Enrolment No:

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION
B.E. 3RD SEMESTER
MID SEMESTER EXAMINATION AUGUST-2014

Subject Code: EC-303 Branch: EC
Subject Name : Basic Electronics Total Marks: 30
Date : 26/08/2014 Time: 12.00AM to 1.30 AM

Instructions: - All questions are compulsory.
- Figures to the right indicate full marks.
- Make suitable assumption, wherever necessary.

Que. 1 Explain Clipping circuits **6**

Que. 2 **Answer the following questions.**

A) State the Law of mass action. Derive the formula for concentration of holes in n-type material and concentration of electrons in p-type material. **4**

B) Explain Hall effect. Also state applications of Hall effect. **4**

C) A bar of n type silicon has length of 5 cm and circular cross section of 20 mm^2. When it is subjected to a voltage of 1 V applied across its length, the current flowing through it is 5 mA. Assume: Charge on one electron as 1.6×10^{-19}C & Mobility of free electrons as 1300 cm^2/v-s. Calculate: 1. Concentration of free electrons. 2. Drift velocity of electrons. **4**

OR

A) Explain drift and diffusion process. Also write down the equation for total current density resulting from drift and diffusion current. **4**

B) Derive the expression for potential difference present in the graded semiconductor material. **4**

C) The Hall experiment is used for a silicon bar known to be p-type. The resistivity of the bar is $220 \times 10^3 \Omega$-cm. width of the bar is 2 mm and distance between the two surfaces of the bar is 2.2mm. The magnetic field used has intensity of 0.1Wb/m^2. If measured value of current and Hall voltage are 5 micro-amp and 28 mv respectively. Calculate the mobility of holes. **4**

Que. 3 **Answer the following questions.**

A) What is rectifier? Explain center tap full-wave rectifier. **5**

B) Difference between silicon diode vs germanium diode. **3**

C) Explain diode capacitance. **4**

OR

A) A bridge rectifier is applied with input from a step down transformer having turns ratio 8:1 and input 230 V, 50 Hz. If the diode forward resistance is 1 Ω, secondary resistance is 10 Ω and load resistance connected is 2 kΩ find :
1. DC power output 2. % efficiency **4**

B) Consider the step graded Germanium semiconductor with ND = 10^3 NA with NA corresponding to 1 acceptor atom per 10^8 Germanium atoms. Calculate the contact potential Vo at room temperature. Assume for Ge atoms per $cm^3 = 4.4 \times 10^{22}$ and ni = 2.5×10^{15} per cm^3. **4**

C) Explain Clamper circuits. **4**

*****All The Best*****