A shaft is made up of solid elements (1), (2) and (3) with circular cross-sections. All elements are made up of the same material having a Young's modulus of E and Poisson's ratio of ν. Torques of $3T$ and T act on rigid connectors C and D, respectively.

1) ***Equilibrium***. Draw free body diagrams (FBDs) of connectors C and D. Write down the appropriate equilibrium equations from your FBDs. Is this system determinate?

2) ***Torque/rotation equations***. Write down the torque/rotation equations for elements (1), (2) and (3).

3) ***Compatibility***. Write down the appropriate compatibility equation(s) relating the rotations of elements (1), (2) and (3).

4) ***Solution***. Solve your equations above for the torques carried by the three elements. Also, determine the maximum shear stresses in the shaft. At which location(s) does this maximum shear stress exists? Write your answers in terms of T and d.