UM-SJTU JI Summer 2020 VE 320 Quiz 4

Name: Student ID:

1. What are the two breakdown mechanisms in reverse-biased pn junction? Please explain them using your own words.

2. A silicon pn junction at $T = 300$ K has doping concentrations of $N_a = 2 \times 10^{16}$ cm^{-3} and $N_d = 5 \times 10^{15}$ cm^{-3}. Draw the band diagram of the pn junction, when the junction has (a) zero bias, (b) reverse bias at 2V, (c) forward bias at 3V, please label the necessary values on the plot clearly.

(d) Determine x_n, x_p, W, and $|E_{max}|$.