1. no = nc

ln no = ln (nc )

ln no =ln nc + ln ; Because, log (ab) = Log a + Log b

ln no =ln nc - ; Because, ln e-x = -x

= ln nc - ln no

= ln (); Because log a – log b = Log (a/b)

So, we get, 2. Ec – Ef = KT ln( )­

It means, the difference between Conduction band energy and Fermi energy level is equal to KT ln( )

If we get a positive number (say, 50)…that means…..???

If we get a negative number (say, -50)…that means…..???

Nc = 2.8x10^19 electr/cm^3

Conduction Band

Energy Band

0.00868 eV

Ef = Fermi Energy level

Nv = 1.04x10^19 elec/cm^3

Valence Band

Similarly, we get -

3. Po = nv 4. Ef – Ev = KT ln( )

5. ni = nc 6. Ec – Ei = KT ln( )

7. Pi = nv 8. Ei – Ev = KT ln ( )

9. no = ni 10. Ef – Ei = KT ln ( )

11. Po = ni 12. Ei – Ef = KT ln ( )

Conduction Band

Energy Band

0.035 eV

Ef = Fermi Energy level

0.191 eV

Valence Band

Ec – Ef = 0.0424 eV

Electron concentration at intrinsic level, Ni = 1.5x10^10 electrons/cm^3

Electron concentration at Conduction Band, Nc = 2.8x10^19 electrons/cm^3

Electron concentration at Valence Band, Nv = 1.04x10^19 electrons/cm^3