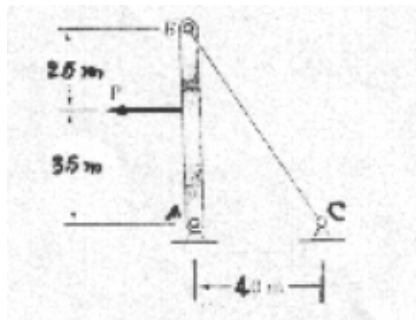


Name:			Computer No.:	
Q.1	Q.2	Q.3	Q.4	Total

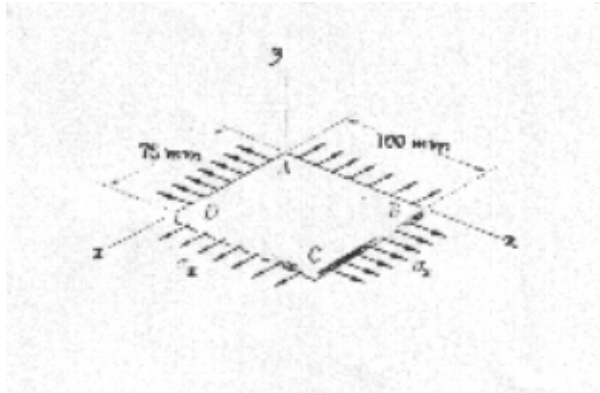
Q.1 [10 points]

The 4-mm-diameter cable BC is made of steel with $E = 200$ GPa. Knowing that the maximum stress in the cable must not exceed 190 MPa and that the elongation of the cable must not exceed 6 mm, find the maximum load P that can be applied as shown.



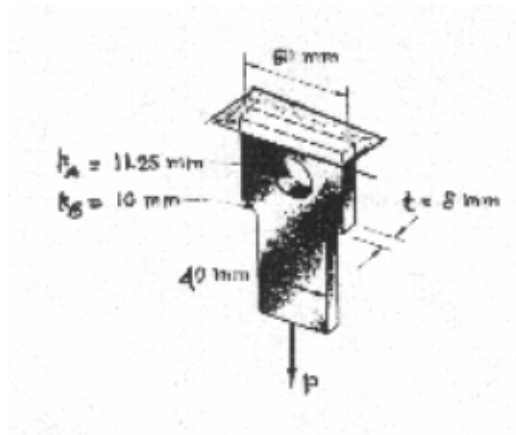
Q.2 [10 points]

A fabric used in an air-inflated structure is subjected to biaxial loading that results in normal stresses $\sigma_x = 120$ MPa and $\sigma_z = 160$ MPa. Knowing that the properties of fabric can be approximated as $E = 87$ GPa and $\nu = 0.34$, determine change in length of (a) side AB, (b) side BC, (c) diagonal AC.



Q.3 [10 points]

Knowing that the ultimate strength of the bar shown is 300 MPa, determine the maximum allowable centric axial force P which may be applied to the bar with a factor of safety 2.



Q.4 [10 points]

The two solid shafts and gears shown are used to transmit 12 kW from the motor at A, which rotates at frequency of 20 Hz, to a machine tool at D. Each shaft has diameter of 25 mm, determine the maximum shear stress in each shaft. If the maximum allowable shearing stress for the shaft material is 60 MPa, what is factor of safety of the system?

