GIVEN: $v_d = 10^7$ cm/s

FIND: j^{max} FOR $n = 10^{17}/cm^3$

SOLN:

$$j = q n v_d = 1.602 \times 10^{-19} (10^{17})(10^7)$$

$$= 160 \text{ KA/cm}^2$$

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GIVEN: $N_A = 10^{15}/cm^3$ $N_D = 10^{14}/cm^3$

$n_i = 5 \times 10^{13}/cm^3$

FIND: n & p

SOLN: SINCE $N_A > N_D$ THIS IS p-TYPE DOPED Si:

SO, $p = N_A - N_D = 9 \times 10^{14}/cm^3$

AND $n_i^2 = pn$

SO $n = \dfrac{(5 \times 10^{13})^2}{9 \times 10^{14}} = 2.78 \times 10^{12}/cm^3$

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GIVEN: $N_D = 1 \times 10^{16} / cm^3$

FIND: A) σ

B)

SOLN: A) $\sigma = q \mu_n N$

$= 1.602 \times 10^{-19} (1350)(1 \times 10^{16})$

$= 2.16 (\Omega\, cm)^{-1}$

B)

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