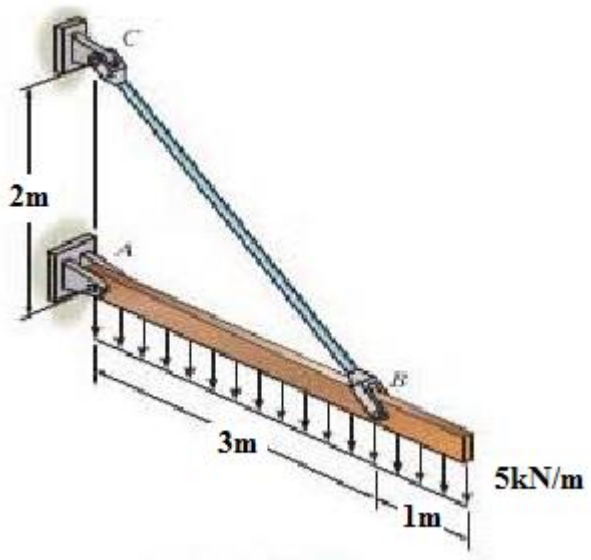
Question#1: (10Marks)

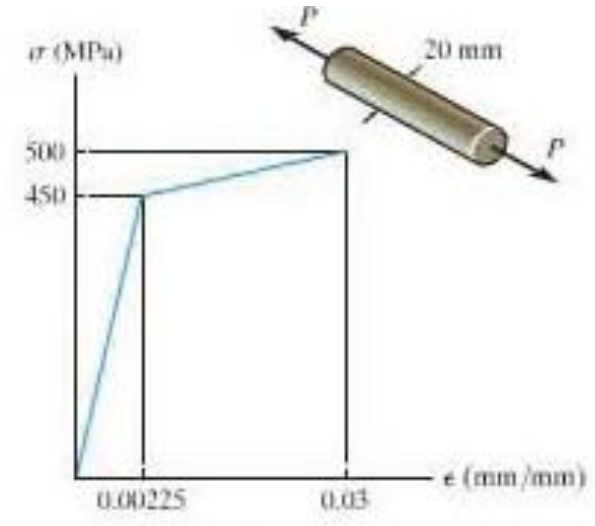
For the loaded beam shown, calculate:

1. The tension in cable BC and the reactions at the pinned support at A?
2. The normal stress in cable BC If it diameter is 20mm?
3. The shear stress at bolt A if its diameter is 15mm?
4. The diameter of bolt B if the allowable shear stress is 100MPa?



Question # 2: (10 Marks)

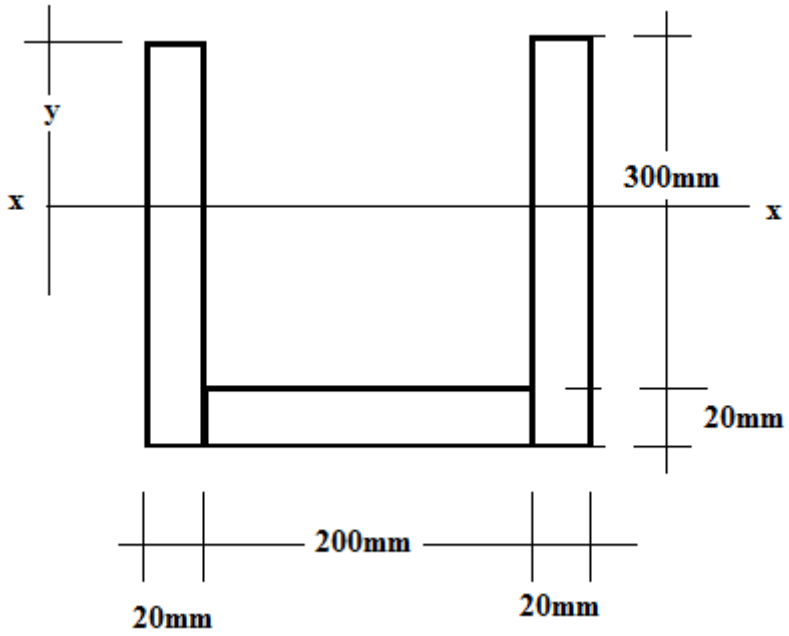
The material of a 50mm long specimen has the stress strain curve shown. If P=150kN is applied and then released, calculate the permanent deformation of the specimen.



Question # 3: (10 Marks)

If the section shown is subjected to Bending moment of 30kN.m, causing compression on the top fiber, determine:

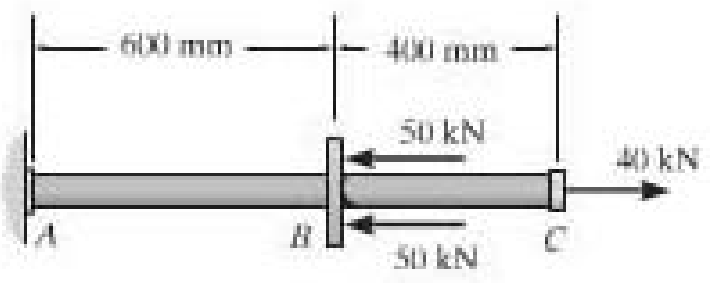
1. The depth of centroid y?
2. The moment of inertia?
3. The maximum bending stress in tension and compression?



Question # 4: **(5 Marks)**

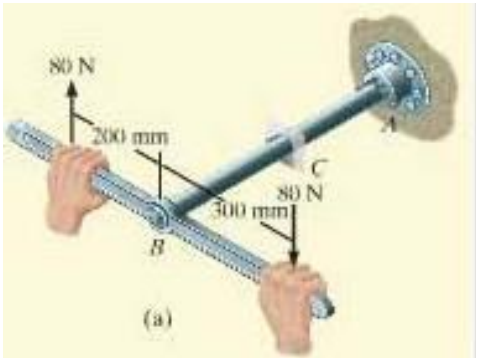
For the axially loaded bar, determine:

1. The normal stress in member AB?
2. The deformation in member BC if the elastic modulus is 200GPa?



Question # 5: **(5 Marks)**

Determine the maximum shear stress in pipe BC if its diameter is 80mm? In addition, calculate the angle of twist in BC if the shear modulus is 70GPa?



Question # 6: (10 Marks)

If the I section beam shown is subjected to a sheer force of 40kN, determine:

1. The Moment of Inertia of the section?
2. The maximum shear stress?