Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Arch. – SEMESTER – IV • EXAMINATION – WINTER • 2014

Subject Code: 1055004 **Date: 02-12-2014**

Subject Name: Structure – V

Time: 10:30 am - 12:30 pm **Total Marks: 50**

Instructions:

1. ***Attempt all questions.***
2. ***Make suitable assumptions wherever necessary.***
3. ***Figures to the right indicate full marks.***
4. ***Use of IS 800 (2007) is permitted***

Q.1	**(a)**	Draw stress-strain curve for Mild Steel and explain important points.	**04**
	(b)	Explain briefly types of connections used in steel design.	**03**
	(c)	Advantages of High strength friction grip (HSFG) bolt.	**03**
Q.2	**(a)**	Enlist various types of Steel structures with sketches.	**05**
	(b)	State the advantages of welded connections.	**05**
		OR	
	(b)	Design suitable fillet weld to connect a tie plate 70 X 8 mm to a 12 mm thick gusset plate. The plate is subjected to load equal to full strength of the member. Assume shop welding and Fe 410.	**05**
Q.3		A member of a steel roof truss consist of two angles ISA 100 X 100 X 6 mm placed back to back on either side of 8 mm thick gusset plate. The member carries an ultimate tensile load of 200 kN. Determine number of 20 mm diameter 4.6 grade ordinary bolts required for the joints. Assume f_u of plate as 410 MPa.	**10**
		OR	
Q.3		Two plates of 8 mm thickness are connected by a single bolted lap joint with 20 mm diameter bolts at 70 mm pitch. Calculate the efficiency of the joint. Take f_u of plate as 410 MPa and assume 4.6 grade bolts.	**10**
Q.4		A single unequal angle 100 X 65 X 8 mm is connected to a 10 mm thick gusset plate at the ends with six 20 mm diameter bolts to transfer tension. Determine the design tensile strength of the angle assuming that the yield and ultimate stress of steel used are 250 MPa and 410 MPa. Assume that the longer leg is connected to the gusset plate. Also calculate efficiency of the member.	**10**
		OR	
Q.4		Select suitable angle section to carry a factored tensile load of 250 KN assuming a single row of M 20 bolts and $f_y = 250\ N/mm^2$.	**10**
Q.5		Determine the design axial load on the column section ISMB 300 having height 3.5 m, hinged at both ends. Take $f_y = 250$ MPa.	**10**
		OR	
Q.5		Design a steel column to carry factored axial load of 1700 KN. The length of column is 3.5 m and hinge at both ends.	**10**

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