Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–II EXAMINATION – SUMMER 2015

Subject Code: 2722007 **Date: 30/05/2015**

Subject Name: Advanced Design of Steel Structures

Time: 02:30 PM to 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Figures to the right indicate full marks.**
3. **Make suitable assumptions wherever necessary**
4. **Use of IS:800, IS:801, IS:811, IS:875, IS:1893 and Steel Table is permitted.**

Q.1		A deck type N-truss bridge has simply supported span of 40m with ten panels each of 4m. Top chord is U_1 to U_{10}, while bottom chord is $L_1$to L_{10}. The height of truss is 4m. Design any three of the following members: U_4L_5, L_5L_6, U_5U_6 and U_3L_3.	**14**
Q.2	**(a)**	Explain parameters for Design of Seismic Resistant Steel Building.	**07**
	(b)	Explain the design steps of axially compressed column made from cold form steel.	**07**
		OR	
	(b)	List various load combinations for design of steel structures. Explain load combination for Non-orthogonal buildings.	**07**
Q.3		Calculate design wind forces using the gust factor approach on a multistory steel building 60 m tall and plan size 20 m x 25 m to be constructed at Surat. Assume average storey height to be 3.2 m. The frames are to be spaced at 5 m c/c in both directions	**14**
		OR	
Q.3	**(a)**	Explain the Dynamic Effects of wind on steel buildings.	**07**
	(b)	Explain the design steps of tension member made from cold form steel.	**07**
Q.4		A non-sway column in a building frame with flexible joints is 5.5 m high and subjected to the following load and moments: Factored axial load = 500 kN Factored moment at top and bottom of column = 50 kNm and 80 kNm Design a suitable beam-column assuming f_y= 250 N/mm^2. Take the effective length of the column as 0.75L along both the axes. Perform all necessary checks.	**14**
		OR	
Q.4		Design a floor joist consisting of two channels welded back to back to form a unstiffened I section. The effective span of joist is 6 m. The joist is carrying UDL of 15 kN/m and one central point load of 35 kN. Use cold formed light gauge steel section. Design should confirm IS 801. Perform all necessary checks.	**14**
Q.5	**(a)**	Elaborate the design steps of industrial shed considering wind load.	**07**
	(b)	Explain the tension field method of determining post buckling strength in design of plate girder.	**07**
		OR	

Q.5 A simply supported plate girder with effective span of 30 m is subjected to uniformly distributed load of 100kN/m and two concentrated loads of 400 kN at 10m from each support. Considering fully restrained condition at both the ends against lateral buckling throughout the span. Design a section with flange plates and 8mm thick web plate and check last panel for shear and moment capacity & design end bearing stiffeners. **14**

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