1.(20pts) Please explain the following terms:
  (a)Homogeneous and Isotropic Material,
  (b) Shearing Strain,
  (c)Stress Concentration,
  (d) Bulk Modulus,
  (e)Idealized Elastoplastic Material,
  (f) Shape Factor of a Beam,
  (g) Fully Plastic Moment,
  (h) Method of Superposition,
 (i) Modulus of Resilience
  (j) Slenderness Ratio of a Column.

2.(20pts) The tensile stress-strain curve of the low-carbon steel is shown in the figure below.   Please (a) explain the meaning of the three regions (yield, strain-hardening and necking regions) shown in the figure, and (b) determine the mechanical properties (Young's modulus, 0.2% offset yield strength, ultimate stress, fracture stress and percent elongation).
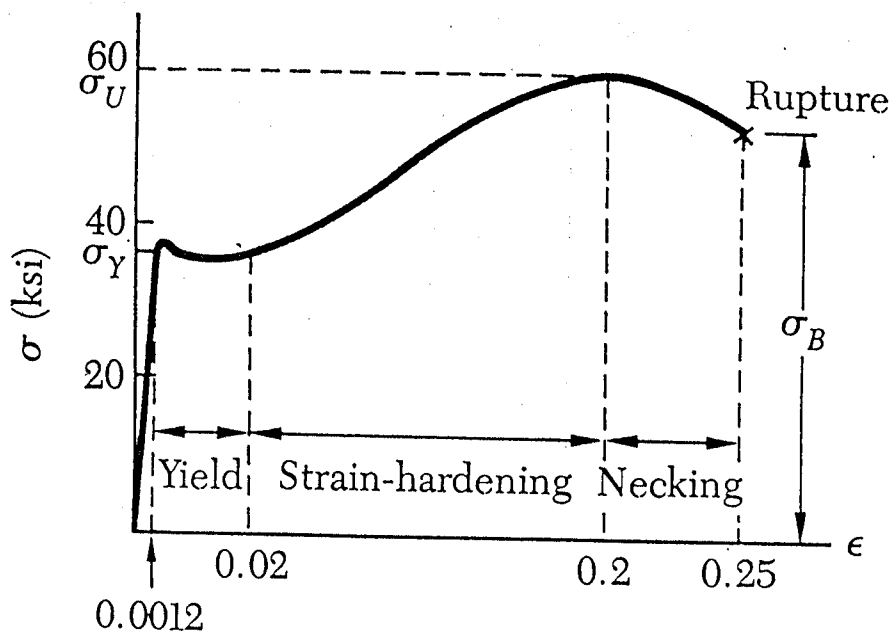
3. (10pts) Please explain the meaning of the **Maximum-Shearing-Stress Yield Criterion** and the **Maximum-Distortion-Energy Yield Criterion**. Give us an example to tell the difference between these two yield criteria.

4. (25pts) Three forces are applied as shown to a cantilever beam. Determine the maximum shearing stress at (a) point H, (b) point K.
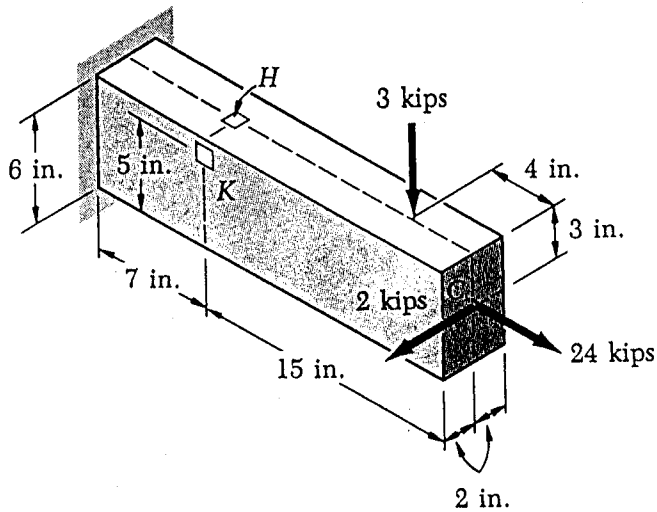
5. (25pts) For the beam and loading shown, determine the deflection at the midpoint D. Use $E = 200$ GPa and $I = 1.024 \times 10^{-6}$ m^4.