	THEJUS ENGINEERING COLLEGE Vellarakkad (P.O), Erumappetty, Thrissur, Kerala, India - 680584	Form no: SD 11 Rev: 02 dated 10/03/2021

SEVENTH SEMESTER SERIES TEST 2 (DECEMBER 2022)
CET 401 DESIGN OF STEEL STRUCTURES

Time: 1.5 hours **Maximum Marks : 50**

(Use of CODES IS 800 and SP 6 are allowed for the Exam)

PART - A				
Answer all questions. Each question carries 5 marks				
Q.No.	**QUESTION**	**MARKS**	**CO**	**LEVEL**
1	What are the main purposes of lacings and battens?	5	3	2
2	Explain the failure modes of axially loaded columns.	5	3	2
3	Explain the classification of beam sections.	5	4	1
4	Explain the types of column bases.	5	4	1
PART B				
Answer ANY ONE question. Each question carries 15 marks				
Q.No.	**QUESTION**	**MARKS**	**CO**	**LEVEL**
5	Design a column to support a factored load of 1100kN. The column has an effective length of 8m with respect to X axis and 6m with respect to Y axis. Use steel of grade Fe 410. OR	15	3	3
6	Design a slab base for a column ISHB 300 @ 588N/m, carrying an axial load of 1200kN. M20 concrete is used for foundation. Provide welded connection between column and base plate.	15	3	3
7	A simply supported steel joist of 4m is laterally supported throughout. It carries a UDL of 45kN inclusive of self weight. Design an appropriate section using steel of grade Fe 410. OR	15	4	3

8	Design a steel beam section for supporting the roof of a big hall for the following data. Clear span= 6.5m, end bearing = 150mm, center to center spacing of beams=3m, imposed load on beam= 10kN/m^2, Dead load inclusive of self weight = 4 kN/m^2. The beam depth is restricted to 375mm. Compression flange is laterally supported throughout.	15	4	3

Course Outcomes	
CO 1	Explain the behavior and properties of structural steel members to resist various structural forces and actions and apply the relevant codes of practice Understanding and analyzing
CO 2	Analyses the behavior of structural steel members and undertake design at both serviceability and ultimate limit states
CO 3	

Levels - 1.Remember 2. Understand 3. Apply 4.Analyse 5. Evaluate 6.Create

Signature of Faculty In charge

Signature of Scrutiny Committee Member

THEJUS ENGINEERINGCOLLEGE

SERIES TEST-1

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, NOVEMBER 2022

DEPARTMENT OF CIVIL ENGINEERING

CET 401 Design of Steel Structures
Answer Key

Time: 1.5 Hrs **Maximum Marks: 50**

PART A

(*Answer ALL questions. Each carries 5 marks*)

1.Explain the failures of bolted joints. Any 3 failures: 3 marks, figure 2 marks

2.Explain the types of welded connections with neat sketches connections with figures : marks 5

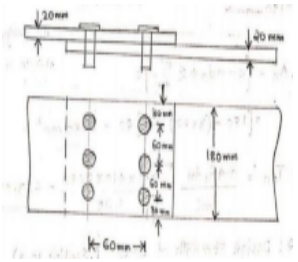
3.List out the types of structural steel sections. : sections with figures 5 marks

4.What are the advantages of bolted connections any 5 advantages 5 marks

PART B

(*Answer any ONE question from each section. Each carries15 marks*)

5. Find the efficiency of the lap joint shown in figure. Given M20 bolts of grade 4.6 and Fe 410 plates are used.

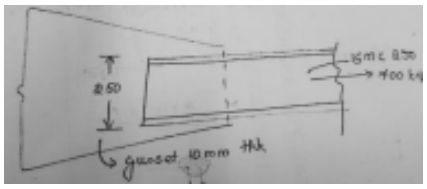


Tdn:4, Vdsb:4, Vdpb:4 Efficiency:3

OR

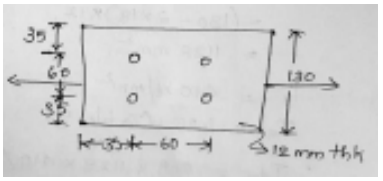
6. An ISMC 250 is used to transmit a factored force of 700 kN. The channel section is connected to a gusset plate 10mm thick. Design a fillet weld if the overlap is limited to 300mm. Use slot welds if required. Assume field weld.

Finding size of weld 5, length 5 slot 5

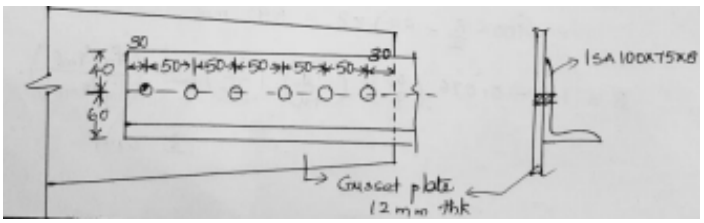


7. Determine the design tensile strength of the plate 130mmX 12mm with holes for 16mm diameter bolts. Steel is of grade Fe410.

Design strength due to yielding 3, rupture 5, block shear7



OR

8. A single unequal angle 100x75x8 mm is connected to a 12 mm thick gusset plate at the ends with 6 numbers of 20 mm diameter bolts to transfer tension as shown in figure. Determine the design tensile strength of the angle section if the gusset is connected to 100mm leg. The yield strength and ultimate strength of the steel used are 250 Mpa and 410 Mpa.

Design strength due to yielding 3, rupture 5, block shear7