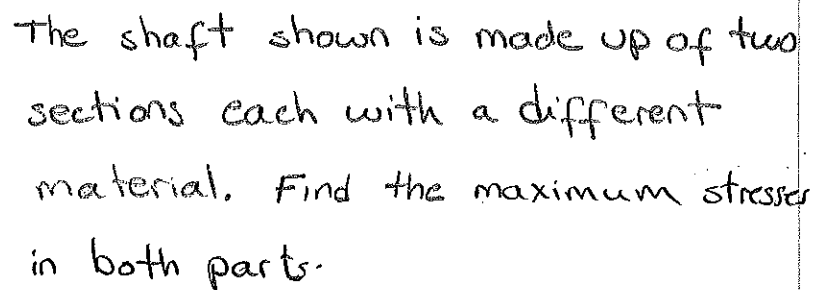


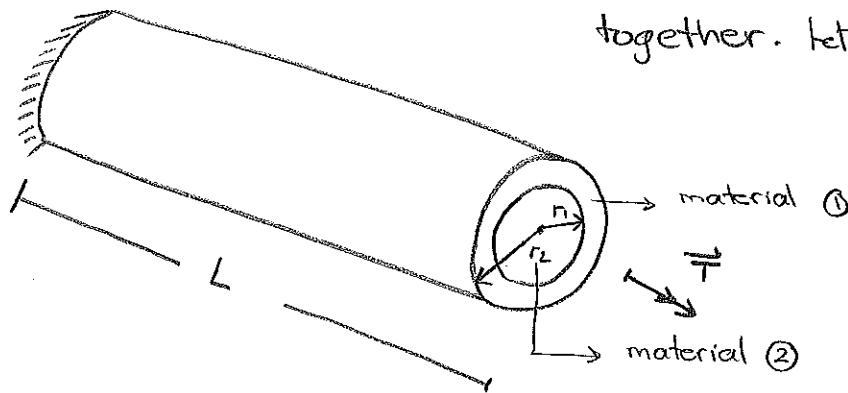
[illegible]
$$G_0 = 3.7 \times 10^6 \text{ psi}$$

$$G_{(2)} = 5.6 \times 10^6 \text{ psi}$$

II. The composite shaft shown is made of two materials bonded together. let $r_1 = 20\text{mm}$ $G_{(1)} = 39\text{GPa}$

$$r_2 = 25\text{mm} \quad G_{(2)} = 77.2\text{GPa}$$

$$L = 2\text{m} \quad |\vec{T}| = 600\text{N.m}$$



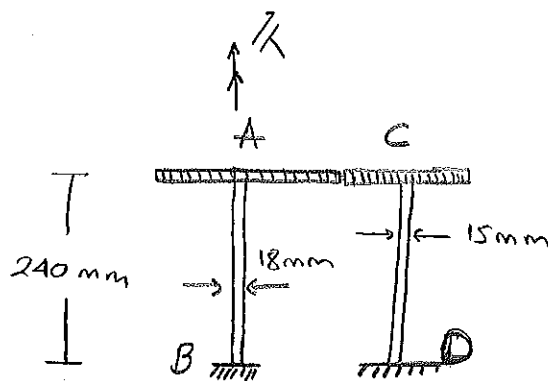
If a torque $\vec{T}$ is applied as shown, find

a) the maximum shear stresses in both materials.

b) the angle of twist at the free end of the shaft.

III. For the system shown $G = 77.6 \text{ Pa}$. A and C are gears connected to shafts fixed at B and D. If a torque $|\vec{T}| = 50 \text{ N}\cdot\text{m}$ is applied at A, find

- the maximum shear stress in shaft CD
- Angle of twist of the shaft at A.



Let $r_{\text{gear C}} = 50 \text{ mm}$

$r_{\text{gear A}} = 75 \text{ mm}$

IV. A solid shaft is to transmit 15 kw at a frequency of 50 Hz.

If the maximum allowable shear is 23.5 MPa find the smallest diameter that will work -