Exam.Code:0905
Sub. Code: 6202

2074

B.E. (ECE), First Semester

EC-103: Introduction to Electronics

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: ***Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Section. Use if scientific calculator is allowed.***

x-x-x

Q1. Answer the following: -

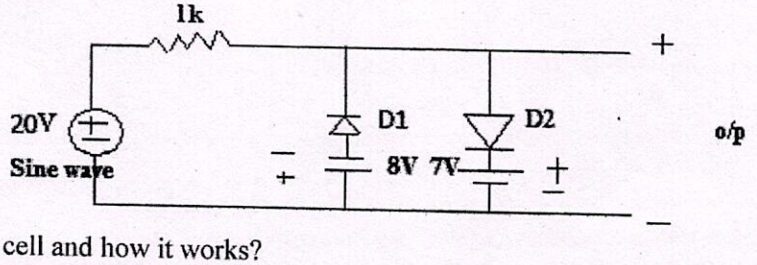
(a) What do you mean by quasi - Fermi levels? (1)
(b) What is Electro luminescence? (1)
(c) What do you mean by carrier generation and recombination rate and when they become equal? (1)
(d) Why normal diodes break down in reverse bias condition? (1)
(e) Why semiconductor materials have positive temperature coefficient of conductance? (1)
(f) What is the prime disadvantage of Schottky diode? (1)
(g) Why emitter, base collector regions in a BJT are doped differently? (1)
(h) What is the formula to calculate the hall coefficient? (1)
(i) Why reverse recovery loss in Schottky diode is less? (1)
(j) What is quantum well? (1)

SECTION A

Q2. (a) Discuss junction and diffusion capacitances. (5)
(b) How the alloy composition changes the band structure? Discuss in detail. (5)
Q3. (a) Discuss the concept of photon and phonon generation. (5)
(b) Discuss how the band structure is formed in Silicon. (5)
Q4. (a) In alloy mixture, mole fraction of GaAs is 0.45. Bandgap of InAs and GaAs are 0.354 eV and 1.42 eV. Lattice constants of InAs and GaAs are 6.0583 A^0 and 5.6532 A^0. Find out the resultant bandgap and lattice constant of the alloy mixture of InGaAs. (5)
(b) Discuss quantum well formation in heterojunction materials and convey applications. (5)

SECTION B

Q5. A sinusoidal input is applied at the input of the circuit shown below. Sketch the input and output waveforms. (10)



Q6. (a) What is solar cell and how it works? (5)
(b) Differentiate Zener and Avalanche breakdown. (5)
Q7. (a) How Zener diode works in reverse bias condition? Explain the construction wise difference with normal diode. (5)
(b) Discuss any application of varactor diode. (5)

x-x-x