Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VIII (NEW) EXAMINATION – WINTER 2020

Subject Code:2180610 **Date:28/01/2021**

Subject Name:Design of Steel Structures

Time:02:00 PM TO 04:00 PM **Total Marks: 47**

Instructions:

1. **Attempt any THREE questions from Q.1 to Q.6.**
2. **Q7 is compulsary**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**
5. **Use of IS: 800, IS: 875 and Steel Tables is permitted, provided that they do not contain anything other than the printed matter inside.**
6. **Consider f_y = 250 N/mm^2 and *fu* = 410 N/mm^2 if not mention.**

			MARKS
Q.1	**(a)**	What are risk co-efficient, terrain factor and topography factor ?	**03**
	(b)	Write design consideration for heavy moment resisting bolted connection.	**04**
	(c)	Determine the plastic moment capacity and plastic modulus of section of the unsymmetric section shown in **Fig 01.**	**07**
Q.2	**(a)**	Explain the analysis of roof column in Industrial building.	**03**
	(b)	Explain the failure of a riveted joint with suitable examples.	**04**
	(c)	The following data refers to a welded plate girder of span 24 m to carry superimposed load of 35 kN/m. Avoid use of bearing and intermediate stiffeners. Use Fe 415 (E250) steel. find out 1. Moment and shear force 2. Depth of web plate. 3. Selection of Flange. 4. Check for moment capacity of the girder. 5. Shear resistance of web.	**07**
Q.3	**(a)**	Distinguish between elastic modulus and plastic modulus.	**03**
	(b)	Explain simple post critical method to evaluate shear strength of web of plate girder as per IS 800:2007	**04**
	(c)	Using the following data calculate total W.L. on the truss. I. Total roof area = 72m^2 II. Risk factor K_1 & Topography factor K_3 =1 III. Terrain factor K_2 IV. Cpi = ± 0.5 V. Cpe = - 0.8 VI. Place = Ahmedabad	**07**
Q.4	**(a)**	Define: Rivet line, butt joint, Purlins.	**03**
	(b)	Enlist advantages and disadvantages of steel structures.	**04**
	(c)	Using the following data calculate wind load per panel point of a roof truss. I. Place = Indore II. Type of truss = Fink truss with slope equal to 26^0. III. No. of panels on each sloping side = 4 IV. Opening of wall area = 16% V. Probable life of structure = 50 years.	**07**

VI. Terrain category = 3 with class B type structure.
VII. Topography factor = 1.00
VIII. Total slope area= 68 m^2,h/w =0.75, Height =15 m.

Q.5	**(a)**	Explain Lateral load due to Wind and Seismic as per I.S. Standard.	**03**
	(b)	Write various types of truss girder.	**04**
	(c)	Design the welded connection to connect two plates of width 200 mm and thickness 10 mm for 100 percent efficiency.	**07**
Q.6	**(a)**	What you understand by class 4.6 and class 8.8 bolts? Explain briefly	**03**
	(b)	Explain the following connections with neat sketches: beam to beam web angle connection, beam to column flange seat angle connection	**04**
	(c)	Find the efficiency of the lap joint shown in **Fig 02** Given M20 bolts and grade 4.6 and Fe 410 (E 250) plates are used.	**07**
Q.7	**(a)**	Explain effect of wind load on structure.	**05**

OR

Q.7	**(a)**	Derive the collapse load for fixed beam of length L, subjected to concentrated load W at centre.	**05**

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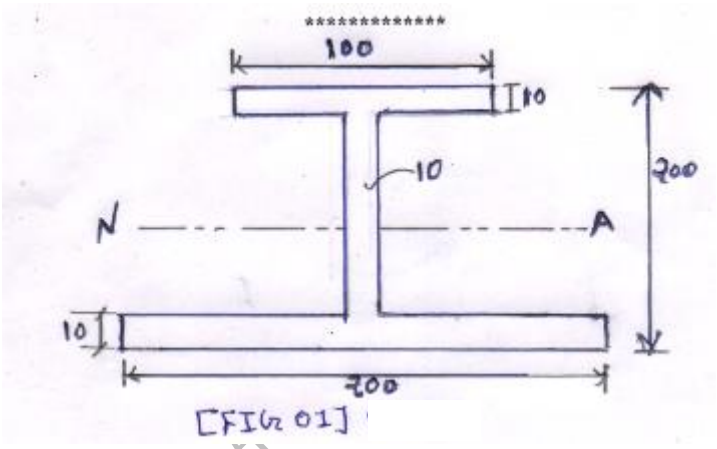
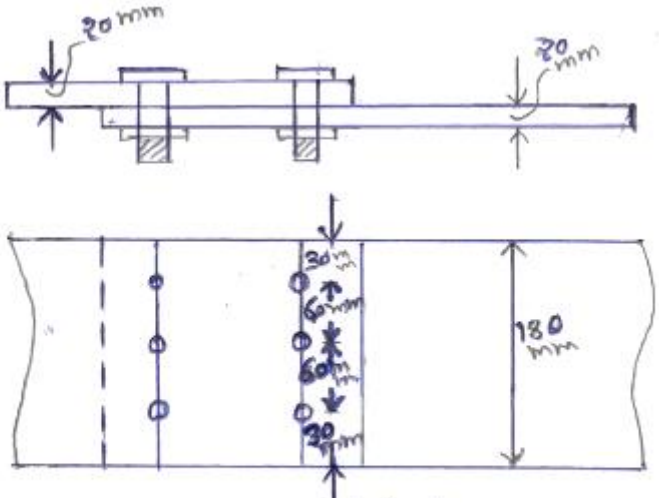


[FIG 01]



[FIG 02]

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