IZMIR UNIVERSITY OF ECONOMICS
Faculty of Engineering

Term	: 23-24 Fall
Course	: ME 208 – Mechanics of Materials
Exam	: Midterm
Date	: 18.11.2023
Duration	: 90 min.

Full Name : ....

Student ID : ....

Classroom : ....: **Section** : ....

Signature of Student:

| Question	1	2	3	4	5
Score					
Total					

QUESTIONS

1) The 5.6 kN load P is supported by two wooden members of uniform cross section that are joined together. Determine the normal and shearing stress in the joined section. **(10 P)**
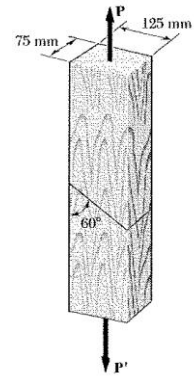
2) In the structure shown, an 8 mm-diameter pin is used at A, and 12 mm diameter pins are used at B and D. Knowing that the ultimate shearing stress is 100 MPa at all connections and the ultimate normal stress is 250 MPa in each of the two links joining B and D. Determine the allowable load P if an overall factor of safety 3 is desired. **(25 P)**
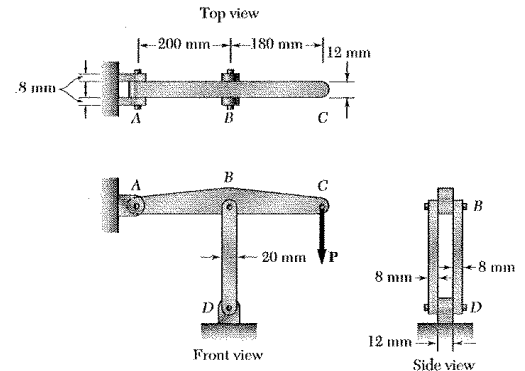
3) The aluminum rod ABC (E = 70 GPa), which consists of two cylindrical portions AB and BC, is to be replaced with a cylindrical steel rod DE (E = 200 GPa) of the same overall length. Determine the minimum requires diameter d of the steel rod if its vertical deformation is not to exceed the deformation of the aluminum rod under the same load and if the allowable stress in the steel rod is not exceed 165 MPa. **(25 P)**
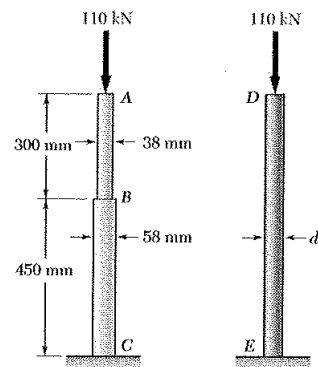
4) a) For a solid steel shaft shown (G = 77 GPa), determine the angle of twist at A. b) Solve option a, assuming that the steel shaft is hollow with 30 mm outer diameter and a 20 mm inner diameter. **(20 P)**
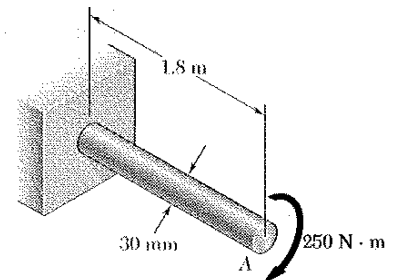
5) The beam shown is made of aluminum for which the allowable stress is 144 MPa in tension and 180 MPa in compression. Determine the largest couple M that can be applied to the beam. **(20 P)**