3-2.   A shaft rotates with $\omega = 500\,\text{rpm}$ and transmits the power of $P \sim N(20, 2^2)\,\text{kW}$. The allowable shear stress is $\tau_a \sim N(14, 0.5^2)\,\text{MPa}$. Determinate the probability of failure of the shaft. Given that the   torsional stress-concentration factor $K = 1.27$. Assuming that P and τ_a are independent.   (**Ans.** $p_f = 4.67 \times 10^{-4}$)