

1. Figure 1 shows the stress-strain diagram of a tensile test. Describe the meaning of point P, E, Y, U and F in figure 1. (20%)
2. Describe the difference between
 - (a) flexibility vs. stiffness (5%)
 - (b) ductile vs. brittle (5%)
 - (c) three-point-bending vs. four-point-bending (5%)
 - (d) plane stress vs. plane strain (5%)
3. Explain the following terms:
 - (a) potential energy (5%)
 - (b) neutral axis (plane) (5%)
 - (c) principle of superposition (5%)
 - (d) equation of compatibility (of displacement) (5%)
4. A cantilever beam fixed at one end and carrying a uniform load of intensity q over its whole length L is shown in figure 2. Find the rotation angle θ_b and deflection δ at the free end of the beam. (20%)
5. A composite beam having the cross-sectional dimensions shown in figure 3 is subjected to a positive bending moment of 30,000 in-lb. Find the maximum and minimum stresses in both materials of the beam assuming that $E_1=1,000,000$ psi and $E_2=20,000,000$ psi. (20%)

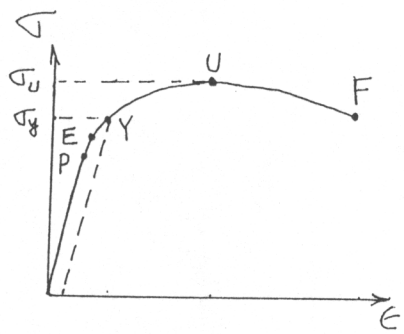


Figure 1

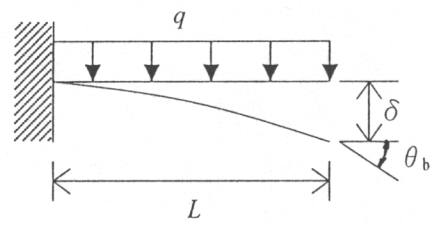


Figure 2

