U.S.N.										

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

Autonomous Institute Affiliated to VTU

July / August 2024 Semester End Main Examinations

Programme: B.E. **Semester: VI**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 20CV6PCDSS **Max Marks: 100**
Course: Design of Steel Structural Elements and Software Application lab

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.
3. Use of IS 800-2007, SP 6(1) handbook/ Steel tables are permitted

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	Describe the different loads and load combinations for design of steel structural elements.	*CO1*		**08**
	b)	List the benefits and limitations of steel structures	*CO1*		**08**
	c)	Write a brief note on partial safety factors for materials considered for design of steel structures as per IS-800-2007	*CO1*		**04**
		UNIT - II			
2	a)	With neat sketches, explain the different modes of failure that occur in bolted connections	*CO2*		**08**
	b)	A double cover butt joint is used to connect two flats 200 ISF 10. The two plates are connected by 9 bolts by chain bolting system at a pitch of 60 mm and edge distance of 40 mm arranged in three rows with three bolts in each row. Determine the strength and efficiency of the joint using HSFG bolts of 8.8 grade. The surfaces are not treated.	*CO2*	*PO1* *PO2*	**12**
		OR			
3	a)	List the advantages and disadvantages of welded connections.	*CO2*		**08**
	b)	A tie member of a truss consisting of an angle section ISA 90 x 90 x 6 of Fe 410 grade is welded to an 8 mm thick gusset plate. Design a weld to transmit a load equal to the full strength of the member. Assume shop welding.	*CO2*	*PO3*	**12**
		UNIT - III			
4	a)	Describe the design principle of a tension member.	*CO3*		**06**
	b)	A tie of a roof truss consists of double angle ISA 100 × 75 × 10 mm with long legs back-to-back connected on either side of gusset plate 8 mm thick with 20 mm diameter bolt of grade 4.6. Determine the strength of tie in axial tension.	*CO3*	*PO1* *PO2*	**14**

			UNIT - IV			
	5	a)	Explain briefly slab base and gusseted base with relevant sketches.	*CO3*		**06**
		b)	Design a double angle discontinuous strut to carry a factored load of 175 kN. The length of strut is 3.0 m between intersections. The two angles are placed back-to-back and tack bolted. Use Fe 410 grade steel. a) If angles are connected on opposite sides of 10 mm thick gusset plate b) If angles are connected on same side of 10 mm thick gusset plate.	*CO3*	*PO3*	**14**
			OR			
	6	a)	Describe the design principles of compression member.	*CO3*		**06**
		b)	Design a gusseted base to resist an axial load of 3000 kN acting on a column ISHB 450 @ 87.6 kg/m with flange plates (400mm wide, 20 mm thick) and gusset plates 16 mm thick. Assume the base to be resting on concrete pedestal of grade M20. Assume bolted connections with 20 mm diameter HSFG bolts of grade 8.8.	*CO3*	*PO3*	**14**
			UNIT - V			
	7	a)	Describe web buckling and web crippling with sketches.	*CO3*		**04**
		b)	A room measuring $7m \times 10$ m consists of 120 mm thick RCC slab supported on steel beams at a spacing of 2.5 m c/c. Load due to floor finishing may be considered as 1 kN/m^2 and live load as 2 kN/m^2. Design an intermediate beam. Assume the beam is laterally supported. Apply check for deflection and web crippling.	*CO3*	*PO3*	**16**

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