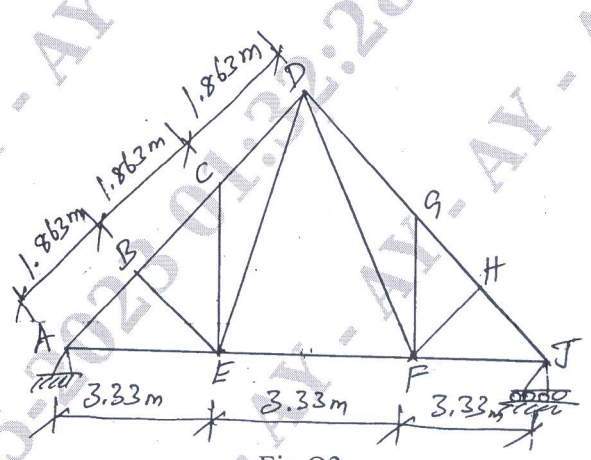

Fig.Q3

Member	DL(kN)	LL(kN)	WL(kN)
AB	+14.37	+21.80	–37.32
BC	+11.64	+17.60	–32.08
CD	+12.05	+18.26	–35.90
DE	–5.13	–7.70	+14.70
EC	+2.77	+4.18	–8.42
EB	+2.77	+4.18	–9.15
EA	–12.85	–19.36	+31.69
EF	–7.69	–11.61	+15.63

Sign : + Compression
– Tension

Table Q3

OR

4 A welded plate girder has an effective span of 36m and carries a uniformly distributed load of 79.5kN/m and two concentrated load of 870 kN. Each acting at 9m from both ends. The girder is simply supported at ends. It is fully restrained at both ends against lateral buckling throughout the span. Design the plate girder using this web and stiffeners. Also design the welded connection between flange and web, end bearing stiffeners and web. Take yield stress of steel = f_y = 250 MPa, ultimate stress of steel = f_u = 415 MPa. Ultimate shear stress of weld = 410 MPa. **(50 Marks)**

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