<u>Inferences for Lab 1:</u>

Firstly, the value of ‘n_i’ is material dependent (through the E_g) and temperature dependent, as it shows a 10^5 increase in value with respect to temperature being doubled. Then, we see that as T (temperature) increases, the V_t increases as more electrons are now in the conduction band. V_0 or V_b is the barrier potential of the diode, again having the same factors as ‘n_i’.

Now, in a reverse bias diode, we calculate the width of depletions layers (p, n and their sum, total depletion width). This is dependent on the concentration of the donor and acceptor atoms, independent of temperature, but will change size depending on the bias voltage (less for forward, more for reverse). The reverse bias saturation current I_s, a constant for the diode designed, after the breakdown voltage, the current increases rapidly, as per the diode equation. The diodes can act as capacitors, due to the opposite polarity and an electric field (here, we take V_r, a reverse bias voltage as 1,2 V), where we calculate the respective capacitances per unit area, which is dependent of $V_0 + V_r$.