21AIE113- INTRODUCTION TO ELECTRONICS

Group Assignment 1

Submission Date: 03/04/2022,11.59 PM

Submission link: Assignment 1

Answer all Questions
One submission per group
Submission format – doc,pdf

1. Perform the experiment of Forward Bias and Reverse Bias of a PN junction silicon diode in Falstad circuit simulator.
   a) Explain the theory behind the experiment
   b) Draw the circuit diagrams, mention the components used, and state the procedure of the experiment.
   c) Plot the V-I characteristics, mark the cut-in voltage, and calculate the static and dynamic resistance in the case of forward bias. Write down the inference from the VI characteristics.

2. Write a Matlab program to calculate the current flowing through a diode during forward bias. (Hint: Shockley's equation and consider n as 1).

3. The reverse saturation current of a diode at 25 deg Celsius is 10pA. Plot the forward characteristic of the diode at the 0 degree Celsius and 100 degree Celsius. Write down the inference from the plot.

   Hint: The expression for the reverse saturation current is as a function of temperature is

$$I_S(T_2) = I_S(T_1)e^{[k_S(T_2-T_1)]}$$

   where ks = 0.072 / deg Celsius. T1 and T2 are two different temperatures