

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2020****Subject Code:2174003****Date:25/01/2021****Subject Name:Design of Steel and Masonary Structure****Time:10:30 AM TO 12:30 PM****Total Marks: 47****Instructions:**

1. Attempt any **THREE** questions from Q.1 to Q.6.
2. Q.7 is compulsory.
3. Make suitable assumptions wherever necessary.
4. Figures to the right indicate full marks.

		MARKS
Q.1	(a) What the below mentioned terms mean?	03
	i) Class 4.8 bolt	
	ii) Class 8.8 bolt	
	(b) Illustrate different types of loads to be considered in the design of steel structure.	04
	(c) A single bolted double cover butt joint is used to connect two plates of 8 mm thickness. Considering the bolts of 20 mm diameter at 55 mm pitch, calculate the efficiency of the joint. Use 410 MPa plates and 4.6 grade bolts.	07
Q.2	(a) Explain the use of Purlin.	03
	(b) Differentiate laterally supported beam and laterally unsupported beam.	04
	(c) Design a column to carry an factored axial load of 1500 kN. The actual length of the column is 5 m. Both the ends of the column are effectively held in the position but restrained against rotation. Select two channel sections back to back. Take column as laced and $f_y = 250$ MPa.	07
Q.3	(a) Write a short note on effective length of prismatic compression members	03
	(b) Why bracing is important in Industrial building?	04
	(c) Calculate the compressive strength of 2 ISA 80x80x8 mm connected on either side of a 8 mm thick gusset plate. It is effectively held in the position at both the ends but restrained against rotation at one end. The member is 3 m long where yield stress is 250 MPa.	07
Q.4	(a) Differentiate between Bolted Connection and Welded Connection in the steel structures .	03
	(b) Write a short note on 'Shear lag'.	04
	(c) Design a tension member to carry a factored load of 180 kN. Use single unequal angle with 5 mm fillet weld for the connection to gusset plate. The member is 3 m long. Take $f_y = 250$ MPa, $f_u = 410$ MPa.	07
Q.5	(a) Write short note on Lug Angles with necessary sketch.	03
	(b) Explain failure of bolted joint with suitable example	04
	(c) Design a welded plate girder for 28 m span to support a uniformly distributed load of 70 kN/m over whole span along with two moving loads of 80 kN each spaced at 8 m apart. The girder is laterally supported throughout. Use steel grade of Fe410 both for Flange as well as web. (Note:No need to Design of weld connection for flange plate and web plate).	07

- Q.6** (a) Enlist various components of plate girder. **03**
(b) What are the elements of Industrial Truss? **04**
(c) Design a simply supported gantry girder to be used in an Industrial building for the following data: **07**
Crane Capacity = 120 kN
Weight of crab = 30 kN
Weight of crane (excluding crab) = 150 kN
Minimum clearance between crane hook and gantry girder = 1 m
Wheel base = 3 m
Distance between centre to centre of gantries = 18 m
Distance between centre to centre of gantry columns = 6 m
Crane type = M.O.T. (Note: Checks are not required)

- Q.7** What are the good construction practices in Earthquake resistant design of masonry structures? **05**

OR

- Differentiate reinforced and unreinforced masonry structures. **05**

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