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

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

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

Instructions: 1. Use of IS-800-2007 and SP-6(1) handbook/steel tables are permitted
2. Missing data if any can be suitable assumed and indicated clearly in the script

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

1	a)	Describe any four Advantages and Disadvantages of steel structures.	**08**
	b)	Describe the limit states of strength and serviceability in the design of steel structures with suitable examples for each state of design.	**06**
	c)	Describe briefly loads and load combinations and partial safety factors in the design of steel structures.	**06**

UNIT - II

2	a)	Describe framed, stiffened seated and unstiffened seated connections in steel structures. Sketch the same.	**08**
	b)	Two plates 12 mm and 20 mm thick are to be joined by a double cover butt joint. Assuming cover plates of 8 mm thickness, design the joint to transmit a factored load of 600 kN. Assume Fe 410 plate and 8.8 grade HSFG bolt. Calculate the efficiency of the designed bolted joint.	**12**

OR

3	a)	Explain the reasons for the failure of welded connections.	**06**
	b)	Design the welded connection of a tie member of a roof truss which is made up of 2ISA 150x75x8 mm. The longer legs of the angles are connected on either sides of a gusset plate 10 mm thick. Design for a factored load of 300kN	**14**

UNIT - III

4	a)	Describe the design principle of a tension member.	**06**
	b)	A single unequal angle ISA 100×75×6 is connected to 10 mm thick gusset plate with six 16 mm ϕ bolts to transfer tension. Determine design tensile strength if longer legs are connected to gusset. Assume pitch and edge distance of 60 mm and 40 mm respectively.	**14**

UNIT - IV

5 Design a compression member with lacing made up of two channel sections held back to back to resist an axial force of 1000 kN. Assume the length of the member to be 10m and end conditions to be restrained in position only. Sketch the design. **20**

OR

6 a) Explain the design principles of slab base and gusseted base with a neat sketch. **06**

b) Design a gusseted base to resist a factored axial force of 3000kN. Consider a column of section ISHB 400 with cover plates 20mm thick and 400mm wide, gusset plates 16mm thick and suitable gusset angles on either sides of the compression member. Assume a base made of M20 concrete. Sketch the design. **14**

UNIT - V

7 a) Discuss laterally supported and unsupported flexural members. **06**

b) Design a laterally restrained simply supported beam of span 6m resting on RC columns of width 300 mm to carry a factored load of 35 kN/m. Check for web buckling and deflection only. **14**

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