ELEG 309 - Example Problems Chapter 3-2

**Example 3.5**

Consider a *pn* junction in equilibrium at room temperature (*T* = 300 K) for which the doping concentrations are *NA* = 1018/cm3 and *ND* = 1016/cm3 and the cross-sectional area *A* = 10-4 cm2. Calculate *pp*, *np0*, *nn*, *pn0*, *V*0, *W*, *xn*, *xp*, and *Qj*. Use *ni* = 1.5 x 1010/cm3.

**Example 3.6**

For the *pn* junction considered in Example 3.5 for which *NA* = 1018/cm3, *ND* = 1016/cm3, *A* = 10-4 cm2, *ni* = 1.5 x 1010/cm3, let *Lp* = 5 m, *Ln* = 10 m, *Dp* (in the *n* region) = 10 cm2/s, and *Dn* (in the *p* region) = 18 cm2/s. The *pn* junction is forward biased and conducting a current *I* = 0.1 mA. Calculate (a) *IS*; (b) the forward-bias voltage *V*; and (c) the component of the current due to hole injection and that due to electron injection across the junction.