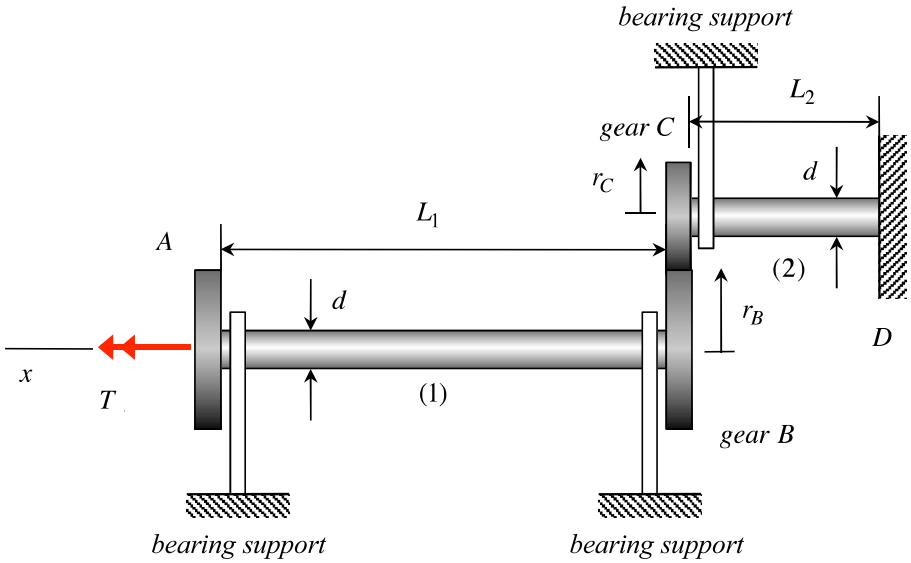
Homework H34.A

GIVEN: Circular cross-sectioned shafts (1) and (2) are coupled through a pair of meshing gears B and C, where $r_B > r_C$.. End D of shaft (2) is connected to a fixed wall, whereas a torque of T is applied to end A of shaft (1). Both shafts have solid cross sections with a diameter of *d*.

FIND: For this problem, determine the maximum shear stress in the system. In which shaft does this maximum shear stress occur, and where on the cross section does it occur?

Express your answers in terms of the parameters defined in the figure.



Homework H34.B

GIVEN: A circular cross-sectioned shaft is made up of components (1), (2) and (3). Components (1) and (2) have a tubular cross sections, with inner and outer diameters as shown in the figure.. Component (3) has a solid cross section with a diameter of $2d$. Components (1) and (2) are joined by a rigid connector at B, components (2) and (3) are joined by rigid connector C, with (1) being attached to a fixed wall at end A. Rigid connector D is attached to end D of component (3). Torques T, $2T$ and $2T$ act on connectors B, C and D, respectively, as shown.

FIND: For this problem:

a) Determine the torque load on each of the components as a result of the applied torques.

b) What is the maximum shear stress in the shaft? At what location(s) does this maximum stress exist?

Leave your answers in terms of T and d.

