

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM
III B. Tech II Semester Supplementary Examinations, November-2025

DESIGN AND DRAWING OF STEEL STRUCTURES
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions**ONE** Question from **Part –A** and **Three** from **Part-B**

		<u>Part-A</u>	
1.		Design a Gusset base foundation system to support a column ISMB400 that carries axial load 800kN and moment 50kN-m. Use grade of foundation concrete M30. Neatly sketch the detailing aspects of elements. Assume suitable design data if required. Use weld connection to joint the component elements. Use steel grade Fe410 and f_y 250MPa	[28M]
		(OR)	
2		Design and detail in-plane shop made weld connection between 16mm thick bracket plate that connect to column flange ISMB 350. The bracket plates receive 120kN factored load at eccentricity of 200mm from column flange. Neatly sketch the detailing aspects and conduct the necessary design checks .Use steel grade Fe410, f_y 250MPa	[28M]
		<u>Part-B</u>	
3.	a)	Find the collapse load of propped cantilever beam of span (L) that carries UDL load (w/ unit length) over the span	[4M]
	b)	Design a laterally supported continuous beam of span 4m, 6m and 8m that carries UDL of 20kN/m. Assume stiff bearing length at support 100mm. Use steel grade Fe410, f_y 250MPa. Evaluate necessary design checks.	[10M]
4		Design a gantry girder (I section) without lateral restraint, and constructed to operate EOT crane. The span of gantry girder 8m, crane capacity 300kN, self-weight of crane girder (exclude trolley) 200kN, self-weight of trolley 40kN, minimum hook approach 1.20m, distance between wheels 3m, c/c spacing of gantry rails 12m, self-weight of rail 1kN/m. Also calculate the serviceability deflection .Use steel grade Fe410 and f_y 250MPa	[14M]
5.	a)	Mention different type of bracing systems used and their significance	[4M]
	b)	Design and detail the built-up column of Two channel sections connected Toe-to-Toe. The applied factored load 1200kN and moment 80kN-m. Assume effective height of column 6m and use double lacing braced system. Use steel grade Fe410 and f_y 250MPa	[10M]
6.	a)	Neatly sketch and detail various components of slab base foundation system	[4M]

	b)	Design and detail a gusset base foundation system to support a column ISHB400 that carries axial load 600kN and moment 50kN-m. Use grade of foundation concrete M25. Neatly sketch the detailing aspects of elements. Use steel grade Fe410 and f_y 250MPa .Assume suitable design data if required	[10M]
7.		Design and detail a un-stiffened plate girder, that simply supported over a span of 6m. The compression flange is laterally restrained. Assume applied dead load 8kN/m, Live load 10kN/m and bearing width at support 100mm. Design the I- section of plate girder and check the serviceability deflection	[14M]
