Prajya

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST – 1 EXAMINATION 2016

B.TECH IV SEMESTER

COURSE CODE: 10B1WEC411

COURSE NAME: Semiconductor Devices **MAX. MARKS:** 15

COURSE CREDITS: 04 **MAX TIME:** 1HR

Roll No.....

Note: *All questions are compulsory. Carrying mobile phone during examinations will be treated as case of unfair means. Attempt questions in same order.*

Q1. Prove that under equilibrium condition product of electron and hole concentration is equal to n_i^2. **[3]**

Q2. Describe Hall Effect. How does Hall voltage help in deciding whether the semiconductor is N-type or P-type? **[3]**

Q3. Define following terms: **[3]**

(a). Carrier life time **(b).** Mean free path **(c).** Einstein Relationship

Q4. In a P-type semiconductor Fermi level lies 0.4eV above the valance band edge. Determine the new position of Fermi level, if the concentration of acceptor atoms is multiplied by a factor of 0.5. Assume KT = 0.025eV **[3]**

Q5. A Si bar 0.1cm long and 100μm^2 in cross sectional is doped with 10^{17}/cm^3 of phosphorous. Find the current at 300K with 10V applied. How long does it take an average electron to drift 1μm in pure Si at an electric field of 100V/m? **[3]**