

Exercise 1

An n- type semiconductor has a graded impurity concentration along the x-axis given by $N_d = 10^{22} - 10^{24}x$ per m^3 . Find the electric field at $x = 0$ at room temperature.

(Ans. 2.6 V)

Exercise 2

- i) For the semiconductor in the above exercise, calculate the diffusion coefficient at 300 K if the electron mobility is $1500 \text{ cm}^2/\text{V}\cdot\text{s}$.
(ii) Calculate the diffusion current density. Explain the direction of diffusion current. (Ans. (i) $3.9 \times 10^{-3} \text{ m}^2/\text{s}$ (ii) 624 A/m^2)

(Hint : Use Einstein relation to find D_n)