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EASTERN UNIVERSITY, SRI LANKA

SECOND EXAMINATION IN SCIENCE - 2000/2001

(May 2001)

PH202 - Electronics I

Time: 01 hour.

Answer All questions.

1. (a) What is meant by an intrinsic semiconductor.
Explain with the aid of suitable diagrams, the formation of n-type and p-type silicon semiconductor by means of appropriate doping. Explain the electrical properties in both cases.

(b) If the properties of silicon at 300 K is given as

Electron mobility factor	=	$0.135\ m^2/Vs$
Hole mobility factor	=	$0.048\ m^2/Vs$
Intrinsic carrier density	=	$1.5 \times 10^{16}\ /m^3$
Density	=	$2.33 \times 10^6\ g/m^3$
Atomic weight	=	28.09
Electron charge	=	$1.6 \times 10^{-19}\ C$
Avogadro's number	=	6.022×10^{23}

Calculate

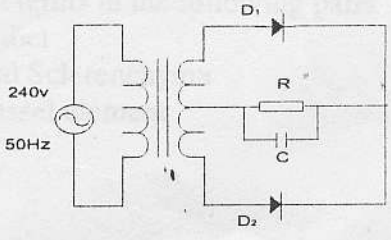
(i) intrinsic resistivity

(ii) the resistivity, if every 10 *millionth* silicon atom is replaced by an atom of indium.

prove any formula you may use.

2. (a) Explain the formation of depletion region and barrier potential of a p-n junction.

(b) Sketch and explain the forward and reverse characteristic of a p-n junction.



(c) The above figure represents a simple rectifier circuits.

(i) Draw the nature of the output across the load R

(ii) If the primary to secondary turns ratio is 4.8:1, the load R is 5 $k\Omega$ and the capacitor C is 30 μF, estimate the dc voltage and ripple voltage on the output.

prove any formula you may use.