BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

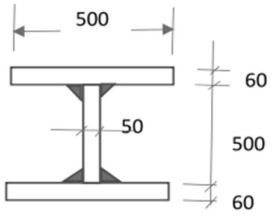
CLASS: BTECH/BARCH **SEMESTER : VI/ADD**
BRANCH: CIVIL/ ARCHITECTURE **SESSION : SP/2025**

SUBJECT: SUBJECT: CE308 STRUCTURAL DESIGN II

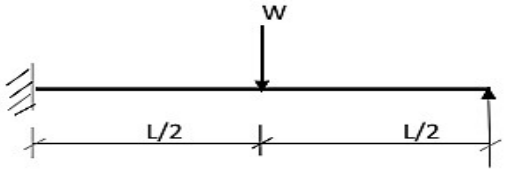
TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
6. IS 800 is allowed in the examination hall.

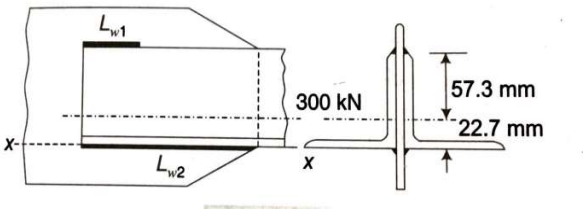
			CO	BL
Q.1(a)	Find the shape factor for the following section.	[5]	1	K2



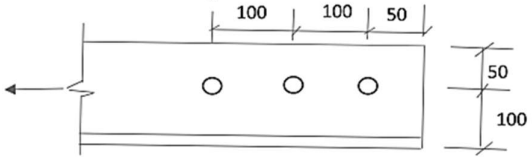
Q.1(b)	Determine the collapse load of the propped cantilever beam as shown in the following figure using the kinematic method.	[5]	1	K2



Q.2(a)	Two plates of thickness of 10 mm are to be lap jointed by 16 mm diameter bolt of grade 4.6. Calculate the strength of the bolt. Assume steel of grade E250 (Fe410). Also assume that the threads of the bolt fall in the shear planes. Take end distance as 30 mm and pitch as 40mm.	[5]	2	K2
Q.2(b)	A tie member of a truss consists of double angle section, each 80 mm x 80 mm x 8 mm welded on the opposite side of a 12 mm thick gusset plate as shown in the following figure. Design a fillet weld for making the connection in the workshop. The factored tensile force in the member is 300 kN. Assume fu = 410 MPa.	[5]	3	K3



Q.3(a)	The 150 x 75 x 10 mm angle shown in the following figure is connected with three 20 mm diameter bolts of grade 4.6. Determine its tensile strength. Grade of steel is E250.	[10]	3	K3



Q.4	Design a column to support a factored load of 1050 kN. The column has an effective length of 7.0 m with respect to z-axis and 5.0 m with respect to y-axis. Use steel grade E 250.	[10]	2	K3

PTO

Q.5	Design a laterally unsupported beam for the following data: Effective span=4m Maximum bending moment=500kN-m Maximum shear force=180kN Check for web buckling and bearing at support is not required.	[10]	2	K3

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