4-7. Two random forces $P_1 \sim N(50, 5^2)$ kN and $P_2 \sim N(30, 3.5^2)$ kN act on a beam as in the figure. The allowable bending stress of the beam is $S_a \sim N(260, 20^2)$ MPa . P_1 , P_2 and S_a are independent. Determine the probability of failure of the beam. (Ans. $p_f = 5.01 \times 10^{-4}$)