1 (1) $I = \dfrac{\pi d^4}{64} = \dfrac{\pi \times (30 \times 10^{-3}\,[m])^4}{64} = 3.98 \times 10^{-8}\,[m^4]$

(2) $I_p = \dfrac{\pi d^4}{32} = \dfrac{\pi \times (30 \times 10^{-3}\,[m])^4}{32} = 7.95 \times 10^{-8}\,[m^4]$

(3) $\tau_{max} = \dfrac{T}{I_p}\dfrac{d}{2} = \dfrac{T}{\left(\frac{\pi d^4}{32}\right)}\dfrac{d}{2} = \dfrac{16T}{\pi d^3} = \dfrac{16 \times 10\,[N \cdot m]}{\pi \times (30 \times 10^{-3}\,[m])^3}$

$= 1.89 \times 10^6\,[Pa] = 1.89\,[MPa]$

2 (1) $I = \dfrac{\pi}{64}(d_2^4 - d_1^4) = \dfrac{\pi}{64} \times \{(30 \times 10^{-3})^4 - (25 \times 10^{-3})^4\}$

$= 2.06 \times 10^{-8}\ m^4$

(2) $I_p = \dfrac{\pi}{32}(d_2^4 - d_1^4) = \dfrac{\pi}{32} \times \{(30 \times 10^{-3})^4 - (25 \times 10^{-3})^4\}$

$= 4.12 \times 10^{-8}\ m^4$

(3) $\tau_{max} = \dfrac{T}{I_p}\dfrac{d_2}{2} = \dfrac{10}{4.12 \times 10^{-8}} \times \dfrac{30 \times 10^{-3}}{2} = 364 \times 10^6\,Pa = 3.64\,MPa$