

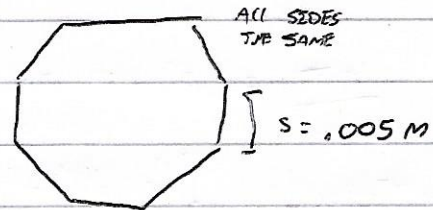
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 DATE / TIME : 30TH APRIL 2020 11:00 HRS
 MODULE CODE : MLX02192
 MODULE DES : ENGINEERING SCIENCE

3) $G = 78 \text{ GPa} = 78 \times 10^9 \text{ Pa}$

$L = 140 \text{ mm} = .14 \text{ m}$

$T = 10 \text{ Nm}$

$\theta = ?^\circ$



$s = 5 \text{ mm} \div 1000 = 5 \times 10^{-3} \text{ m}$

$$J = \left(\frac{5\sqrt{3}}{8} \right) (5 \times 10^{-3})^4 = 6.77 \text{ m}^4$$

$$\frac{T'}{J'} = \frac{\tau^*}{r^*} = \frac{G\theta}{L'} \quad \text{so} \quad \frac{T}{J} = \frac{G\theta}{L} \quad \text{so} \quad \frac{TL}{JG} = \theta$$

$$\frac{(10)(.14)}{(6.77)(78 \times 10^9)} = 2.65 \times 10^{-12} \text{ RADS}$$

$$2.65 \times 10^{-12} \times \frac{360}{2\pi} = 1.52 \times 10^{-10}^\circ$$

$$\theta = 1.52 \times 10^{-10}^\circ \leftarrow \text{DEGREES}$$