**B.Tech III Year 5th Semester**

**Year(2022)**

**Branch ECE**

**Subject : Microelectronics Final Semester**

**Time : 1Hour M.M : 20**

**Note : Attempt All question**

1: (a)Si sample is doped with 10 boron atoms per cm3. What are the carrier concentrations in the sample sample at 300K?

(b)In a particular semiconductor, the probability of electrons occupying states at an energy kT above the

Bottom of the conduction band is e-7. Determine the position of the Fermi level in the given material.

(ii)Derive an expression for the relation of electric field and the energy band (Ec/Ev/Ei).

2: A silicon device maintained at 300K in characterized by the following Energy band diagram. Use the cited energy band diagram in answering the following question. Where, EG is the band gap of the semiconductor?

(i)Sketch the electrostatic potential(v) inside the semiconductor (ii)Sketch the electric field(E).

(iii)Does the equilibrium condition prevail? (iv) At x=x2, p=?(v) What is the hole drift current density (jp,drift)

Flowing at x=x1.

3:(a)Derive an expression for Einstein Relationship.

(b)AP-N junction has Na=1x10cm and Nd=1x10cm.T=300K

(c)Calculate the built in potential. (ii)Calculate the depletion layer width (Wep).

www.anysolution.com www.anysolution.com