1-11. The radius of a shaft is 16 mm. Two strain gauges are attached to the surface of the shaft as shown in the figure. The strains of $\varepsilon_{x'}$ and $\varepsilon_{y'}$ are measured repeatedly. From the measured results, the distribution of $\varepsilon_{y'}$ is found to be $\varepsilon_{y'} \sim N\left(55\times10^{-6}, \left(5\times10^{-6}\right)^2\right)$, what is the estimated torque in the form of $\mu_T \pm 2\sigma_T$. Assume that $E = 200\,\text{GPa}$, $\nu = 0.3$. (**Ans.** $T = 54.4 \pm 2(4.95)\,\text{N}\cdot\text{m}$)