

HW2

Please do Hw2 from page 1 of "HW-Total" file as follows:

Problems: 10, 11, 15, 17; 14 (Bonus)

Hints:

10: Use N_c and N_v equations to find m^* . Use Appendix I (from Appendix tab) to find m_0 for comparison.

11. Use n_i equation: $n_i(T) = N_c e^{-(E_c - E_i)/kT}$ to find $E_i - E_c$

15 using $E_f - E_i = 0.2$ eV, find n_0 from the equation $n_0 = N_c f(E_c)$
Then use charge compensation concept to find N_D from $n_0 = N_D - N_A$

17 use appendix I to find n_i
Use Approximation from space charge neutrality principle to find the majority carrier; for example for n-type $n_0 \sim N_D$
Then use law of SC $n_0 p_0 = n_i^2$ to find the minority carrier

14 (bonus) Use $n_i(T)$ equation to find T when $n_i(T) = N_D$