

**Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)**

M.Tech. (Second Semester - Regular) Examinations, May – 2026

24MSEPE12002 – Advanced Steel Structures



Time: 3 hrs

Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Differentiate between compact and non-compact sections.	CO1	K2
b. Define plastic moment capacity of a beam.	CO2	K2
c. Define lateral torsional buckling.	CO3	K2
d. Define slenderness ratio of a column.	CO4	K2
e. State any two advantages of welded joints.	CO5	K2

PART – B

(10 x 5 = 50 Marks)

Answer **ALL** the questions

	Marks	CO #	Blooms Level
2.a. Explain the stress-strain characteristics of mild steel and high-strength steel.	5	CO1	K3
b. Discuss the advantages and limitations of structural steel in construction engineering.	5	CO1	K3
(OR)			
c. Explain the classification of hot-rolled steel sections based on compactness and slenderness.	5	CO1	K3
d. Explain the importance of toughness and hardness in structural steel applications.	5	CO1	K3
3.a. Illustrate short notes on:			
(i) Sag rods			
(ii) Principal rafter	10	CO2	K3
(iii) Roof trusses			
(iv) Bracing			
(OR)			
b. Design the slab base for the column consisting of ISHB 300 @ 58.8kg/m and carrying an axial load of 1000kN. Take the allowable bearing pressure on concrete as 4 N/mm ²	10	CO2	K3
4.a. Design of a column consisting of ISHB 350 @67.4 kg/m carries an axial load of 350KN and a bending moment of 100 kNm in the plane of web. Design the attached base for the column with the provision of anchor bolts to resist the bending moment. Take permissible bearing pressure on footing as 4N/mm ² .	10	CO3	K3
(OR)			
b. Design a single unequal angle strut to carry a load of 90 kN. The angle is connected by its longer leg to 8 mm thick gusset plate. The effective length of the member is 2.5 m. Also design the plate bolted end connections.	10	CO3	K3
5.a. Illustrate elaborately about the items that are to be considered while planning and designing an industrial building.	5	CO4	K3
b. Explain various steps involved in the design of gantry girder.	5	CO4	K3

(OR)

- c. Determine the bolt value of a 18 mm diameter bolt of grade 4.6 for the following connections. The main plates to be jointed are 12mm thick

- Lap joint
- Single cover butt joint the cover plate being 10mm thick
- Double cover butt joint the cover plate being 10mm thick

10 CO4 K3

Assume suitable data.

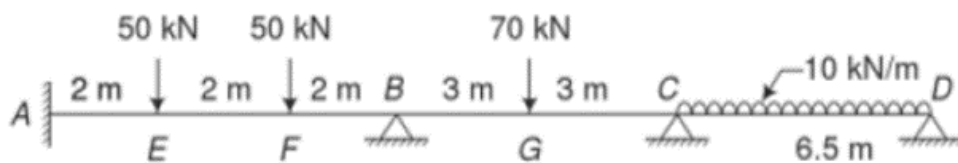
- 6.a. Determine the shape factor of the followings:

- Rectangular Section
- Triangular Section

10 CO5 K3

(OR)

- b. Design the continuous beam with the service load as shown in the fig. Provide a uniform cross-section throughout the beam.



10 CO5 K3

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