Extrinsic Photodetectors and Photodiodes

1. Problem 3.3, from Rieke, p. 77. Just compare dark currents at T = 4K and 77K only. Hints: (1) assume that the dopant ionization energy is 15 meV for the extrinsic devices, and (2) assume that $m^* = 1 m_e$ in $N_C, N_V$ for calculating the intrinsic concentration $n_i$ in terms of bandgap, as for example in Eqn. (4.34).

2. Problem 3.4, from Rieke, p. 77. Only do for $N_A = 10^{13}$ and $10^{14}$ cm$^{-3}$. Note: Gain = M (multiplication factor) in Eqn (3.12). For the relative responsivity, use the gain $\times$ quantum efficiency product.

3. Problem 4.1, from Rieke, p. 113.

Homework assignments will appear on the web at: 
http://www.ece.udel.edu/~kolodzey/courses/eleg867f09.html.

Note: On each homework and report submission, please give your name, the due date, assignment number and the course number.