EASTERN UNIVERSITY, SRI LANKA

SECOND EXAMINATION IN SCIENCE - 2001/2002

(APRIL 2002)

PH 202 ELECTRONICS I

Time: 01 hour.

Answer <u>ALL</u> Questions

1. What do you mean by intrinsic semiconductor. Explain the formation of extrinsic
   (a) $n - type$
   (b) $p - type$
   germanium semiconductor.
   Discuss the mechanism of electrical conduction using energy band diagrams for above two cases.
   A crystal is specified to be $n - type$ silicon of $15\Omega cm$ resistivity. Compute the electron and hole concentration. You may assume that the carrier concentration $n_i = 1.5 \times 10^{10} Cm^{-3}$, mobility of electron $\mu_e = 1300 Cm^2 V^{-1} s^{-1}$ and the charge of electron $e = 1.6 \times 10^{-19} C$.

2. Explain briefly action of a transistor. Discuss the input and the output characteristics curves of a transistor.
   A silicon transistor used in the following circuit may have any value of β between 36 and 90 at room temperature. The leakage current can be neglected at room temperature. Assume that $R_c = 4k\Omega$, $V_{cc} = 20V$, the nominal bias point is to be at $V_{CE} = 10V$, $I_c = 2mA$ and I_c should be in the range $1.75mA$ to $2.25mA$ as β varies from 36 to 90. Find R_E, R_1 and R_2.