

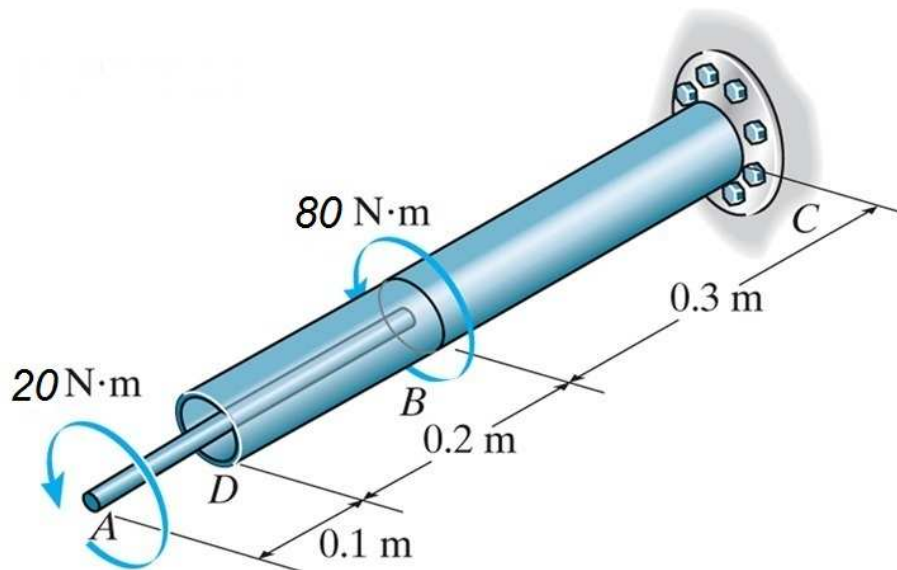
HOMEWORK NO. 7

- **Textbook Sections Covered:** 5.1 – 5.4, Torsion : stress and angle of twist
- **DUE DATE:** Monday 19-March-2012

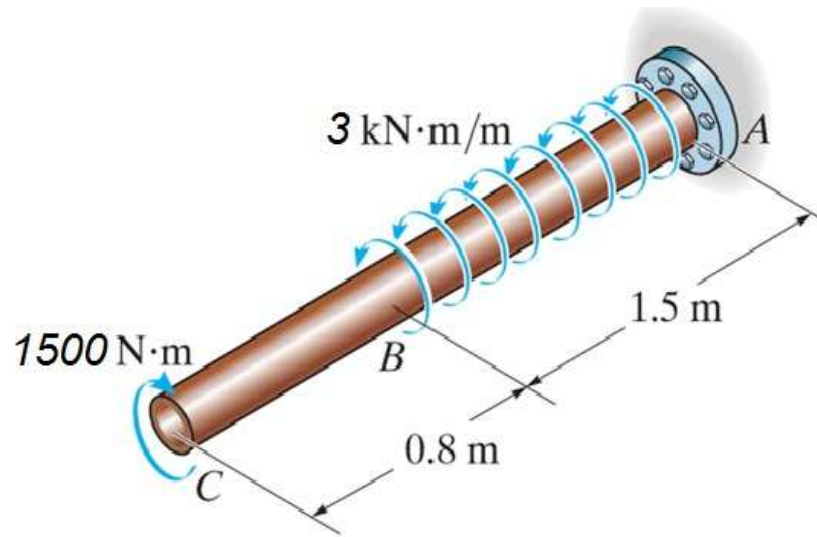
1 - Solve problem 5- 40 in the textbook. Use the shaft diameter as 30 mm (instead of 25 mm).

2- Use the figure and data for problem 5-70 in the textbook. Determine the absolute maximum shear stress in the shaft and the angle of twist of E with respect to B , and the angle of twist of E with respect to A.

3- The assembly (shown below) consists of a solid rod AB ($d=20$ mm) connected to the inside of a tube DC using a rigid disk at B. The tube DC has an outer diameter of 55 mm and a thickness of 5 mm. Determine the absolute maximum shear stress in the whole shaft and the angle of twist of D , and the angle of twist of A. $G = 100$ GPa .



4 – The solid circular shaft is subjected to the shown torques. If the angle of twist of end C is not to exceed 1 degree , and the allowable shear stress is 60 MPa, determine the smallest (required) diameter of the shaft that may be used. $G = 80 \text{ GPa}$.



5- The given shaft has an outer diameter = 50 mm , and an inner diameter = 30 mm. Determine the shear stress at the inner and outer surfaces *in segment CD only*. Plot the shear stress distribution along the radius in that segment. Also, calculate the angle of twist of B with respect to A. $G = 100 \text{ GPa}$

