U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

Programme: B.E.
Branch: Civil Engineering
Course Code: 20CV6PCDSS
Course: Design of Steel Structural Elements & Software Applications Lab
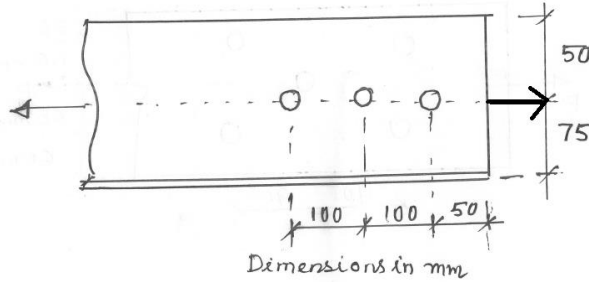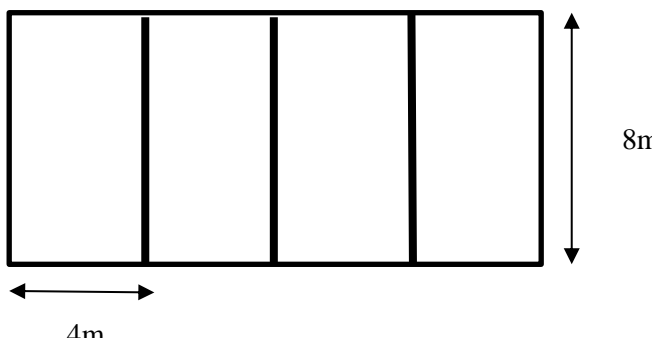
Semester: VI
Duration: 3 hrs.
Max Marks: 100
Date: 12.07.2023

Instructions: Answer 5 full questions choosing one from each unit.
Missing data may be assumed appropriately and mentioned
Use of IS 800-2007, SP 6(1) handbook/ Steel tables are permitted
Grade of steel in all cases may be assumed as Fe410

			UNIT - I	CO	PO	Marks
1	a)		List out the benefits and limitations of steel structures	CO1	PO1	**08**
	b)		Write a detailed note on the various loads mentioned in IS-800-2007 for design of structural steel elements	CO1	PO1	**08**
	c)		Write a brief note on partial safety factors considered for design as per IS-800-2007 for materials	CO1	PO1	**04**
			UNIT - II			
2	a)		With neat sketches, elucidate the different modes of failure that occur in bolted connections	CO1	PO1	**05**
	b)		Design a bolted connected between the flange of a column ISHB 450 @ 907 N/m and a bracket plate 15mm thickness. The bracket plate is perpendicular to the flange of the column and is supporting a load of 150kN at an eccentricity of 350mm from the flange of the column. Use 20# HSFG bolts of property class 8.8	CO2	PO3	**15**
			OR			
3	a)		Compare the advantages and drawbacks of welded connections used in steel structures	CO1	PO1	**06**
	b)		A diagonal member of a truss ISA 65x65x6mm is welded in the field to a gusset plate of 8mm thickness. Design the joint for full strength of angle, i. If fillet weld is provided along length of member ii. If fillet weld is provided along the length and side of the angle.	CO2	PO3	**14**
			UNIT - III			
4	a)		The tension member shown in Fig Q4(a) is an angle section 100x75x8 mm. Determine the block shear strength. Bolts are of	CO1	PO1	**08**

20 mm diameter and grade 4.6. Gusset plate thickness may be taken as 10 mm.

Fig Q4(a)

	b)	A tension member consists of single ISA100x100x10@10.8 kg/m connected to 12 mm gusset plate. If 3 numbers of 20 mm diameter bolts of class 4.6 are used, determine the design tensile strength of the given section	*CO3*	*PO3*	**12**

UNIT - IV

5	a)	Design a discontinuous strut comprising of 2 unequal angles back to back on opposite sides of gusset 12 mm thick. The angles are connected by their longer legs. The length of the member is 3.5 m between c/c of intersections. The strut is required to support a factored load of 180 kN.	*CO1*	*PO1*	**08**
	b)	A Column 5m long is to support a factored load of 5500kN. If the ends at the column are effectively held in position and direction at both ends. Design the Column. Use additional plates if required	*CO3*	*PO3*	**12**

OR

6		Design a built-up laced column carrying a factored load of 1800 kN. The length of column is 8 m. It is effectively held in position at both ends and restrained against rotation at one end. Assume 20 mm diameter bearing bolts of grade 4.6.	*CO3*	*PO3*	**20**

UNIT - V

7		Steel beam with flanges embedded in concrete slab have simply supported span of 8 m. The c/c spacing of beam is 4 m. It carries RCC Slab of 140 mm thickness. The super-imposed load is 4 kN/m^2 and floor finish of 1.5 kN/m^2. Take fy= 250MPa. Design the section of an interior beam. Refer Fig Q7. Apply suitable checks recommended for beams as per IS800-2007	*CO3*	*PO3*	**20**

8m

4m

Fig Q 7

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