

1. Sketch and label a complete stress strain curve typical for a ductile metal, such as steel.

Labels should include:

- a. Stress/Strain Axes
 - b. 0.2% offset yield strength (YS)
 - c. Ultimate Tensile Strength (UTS)
 - d. Elastic, Plastic and Total Strain
 - e. Young's/Elastic Modulus region
2. Describe the mechanism for plastic deformation in crystalline materials.
 3. Write equations for the following:
 - a. Engineering Stress
 - b. Engineering Strain
 - c. True Stress
 - d. True Strain
 - e. % Elongation
 - f. % Reduction in Area
 4. Sketch and label two curves for the same material test on the same plot:
 - a. Engineering Stress-Strain
 - b. True Stress-Strain
 5. Calculate the safety factor for a component with a YS of 80 ksi and a design strength of 20 ksi.