Sardar Vallabhbhai National Institute of Technology, Surat
B. Tech. II (IIIrd Semester)

DELD

Tutorial 1 Practice Numericals

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1). The current flowing through a silicon diode at room temperature is 9×10^{-7} A, when a large reverse voltage is applied. Calculate the current through the diode when 0.4 V forward bias is applied. Consider $\eta = 2$, where η is ideality factor.

2). A germanium diode carries a current of 1 mA at room temperature when a forward bias of 0.15 V is applied. Estimate the reverse saturation current at room temperature.

3). A diode current is 0.6 mA when applied voltage is 400 mV and 20 mA when the applied voltage is 500 mV. Find η assuming $V_T = 26$ mV.

4). A silicon diode has a reverse saturation current of 2.5 μA at 300 K. Find forward voltage for a forward current of 10 mA.

5). What is the ratio of current for forward biased mode with voltage 0.05 V to the current with same magnitude of reverse bias?

6). The intrinsic concentration in Ge at room temperature is $n_i = 2.5 \times 10^{19}/m^3$ and of Si at room temperature is $n_i = 1.5 \times 10^{16}/m^3$. If doping levels of materials are the same to the extent $N_D = N_A = 10^{21}/m^3$, obtain the values of built-in voltage in each case.

7). A germanium diode draws (roll-no) mA with a forward bias of 0.27 V. The junction is at the room temperature of 27 ^oC. Determine the reverse saturation current of the diode.