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06CV82

Eighth Semester B.E. Degree Examination, May/June 2010
Design and Drawing of Steel Structures

Time: 4 hrs. Max. Marks:100

Note: ***1. Answer One question from Part A and One question from Part B.***
2. Use of IS:800 – 2007 and steel table are permitted.
3. Assume missing data suitably.

PART – A

1 a. A secondary beam ISMB 300 @ 461 N/m is to be joined to the main beam ISMB 400 @ 616 N/m. Two angles ISA 90 x 90 x 6 are used for connection. Three bolts of diameter 20 mm are used to connect angles to the web of ISMB 300. 6 bolts of 22mm diameter are used to connect the angles to the web of ISMB 400. The flanges of both beams are at the same level. Draw to a suitable scale.
i) Sectional elevation. **(08 Marks)**
ii) Side view showing all details. **(07 Marks)**

b. Two channels ISMC 400 @ 494 N/m placed back to back with a spacing 250 mm. The channels are supported on a slab base having 700 x 700 x 80 mm size. The side angles are 100 x 100 x 10 and are connected by suitable bolts. Base plate is connected to concrete pedestal 2m x 2m x 0.8 m size using 4 anchor bolts of diameter 20 mm having 250 mm length. Draw to a suitable scale the following :
i) Sectional elevation. **(08 Marks)**
ii) Plan of slab base giving all details. **(07 Marks)**

2 a. An ISLB 400 @ 569 N/m beam connects ISHB 300 @ 588 N/m column by means of stiffened connection. The stiffener angles are ISA 90 x 90 x 10 mm with two rows of 5 bolts of diameter 20 mm. Seat angle is ISA 130 x 130 x 10 mm and cleat angle ISA 90 x 90 x 10 with nominal bolting. Draw :
i) Front elevation. **(10 Marks)**
ii) Side view with details. **(10 Marks)**

b. An ISHB 300 @ 630 N/m in the lower storey of a building is connected to ISHB 200 @ 400 N/m of the upper storey. The splice for the columns consists of 250 x 300 x 8 mm plates with all round welding. The base plate is 300 x 250 x 50 mm. Use suitable web angles and welding for connection. Draw:
i) Sectional Elevation.
ii) Side view with details. **(10 Marks)**

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.

PART – B

3 The fink roof truss for an industrial building has the following details.
Span = 10 m, Rise 2.5 m, bearing = 300 mm, slope θ = 26.6°. Panel width AD = DE EF = FC = 1.4 m.

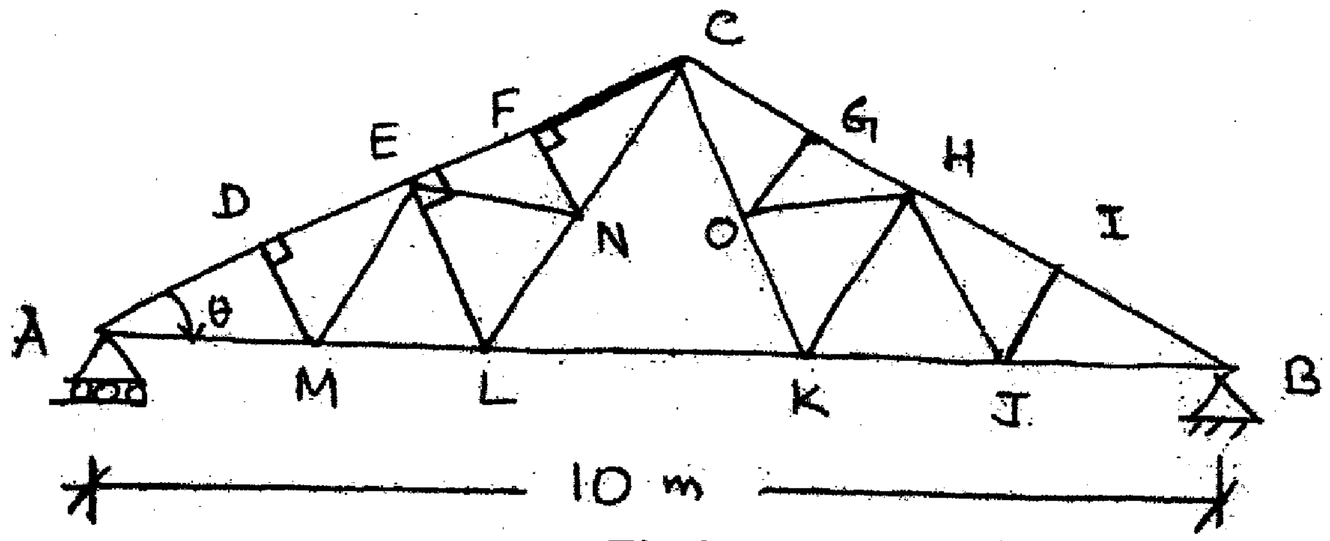

Fig.3

Design the members of the joint C and A completely. Also design the sliding base at A consisting of shoe angles, base plate and bearing plate. The forces under service condition are :
Reaction at A = 20 kN
Force in CF = CG = 36 kN compression and 22 kN tension
Force in CN = CO = 20 kN compression 15 kN tension
Force in AD = 67 kN (compression)
Force in AM = 60 kN (tension).
Use suitable diameter bolts for all connections. Also design the anchor bolts for a pull of 20 kN. Draw to a suitable scale :

a. The elevation of roof truss greater than half span.
b. Elevation of joint C to a larger scale.
c. Elevation and plan details of sliding joint at A.

(70 Marks)

4 Design a simply supported crane gantry girder for the following data. The girder is electrically operated. Yield stress of steel is 250 MPa. Use 16 mm diameter bolt of grade 4.6.

i)	Span of crane girder	= 20 m
ii)	Span of gantry girder	= 7 m
iii)	Capacity of the crane	= 220 kN
iv)	Self weight of crane excluding crab	= 200 kN
v)	Weight of crab	= 60 kN
vi)	Wheel base distance	= 3.4 m
vii)	Minimum hook approach	= 1.1 m
viii)	Self weight of rail	= 0.3 kN/m
ix)	Height of rail	= 75 mm

Draw to a suitable scale :

a. The cross section of gantry girder and its attachments to supporting column and the bracket.
b. Plan details.
c. Side elevation.

(70 Marks)

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