Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1721507 **Date: 12/07/2012**

Subject Name: Advanced Steel Structure Design

Time: 10:30 am – 13:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **IS 800:2007, IS 875 part I, II and III, IS 1893 and steel table are permitted.**

Q.1 A non-sway column of multistoried building frame with flexible joints is 4 m high and subjected to the following load and moment: **14**

1. Factored moment at the top of column = 27 kN.m
2. Factored moment at the bottom of column = 45 kN.m
3. Factored axial load = 500 kN

Design suitable beam – column assuming f_y = 250 N/mm^2. Take effective length of the column as 0.8L along both axes.

Q.2 **(a)** Elaborate the advantages of cold form steel sections. **07**

(b) Explain the design steps of tension member made from cold form steel. **07**

OR

(b) Explain the design steps of axially compressed column made from cold form steel. **07**

Q.3 **(a)** Determine the wind pressure for a bridge of life span of 100 years of 60 m span, located at Veraval. Also determine the design wind force in terms of width b of the bridge. **07**

(b) Write short note on 'Seismic Force Resisting Systems'. **07**

OR

Q.3 **(a)** Determine seismic load on the structure for a three story building having following data, located at Ghandhidham. Soil conditions are medium stiff and the entire building is supported on a raft foundation. The steel frames are infilled with unreinforced brick masonry. Consider no live load at roof. **07**

1st Floor W = 3435 KN, 4 m above GL

2nd Floor W = 2576 KN, 3 m above first floor

3rd Floor W = 1717 KN, 3 m above second floor.

(b) Explain the design criteria of steel structures under fatigue load. **07**

Q.4 **(a)** Explain the analysis steps of plate girder bridge. **07**

(b) Explain the empirical method used for the design of cold form section for compression member and state its limitations. **07**

OR

Q.4 **(a)** Explain the analysis steps of girder bridge. **07**

Q.4 **(b)** Write short note on 'Effect on shear force on plastic moment capacity'. **07**

Q.5 **(a)** List the various steps involved in the design of steel truss bridges for rail ways. How it will differentiate with road ways. **07**

(b) Make an algorithm for the analysis of rigid steel frame. **07**

OR

Q.5 **(a)** Explain the different steps to be followed while designing a beam-column of multistoried building. **07**

(b) Elaborate the load combination used for the design of steel bridges. **07**

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