Total No. of Questions : 8]

SEAT No. :

P4110

[Total No. of Pages :3

[4760] - 1030

M.E. (Civil -Structures)

ADVANCED DESIGN OF STEEL STRUCTURES

(2013 Credit Pattern) (Semester - I)

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

Instructions to the candidates:

1) ***Answer any five from eight questions.***
2) ***Neat sketches must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of non-programmable calcultor IS:800-2007, 801, 802, 811 and steel tables is allowed.***
5) ***Assume suitable data if necessary.***

Q1) a) What are the different forces acting on the hoarding structures and various structural configuration used. **[4]**

b) The design factored forces coming in a member of a hoarding structure are 100KN tensile and 150KN compressive due to reversal of wind forces. Design the member using double unequal angle section back to back on opposite faces of 10mm thick gusset plate using M20 black bolt of 4.6 grade. Assume Fe-415 grade of steel. Draw the design sketch. Take length of member as 2.4m. **[6]**

Q2) a) State the advantages and disadvantages of using castellated beams over rolled steel sections. **[3]**

b) Design a castellated beam in grade Fe 410 steel to carry an imposed load of 3.5kN/m and dead load of 3.5kN/m over a simply supported span of 16m. Assume that the compression flange is fully restrained. **[7]**

Q3) a) Define tower and state the difference between Microwave tower and transmission tower. **[4]**

b) A 60m 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 hemi-spherical antenna disc, fixed at the top is 3m. The width of the tower at the top has to 3.5m. Select a suitable configuration for the tower and determine maximum compressive force

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and tension in the tower legs and also the maximum shear at the base, for the following data. **[6]**

Weight of antenna disc and fixtures: 9kN

Weight of platform at 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: 2.5kN

Q4) a) Draw figures and explain XBX-Bracing, K-Bracing, Y-Bracing. **[4]**

b) Explain structural configuration (Tower geometry) and material. State the factor considered while deciding the configuration. **[6]**

Q5) a) What are tubular structures? Write down its various purpose and its important advantages. State IS provisions for tubular structures used in form works. **[5]**

b) A tubular column hinged at both ends has the outside diameter of tube 130mm and is of heavy gauge (i.e. @ 16.2 kg/m). The length of the column is 3.5m. Determine the safe load and column can carry if the column is of IS 1161 grade Yst 240 steel. **[5]**

Q6) a) Define stiffened, Unstiffened & multiple stiffened element and What are the advantages of light-gauge sections. **[4]**

b) Find the allowable load for the rectangular tubular column section show in fig.b. The effective length of column is 3.3m. Take fy = 235 N/mm^2.**[6]**

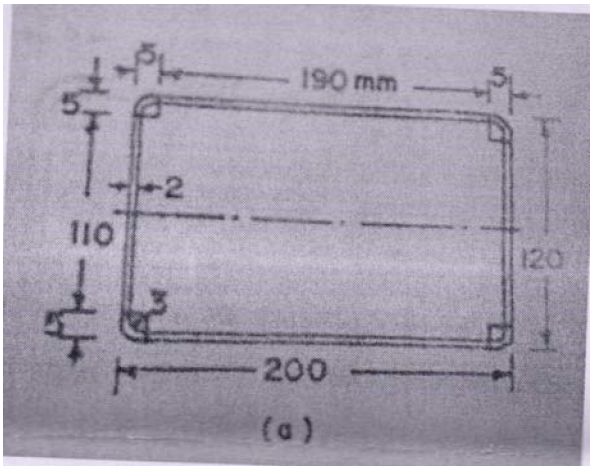

Fig. b.

Q7) Design a self- supporting lined chimney to the following particulars. **[10]**

Height of the chimney = 100 metres

Diameter of the chimney = 5 metres

Thickness of the lining = 100mm

Wind pressure = 1800 N/metre^2 on flat vertical surface

Assume suitable safe stresses.

Q8) A column section ISHB 350@ 661.2 N/m carries a factored axial compressive load of 1600kN and factored bending moment of 80kNm. Design the base plate and its connections.

If the factored bending moment is increased to 180kNm redesign the base and connections.

Assume concrete pedestal of M-20 grade. **[10]**

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