Total No. of Questions : 8] **SEAT No. :**

P4742 **[Total No. of Pages : 4**

[5060]-539
M.E. (Civil Engg. - Structures)
ADVANCED DESIGN OF STEEL STRUCTURES (ADSS)
(2013 Pattern) (Semester - I)

Time : 3 Hours] ***[Max. Marks : 50***

Instructions to the candidates:-

1) ***Answer any five from eight questions.***
2) ***Figures to the right side indicate full marks.***
3) ***Use IS - IS: 800-2007, IS:800-1984, IS:801. IS:802, IS:811, SP-34 and Nonprogrammable calculator.***
4) ***Neat diagram must be drawn wherever necessary.***
5) ***More reproduction from IS code as answer, will not be given full marks.***
6) ***Assume suitable data, if necessary.***

Q1) a) Enlist the various components of hoarding. **[3]**

b) The hoarding structure is to be installed on the top of the building (2.5m height). The hoarding carries display board 5m × 5m. Suggest the suitable hoarding structure to carry this board. Calculate all the loads acting on the hoarding structure. Draw FBD of the suggested structures, showing calculated forces on it. **[7]**

Q2) a) Write down the guideline for web opening and stiffeners for castellated beams. **[3]**

b) Design a castellated beam in grade Fe 410 steel to carry an imposed load of 4kN/m and dead load of 4 kN/m over a simply supported span of 16m. Assume that the compression flange is fully restrained. **[7]**

Q3) a) What is mean by microwave tower, explain with examples. **[3]**

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b) A 65 m high microwave antenna lattice tower is to be built near Agra where the terrain at the site is nearly a level ground with terrain of category 2. The diameter of the hemispherical antenna disc, fixed at the top is 3m. The width of the tower at the top is 3.5m. Select a suitable configuration for the tower and determines maximum compressive force and tension in the tower legs and also the maximum shear at the base, for the following data. **[7]**

Weight of antenna disc and fixtures : 9 kN

Weight of platform at the top : 0.82 kN/m^2

Weight of railing at top : 0.30 kN/m^2

Weight of ladder and the cage : 0.65 kN/m

Weight of miscellaneous item : 2.5 kN

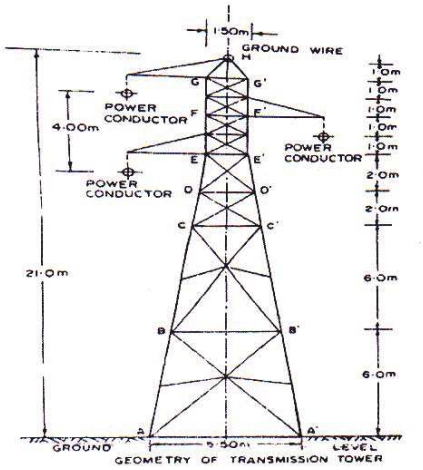
Q4) a) Draw figures and explain XBX-bracing, K-bracing, W-bracing. **[3]**

b) Determine the various forces (lateral forces due to wind, longitudinal forces, if any, torsional forces, if any and dead load) acting on the tower under the following conditions: **[7]**

i) Normal operating conditions.

ii) Top-most power conductor in broken condition.

iii) Ground wire in broken condition. Refer figure -1.



GEOMETRY OF TRANSMISSION TOWER

Figure 1

Q5) a) What are tubular structures? Write down its various purpose and its important advantages. **[3]**

b) Design a member of a tubular truss. A tension member of a truss, carrying tensile forces of 25 kN, meets the principal rafter, carrying a compressive force of 100 kN, at right angle. The panel length along the principal rafter is 2.5 m. Design both the members, using IS: 1161 grade, Yst 240 tubes. Also, design the welded joint for the members, Taking the allowable stress in fillet weld as 110 N/mm^2. **[7]**

Q6) a) Explain light-gauge section and draw different forms of light-gauge sections. **[3]**

b) Find the column section properties and allowable load for the column section shown in figure 2. The effective length of column is 3.2m. Take fy = 235 MPa. **[7]**

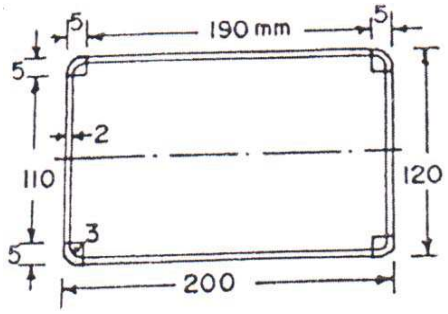


Figure - 2

Q7) a) What are the types of chimneys? State the factor influencing the design of chimney. **[3]**

b) Find thickness of the supporting lined chimney to the following particulars. **[7]**

Height of the chimney = 72m.

Diameter of the chimney = 3.0m.

Thickness of the lining = 100 mm.

Wind Pressure = 1300 N/mm^2 on flat vertical surface.

Take safe tensile stress = 120 N/mm^2.

The foundation has to rest on medium soil having bearing capacity = 200 kN/m^2.

Q8) a) State the difference between bolted and welded connections. **[3]**

b) A column section ISHB250@ 907.4 N/m is subjected to following factored loads. **[7]**

Axial compressive load, P = 500 kN

Moment, M = 45 kN.m

Assuming M25 grade of concrete for the pedestal and a square base plate, design the following.

i) Thickness of base plate

ii) Anchor bolts

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