PHY411 Homework Set 14

1. [5 pts] Kittel-Kroemer, problem 13-1. Expand the results retaining the lowest interesting terms in $\Delta n/n_i$.

2. [5 pts] Kittel-Kroemer, problem 13-2. Mobilities appear as coefficients of proportionality between applied electric field and induced current densities in a medium. They reflect characteristics of carrier motion within the two bands. Treat them as constants independent of dopant concentrations. In (a), take n_e as independent variable and find a value that minimizes the conductivity. Thereafter you can compute n_h and Δn. In (c), look only for numerical values of the ratio in (b).

3. [5 pts] Kittel-Kroemer, problem 13-3. Resistivity is inverse of conductivity, $\rho = 1/\sigma$.

4. [5 pts] Kittel-Kroemer, problem 13-6. Much of the derivation will be done in class.