BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)

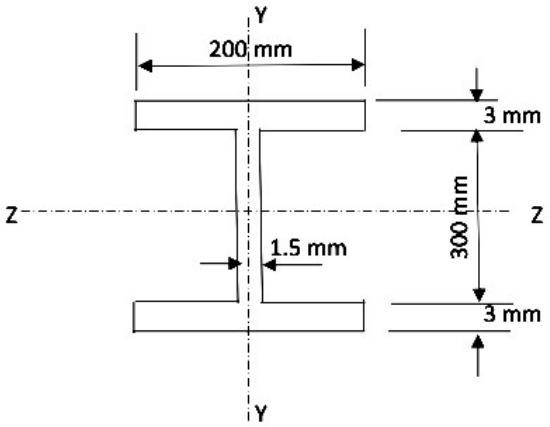
CLASS: BTECH/BARCH **SEMESTER : VI/ADD**
BRANCH: CIVIL/ARCHITECTURE **SESSION : SP/2025**

SUBJECT: CE308 STRUCTURAL DESIGN II

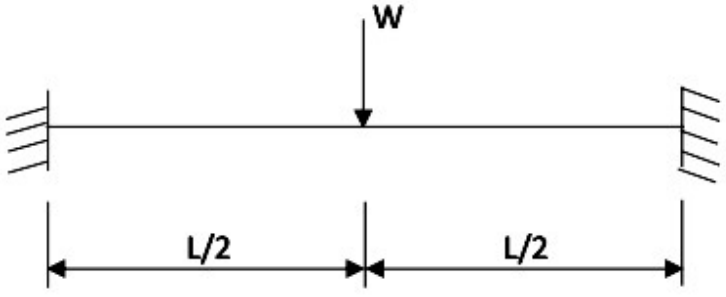
TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**
***5*. IS 800 will be supplied to the candidates**

			CO	BL
Q.1(a)	What is the uniformly distributed load for a roof with a slope of 18° with access not provided ?	[2]	2	K3
Q.1(b)	Sketch the typical stress-strain curve of mild steel, indicating the three important regions.	[3]	1	K1
Q.2(a)	For the built-up section shown in the following figure, calculate the plastic section modulus.	[2]	1	K2

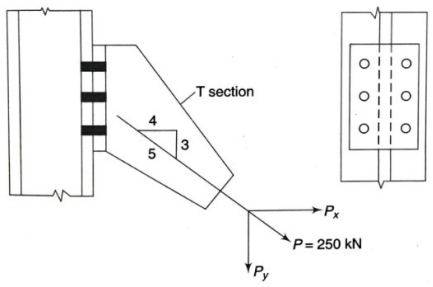


Q.2(b)	A beam fixed at both ends is subjected to a concentrated load W at mid-span as shown in the following figure. Find out the collapse load if the beam has uniform cross section.	[3]	1	K2

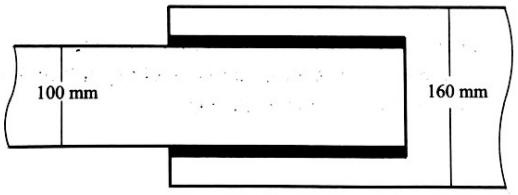


PTO

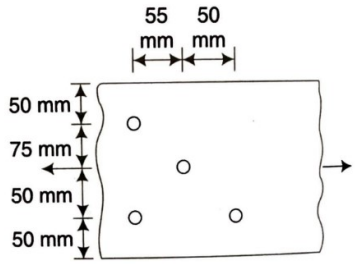
Q.3(a)	What are 4 and 6 imply for bolts of grade 4.6?	[2]	2	K3	2
Q.3(b)	Determine the adequacy of the fasteners in the following figure, when 20 mm diameter grade 4.6 bolts are used. Assume that the strength of the column flange and the structural T-section do not govern the design. Neglect prying action. Strength in single shear for 20 mm diameter bolt is 45.3 kN.	[3]	3	K3	2



Q.4(a)	Two plates of 16 mm and 14 mm thickness are to be joined by a groove weld. The joint is subjected to a factored tensile force of 430 kN. Effective length of the weld is 175 mm. Check the safety of the joint if Single-V grooved weld is provided.	[2]	3	K3	2
Q.4(b)	Design a suitable longitudinal fillet weld to connect the plates as shown below to transmit a pull equal to the full strength of the small plate. Given: Plates are 12 mm thick: grade of steel for plates is Fe 410 and welding to be made in workshop.	[3]	3	K3	2



Q.5(a)	Mention two advantages of HSFG bolts.	[2]	2	K3	2
Q.5(b)	Determine the net area of the 20 mm thick plate shown in the following figure. All holes are 20 mm diameter.	[3]	2	K3	3



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