



PRESIDENCY UNIVERSITY

BENGALURU

Roll No.														
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--

End - Term Examinations – May/June 2026

Date: 18-05-2026

Time: 01:00pm – 04:00pm

School: SOE	Program: B.Tech Civil Engineering	
Course Code: CIV3004	Course Name: Design of Structural Steel Elements	
Semester: VI	Max Marks: 100	Weightage: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	10	15	20	26	29

Instructions:

- Read all questions carefully and answer accordingly.
- Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1.	Draw the stress-strain curve for mild steel.	2 Marks	L1	CO1
2.	What are the different design philosophies used for the design of structural steel?	2 Marks	L1	CO1
3.	List any 4 types of rolled steel section.	2 Marks	L1	CO1
4.	List any 2 advantages of using structural steel.	2 Marks	L1	CO1
5.	List the different types of loads applied on steel structures.	2 Marks	L1	CO1
6.	What is shear lag?	2 Marks	L1	CO4
7.	What is the slenderness ratio in a tension member as per IS code where reversal of direct stress occurs due to loads other than wind or seismic forces?	2 Marks	L1	CO4
8.	What is block shear failure?	2 Marks	L1	CO4
9.	What is the effective length of a column with one end effectively held in position and restrained against rotation and the other end is not held in position and free to rotate?	2 Marks	L1	CO5
10.	What is the mode of failure in a long/slender compression member?	2 Marks	L1	CO5

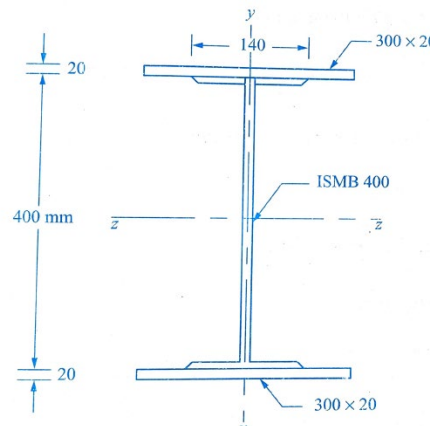
Part B

Answer the Questions.

Total Marks 80M

11.	a.	Describe the advantages and disadvantages of welded connections.	10 Marks	L2	C03
Or					
12.	a.	Explain the various defects in weld with neat sketch.	10 Marks	L2	C03

13.	a.	An ISMC 300 channel section is used to transmit a factored tensile load of 800 kN. The channel is welded to a 12 mm thick gusset plate with an overlap limited to 350 mm. Design the fillet weld connection.	10 Marks	L3	C03
Or					
14.	a.	Two plates of 20 mm and 18 mm thickness are connected using groove weld. The effective weld length available is 200 mm. Assume partial as well as complete penetration and shop welds. Determine the design strength of the welds. Use Fe410.	10 Marks	L3	C03

15.	a.	A column is made using two ISMC 150 channels placed toe-to-toe with a clear spacing of 40 mm. Calculate the least radius of gyration about the principal axes.	10 Marks	L3	C05
Or					
16.	a.	Calculate the least radius of gyration for the built-up column consisting of an ISMB 400 with one cover plate 300mmx20mm on each flange. 	10 Marks	L3	C05

17.	a.	Design a Lap joint between plates 8mm thick so as to transmit a factored load of 450kN using bolts of 16mm diameter of grade 4.6. Assume Fe410 grade steel.	15 Marks	L3	C02
Or					

18.	a.	Two plates of 6mm thickness are connected by a single bolted double cover butt joint using M20 bolts of grade 4.6 and 4mm thick cover plates. Take the pitch of the bolted connection as 60mm and edge distance as 40mm. Width of the plate is 140mm and 2 bolts are provided in a single vertical row. Use steel of grade Fe410. Calculate the efficiency of the bolted joint.	15 Marks	L3	C02
-----	----	---	----------	----	-----

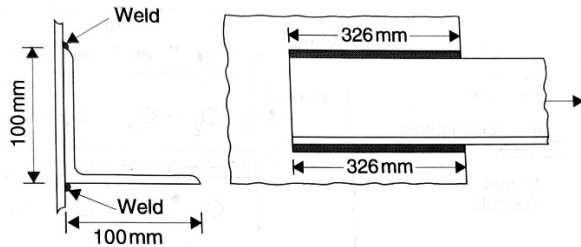
19.	a.	Discuss the assumptions in Euler's Buckling Theory.	5 Marks	L2	C05
	b.	Design a column section to be used in a public building. Column is 4.8m long with ends restrained in direction and position in z-z as well as y-y directions. The column is to support a factored load of 2500kN. Use steel of grade Fe410	10 Marks	L3	C05

Or

20.	a.	Describe the possible modes of failure in a compression member.	5 Marks	L2	C05
	b.	Calculate the compressive resistance of a column consisting of ISMB 400 and having a length of 5m. Assume that bottom of the column is fixed and top is rotation fixed, translation free.	10 Marks	L3	C05

21.	a.	Design a suitable angle section to carry a factored tensile force of 210 kN assuming a welded connection. The yield strength and ultimate strength of the material is 250 MPa and 410 MPa, respectively. The length of the member is 3 m.	20 Marks	L3	C04
-----	----	---	----------	----	-----

Or

22.	a.	Find the ultimate tensile strength of ISA100x100x10 which is connected to a 12mm thick gusset plate using welded connection. The yield and ultimate strengths are 250MPa and 410MPa respectively. 	20 Marks	L3	C04
-----	----	---	----------	----	-----