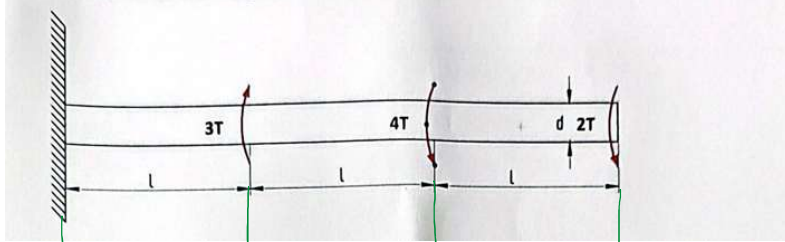
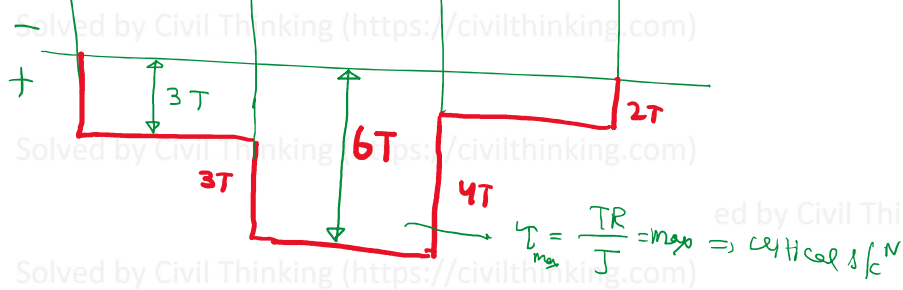


Torsion in Shafts (Torque distribution Diagram and Shear Stress Diagram) problem Solution

For the shafts shown in the figures, make diagrams of Torque and shear stresses from torsion, also determine the total twist angle of the shaft.

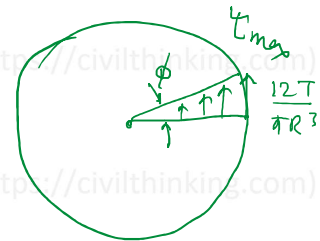


Torque Distribution Diagram:



$$\tau_{max} = \frac{6T \times R}{\frac{\pi R^4}{2}} = \frac{12T}{\pi R^3}$$

Shear Stress Diagram:



$$\frac{\phi}{L} = \frac{T}{J} \Rightarrow \phi \approx \frac{TL}{GJ}$$

$$\phi_{total} = \frac{2TL}{GJ} + \frac{6TL}{GJ} + \frac{3TL}{GJ} = \frac{11TL}{GJ}$$

This problem was solved by Civil Thinking (<https://civilthinking.com>)

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