EASTERN UNIVERSITY, SRI LANKA

SECOND EXAMINATION IN SCIENCE 2002/03 (OCT-DEC. 2006)

FIRST SEMESTER

EXTERNAL DEGREE

EXTPH 202 – ELECTRONICS I

Time: 01 hours.

Answer ALL Questions.

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01. What is meant by intrinsic semiconductor? Explain with the aid of suitable diagrams the formation of extrinsic

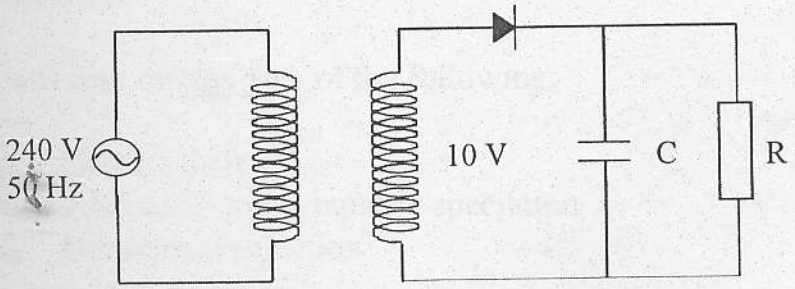
(i) p-type

(ii) n-type

Silicon semiconductor by means of doping with suitable donor and acceptor elements respectively. What do you mean by mobility of a carrier?

A semiconductor is doped with n-type impurities of concentration $10^{21}\,atom/m^3$. If the mobility of electrons in the semiconductor is $0.3m^2V^{-1}s^{-1}$, calculate the resistivity of the doped semiconductor at room temperature. Assume, charge of the electron is $1.6\times10^{-19}\,Coulomb$.

02. (a)



The figure shows a simple rectifier circuit. Sketch the out put signal when the

i. capacitor in place

ii. capacitor removed

(i) Derive an expression for the ripple voltage of the circuit.

(ii) If $C = 8\mu F$ and $R = 4k\Omega$, calculate the dc voltage and ripple voltage across the load resistance R.

(b) Give the structure of a junction transistor and state the functions of each of its components. If the transistor is connected in the common-emitter configuration sketch its

i. input characteristics

ii. output characteristics

What are the three different configurations in which a transistor can be used in electronic circuits?