1) In the following two diagrams, are the BJTs shown biased in Forward Active, Inverse Active, Saturation, or Cutoff? Sketch your own plot of log(n,p) vs. x for the case of an npn transistor in saturation.

2) For the silicon p⁺np bipolar transistor shown below, what are α_T, γ, and β if we do not include base recombination and the device is biased in forward active? What if the device is biased in inverse active? (Ignore depletion region chances when using W for inverse active.) Why are the numbers so different?

\[ p^+: N_n = 5 \times 10^{17} \text{ cm}^{-3} \]
\[ n^+: N_p = 3 \times 10^{16} \text{ cm}^{-3} \]
\[ p: N_n = 6 \times 10^{15} \text{ cm}^{-3} \]
\[ \tau_E = \tau_B = 0.2 \mu\text{s}; \tau_C = 1 \mu\text{s} \]
\[ A = 1 \text{ cm}^2 \]
\[ V_{EB} = 0.3 \text{V} \]
\[ V_{CB} = -3 \text{V} \]