

CBCS SCHEME

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Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020 Design of RCC and Steel Structures

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any TWO full questions, choosing ONE full question from each module.
2. Use of IS456, IS800, SP(6)-Steel Table is permitted.
3. Assume any missing data suitably.*

Module-1

- 1 Design a reinforced concrete combined rectangular slab footing for two columns located at 4.5 m apart. The overall sizes of the columns are 400mm × 400mm and 600mm × 600mm and they are transferring 600 kN and 1000 kN respectively. The centre of the lighter column is 0.4m from the property line. The safe bearing capacity of the soil 150 kN/m². Use M20 concrete and Fe 415 steel. Sketch the reinforcement details. (40 Marks)

OR

- 2 Design a cantilever retaining wall to retain an earth embankment with a horizontal top 3.5m above ground level. Density of earth 18 kN/m³, angle of internal friction $\phi = 30^\circ$. SBC of soil is 200 kN/m³. Take coefficient of friction between soil and concrete 0.5, Adopt M20 grade concrete and Fe 415 steel. (40 Marks)

Module-2

- 3 The centre line of a roof truss is as shown in the Fig.Q3. The forces in the members of the truss due to dead load, live load and wind load is given below: Design the roof truss member using M16 bolts of property class 4.6. Also design a bearing plate and anchor bolts for a pull of 40 kN. Use M20 grade concrete. Draw to suitable
(i) Elevation of truss greater than half space (ii) Support details.

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

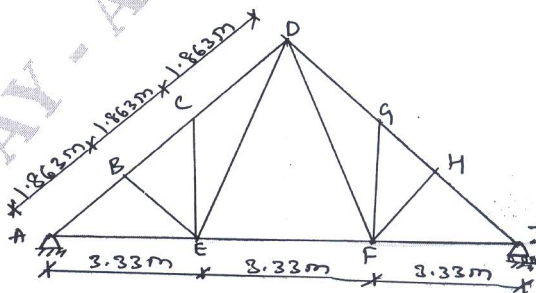


Fig.Q3

(40 Marks)

OR

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

- (i) Span of the crane bridge \Rightarrow 25 m
- (ii) Span of the gantry girder \Rightarrow 8 m
- (iii) Wheel base \Rightarrow 3.5 m
- (iv) Crane capacity \Rightarrow 200 kN
- (v) Weight of crane bridge \Rightarrow 150 kN
- (vi) Weight of trolley (crab) \Rightarrow 75 kN
- (vii) Minimum hook distance \Rightarrow 1.0 m
- (viii) Weight of rail \Rightarrow 0.30 kN/m
- (ix) Height of rail \Rightarrow 105 mm

Draw neatly cross section of gantry girder showing all details. Also draw side view.

(40 Marks)
