MIDTERM ME 208

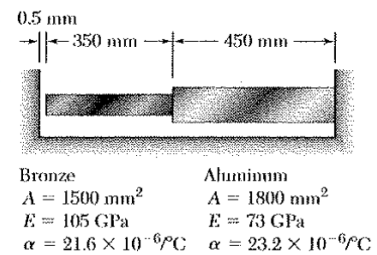| Q1	Q2	Q3	Q4	TOTAL

Name:
No:

1) a) Two solid cylindrical rods AB and BC are welded togeter at B and loaded as shown. Determine the magnitude of the force P for which te tensile stress in rod AB is twice the magnitude of the compressive stress in rod BC.
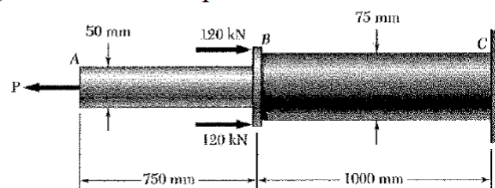

b) Draw Engineering and True stress-strain diagrams and explain the difference between the engineering stress and true stress.

2) Knowing that a 0,5 mm gap exists when temperature is 24ºC, determine the temperature at which the normal stress in the aluminum bar wil be equal to -75 MPa.

Bronze
$A = 1500 \text{ mm}^2$
$E = 105 \text{ GPa}$
$\alpha = 21.6 \times 10^{-6}/°C$

Aluminum
$A = 1800 \text{ mm}^2$
$E = 73 \text{ GPa}$
$\alpha = 23.2 \times 10^{-6}/°C$

3) A torque T = 3 kN.m is applied to the solid bronze cylinder shown. Determine a) the maximum shearing stress, b) the shearing stress at point D which lies on a 15 mm radius circle drawn on the end of the cylinder, c) the percent of the torque carried by the portion of the cylinder within the 15 mm radius.
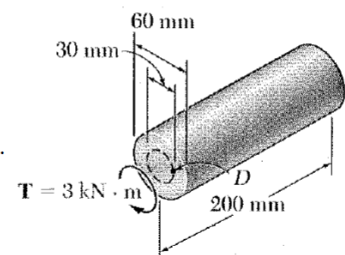
4) The vertical forces are applied to a beam of the cross section shown. Determine the maximum tensile and compressive stresses in portion BC of the beam.