

EE 320 – *Electronics I*

Homework #3

10 points

Date Assigned: 9/1

Date Due: 9/8

- 3.1 Using a copy of the diode curve shown in Fig. 1 of the Lecture 3 notes, approximate the diode characteristic curve using a straight line that exactly matches the diode characteristic at both 10 mA and 1 mA. Calculate the slope, r_D , and V_{D0} .
- 3.2 On a copy of the diode characteristic curve shown in Fig. 3 of the Lecture 3 notes, draw a load line corresponding to an external circuit consisting of a 0.9-V voltage source and a 100- Ω resistor. Calculate the values of the diode voltage and the loop current you estimate using:
- (a) the actual diode characteristics.
 - (b) the two-segment model shown.
- 3.3 For the diodes characterized below, calculate r_D and V_{D0} , the elements of the battery-plus-resistor model for which the straight line intersects the diode exponential characteristic at 0.1x and 10x the specified diode current:
- (a) $V_D = 0.7$ V at $I_D = 1$ mA and $n = 1$.
 - (b) $V_D = 0.7$ V at $I_D = 1$ A and $n = 1$.
 - (c) $V_D = 0.7$ V at $I_D = 10$ μ A and $n = 1$.
- 3.4 Text problem 4.40. Assumed $V_D = 0.65$ V.
- 3.5 Text problem 4.42. Assumed $V_D = 0.65$ V.
- 3.6 Text problem 4.48.
- 3.7 Text problem 4.59. Parts (c), (d), and (e). Calculate power ratings.
- 3.8 Text problem 4.61.