1. (10pts) Please define the following terms:

(a) stress components under general loading condition, (b) bulk modulus, (c) stress concentration factor, (d) homogeneous and isotropic material, (e) Tresca's yield criterion.

2. (10pts) Determine the following mechanical properties from the axial stress-strain curve shown, (a) the modulus of elasticity, (b) the 0.2% offset yield stress, (c) the modulus of resilience, (d) the fracture stress, (e) the percent elongation.
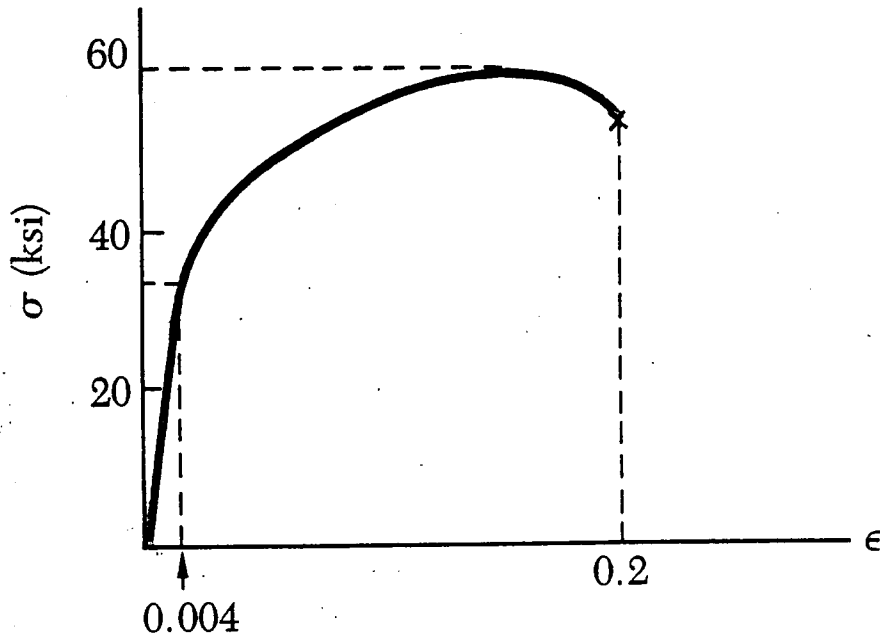
3. (20pts) A torque of the magnitude T = 4 kN · m is applied at the end A of the composite shaft shown. Knowing that the shear modulus is 77 GPa for the steel and 27 GPa for the aluminum, determine the maximum shearing stress in the steel core.
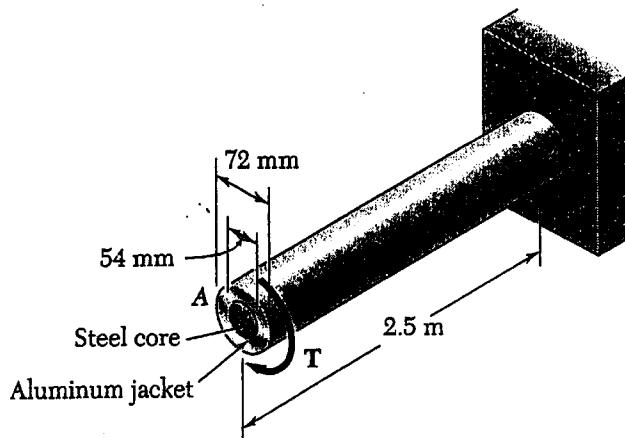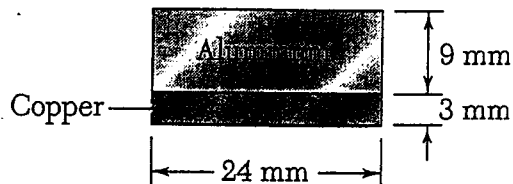
4. (20pts) A copper strip (E_c = 105 GPa) and an aluminum strip (E_a = 75 GPa) are bonded together to form the composite bar shown. Knowing that the bar is bent about a horizontal axis by a couple of moment 35 N · m, determine the maximum stress in the aluminum strip.

5. (20pts) The pressure tank shown has a 3/8-in. wall thickness and butt-welded seams forming an angle $\beta = 20°$ with a transverse plane. For a gage-pressure of 85 psi, determine the normal stress perpendicular to the weld.
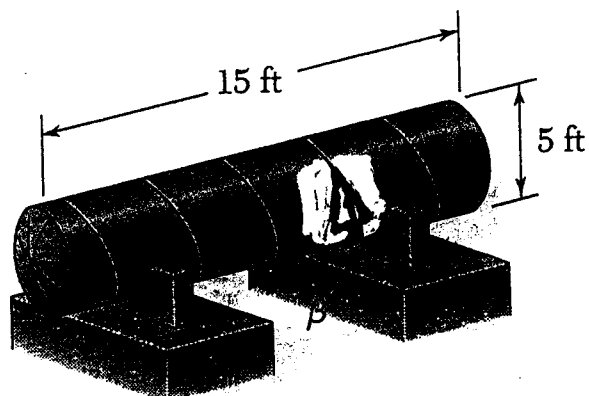
6. (20pts) For the beam and loading shown, determine the reaction at the roller support.