Assignment 3

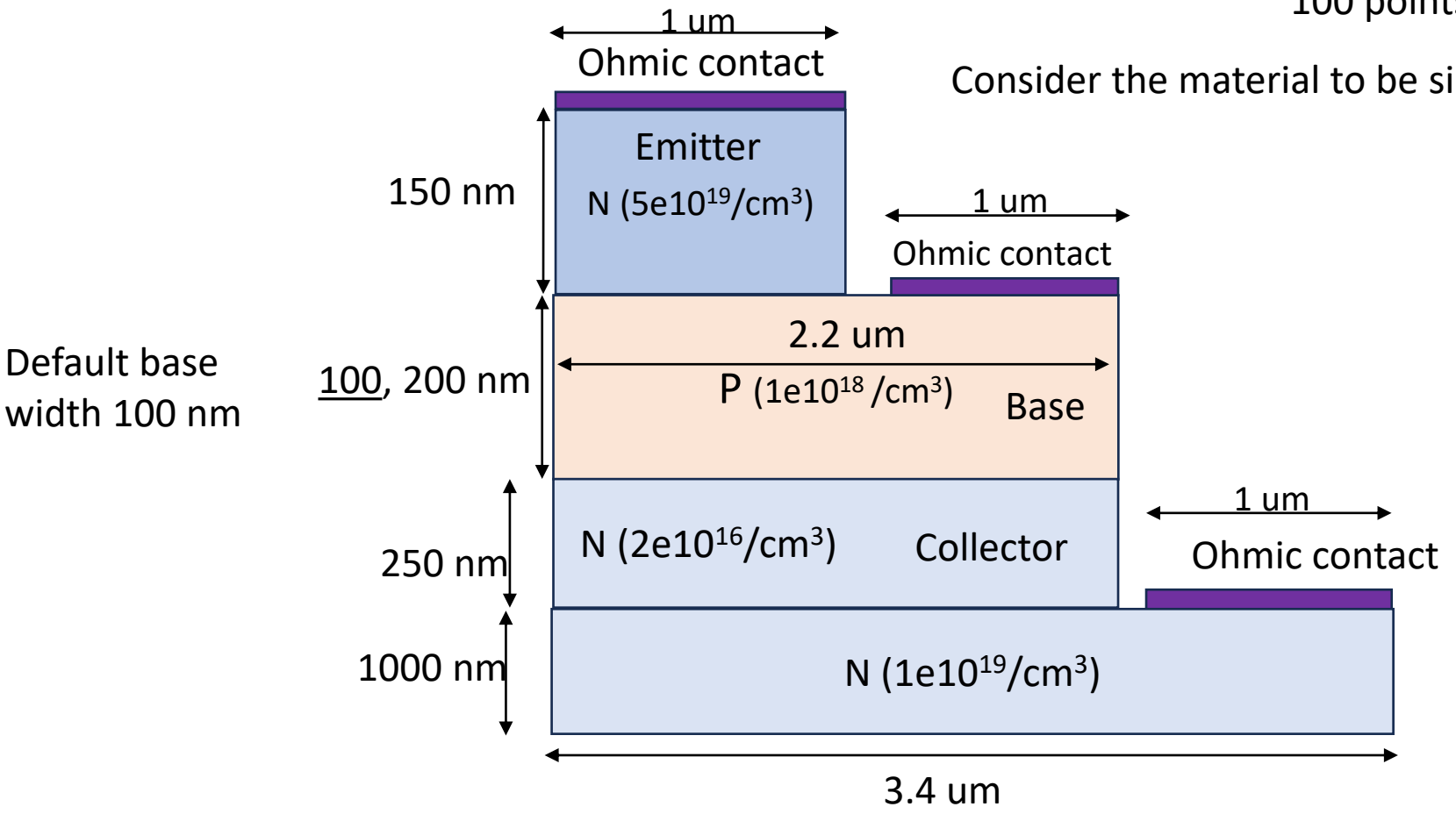
ECE 445

Submission deadline: 30th Nov,2023

Bipolar-Junction Transistor

100 points

Consider the material to be silicon



1. Plot Gummel plot (log (I_C) and log(I_B) versus V_{BE} (0- 0.8V)) under V_{CB} = 0 V.
   In another plot, plot (log (I_C) and log(I_B) versus V_{BE} (0- 0.8V)) under V_{CB} = 2 V. Explain the reasons for the differences between the two plots. (base width is 100 nm).
2. Plot beta versus log (IC) for V_{BE} (0- 0.8V), under VCB = 1 V, 2 V and 5 V. Explain the reason for the beta changes. (base width is 100 nm).
3. Plot beta versus log (IC) for V_{BE} (0- 0.8V), under VCB = 2 V, for two different base width 100 nm, 200 nm. Explain the reason for the beta changes.