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

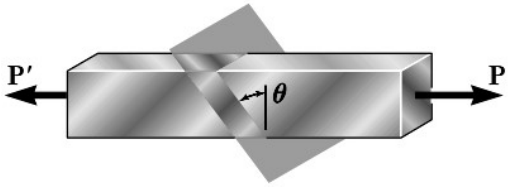
CLASS: BE **SEMESTER: III**
BRANCH: CIVIL **SESSION : MO/2018**

SUBJECT : CE3001-STRENGTH OF MATERIALS

TIME: 1.5 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

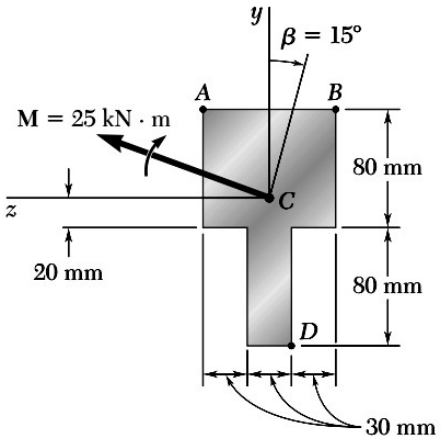
Q1 (a) Draw and indicate salient features of stress-strain curve for mild steel with neat sketch. [2]
(b) Find normal and shearing stress on the oblique plane: [3]
Given: P=100 kN, θ=45°, A=100 mm^2



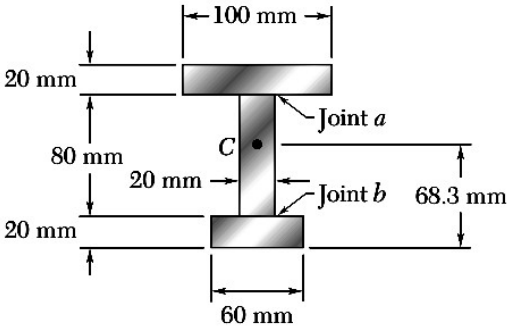
Q2 (a) Describe usage of Mohr's Circle for plane stress problems with neat sketch. [2]
(b) Find principal stresses for the given stress condition: [3]
σ_x=10 N/mm^2, σ_y=20 N/mm^2, τ_{xy}=15 N/mm^2

Q3 (a) Distinguish between symmetric and un-symmetric bending. [2]
(b) Explain and give an example of pure bending. Use suitable sketch. [3]

Q4 A couple M is applied to a beam of cross-section as shown. Determine normal stress due to bending at point B. [5]



Q5 Find the longitudinal shear force at joint a and b per 100mm length of the beam for given cross-section. Take V=100 kN. [5]



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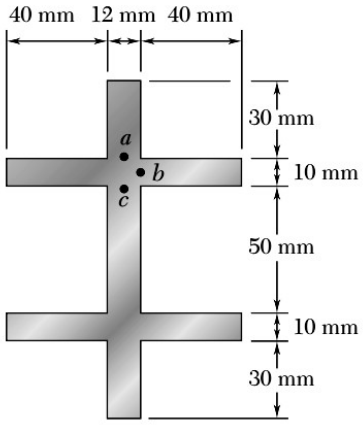
Q6 Find shear stresses at point A and B for a beam having following cross section. [5]
Take vertical shear V=100 kN.



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