EASTERN UNIVERSITY, SRI LANKA

SECOND EXAMINATION IN SCIENCE 2005/2006 (AUG-SEP. 2007)

FIRST SEMESTER

REPEAT

PH 202 – ELECTRONICS I

Time: 01 hour.

Answer ALL Questions.

1. What do you mean by intrinsic semiconductors?

   Explain how an intrinsic semiconductor, for example Silicon, may be converted into

   (a) an N-type semiconductor,

   (b) a P-type semiconductor.

   Drive an equation for electrical conduction in the above two cases.

   A intrinsic germanium specimen is doped with 10^{18} donors/cm^3. The sample is 2.54 cm long and has a cross section of 2×2 mm^2. If electron and hole mobility of the germanium is 1800 cm^2/V sec and 3800 cm^2/V sec respectively at 300° K.

   Find;

   (i) conductivity of the germanium specimen,

   (ii) resistivity of the germanium specimen,

   (iii) resistance of the bar between contacts placed at the ends of the long dimensions,

   (iv) resistance of the bar between contacts placed at opposite side of the short dimensions,

2. Explain using circuit diagram function of a full wave bridge rectifier, and indicate the direction of flow of current for any cycle of a.c. voltage.

   A full wave rectifier uses two diodes, the internal resistance of each diode is 20 Ω. The r.m.s secondary voltage of a centre tap transformer is 100V, and load resistance R_L = 980 Ω. Find

   (i) The average value of current I_{dc}

   (ii) Average dc voltage across R_L

   (iii) r.m.s value of current I_{rms}

   (iv) r.m.s voltage across R_L

   (v) Ripple factor

   (vi) Peak inverse voltage