3. For a loaded wide flange steel beam as shown (圖三), please find
(a) the bending and shearing stresses at point A,
(b) the directions and magnitudes of maximum and minimum principal stresses at point A,
(c) the orientations and magnitudes of the maximum shearing stress and the corresponding normal stress at point A (30%)

4. A rigid beam is constructed on supports B and C, and is suspended at D by a wire, as shown (圖四). If it is given that the support B has a stiffness \( k = 10 \text{ kN/m} \), the support C is rigid and the wire connected at D has a modulus of elasticity \( E = 200 \text{ MPa} \) and a cross-section area \( A = 1.0 \text{ cm}^2 \). Try to find the reactions at supports B, C and D as a uniform load \( q = 2 \text{ kN/m} \) is added on span CD. (20%)