

3-6. A shaft transmits torques applied to the gears. The three torques follow normal distributions  $T_1 \sim N(150, 12^2)$  N·m,  $T_2 \sim N(200, 20^2)$  N·m, and  $T_3 \sim N(150, 15^2)$  N·m. If the shaft has an allowable shear stress  $\tau_a \sim N(135, 10^2)$  MPa, determine the probability of failure of the shaft. Assume that  $T_1$ ,  $T_2$ ,  $T_3$  and  $\tau_a$  are independent. (Ans.  $p_f = 4.07 \times 10^{-5}$ )

