EASTERN UNIVERSITY, SRI LANKA
SECOND EXAMINATION IN SCIENCE - 2008/2009
FIRST SEMESTER (PROPER/REPEAT)
(February 2010)
PH 202 ELECTRONICS I

Time: 01 hour.

Answer __ALL__ Questions

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1. (a) By explaining the meaning of an intrinsic semiconductor, discuss how an intrinsic
    semiconductor (for example pure germanium) may be converted into:

    (i) An N-type semiconductor

    (ii) A P-type semiconductor

    Discuss the mechanism of electrical conduction in the above two cases.

    (b) At room temperature, for the germanium intrinsic semiconductor, the mobility of
    electrons approximately doubled the mobility of holes. The mobility of electrons in
    the semiconductor is 0.36 $m^2 V^{-1} s^{-1}$. If the electrons and holes densities are equal and
    is 2.5×10^{19} m^{-3}, find the conductivity of the semiconductor.

2. Briefly explain the action of a bipolar junction transistor.

Sketch and explain the input and output characteristics curves of a transistor.

A silicon transistor is used in the biasing arrangement as shown in the figure below
$R_2=5k\Omega$, $R_C=5k\Omega$, $R_E=10k\Omega$ and $V_{CC}=15V$.
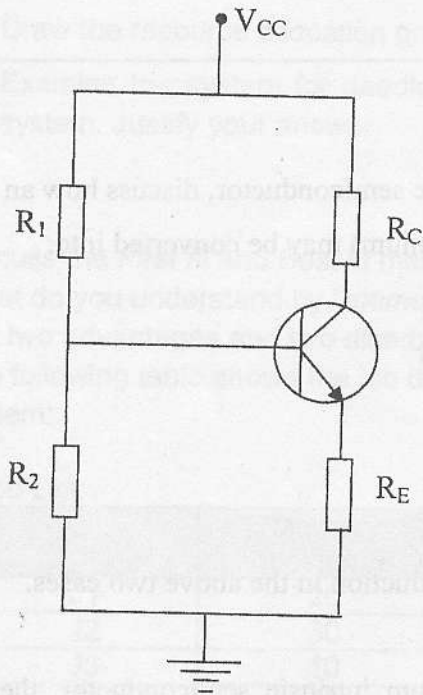
If the base voltage is 5V find:

    (i) The value of R_1

    (ii) The emitter voltage

    (iii) The emitter current

    (iv) The collector current

    (v) The voltage across R_c

    (vi) The collector voltage