EASTERN UNIVERSITY, SRI LANKA

FIRST EXAMINATION IN SCIENCE - 2009/2010

FIRST SEMESTER (PROPER/REPEAT)

(July/August 2011)

PH 202 ELECTRONICS I

Time: 01 hour.

Answer ALL Questions

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1. What do you mean by intrinsic semiconductor?

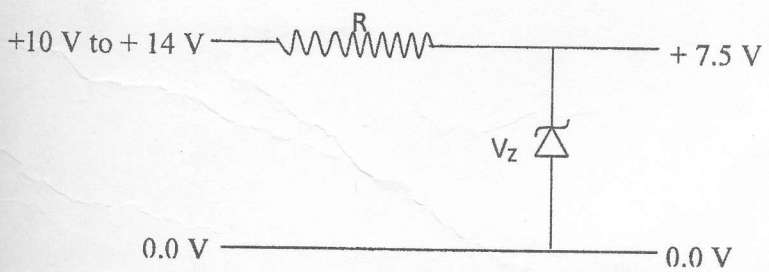
   Explain how an intrinsic semiconductor, for example pure silicon, may be converted into

   (a) N - type semiconductor

   (b) P - type semiconductor

   Discuss the terms Junction break down, Zener break down and Avalanche break down.

   The figure shows regulated voltage supply circuit. The input voltage varies from 10 V to 14 V. The required output voltage is 7.5 V.



   i. Name the type of diode required in this circuit.

   ii. What voltage rating should be chosen for the diode?

   iii. In which bias direction is the diode connected?

iv. If the minimum diode current is 10 *mA* and the required output current from the circuit is 100 *mA*, Calculate;

a) The current through the resistance *R* , when the output current is 100 *mA*

b) The voltage across the resistor *R*, when the input voltage is at minimum of 10 *V*.

v. The input voltage now rises to its maximum of 14 V. Calculate;

a) the voltage across R,

b) the current through R at this voltage

c) the power dissipated by R at this voltage

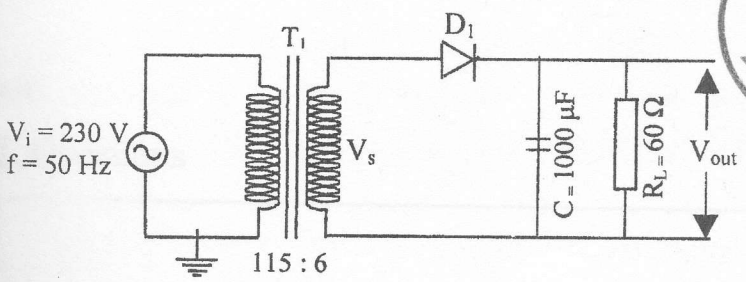
vi. The power supply input voltage remains at 14 V, but no current is drawn from the output of the regulator circuit. Find;

a) the current through the diode

b) the power dissipated by the diode

2. Explain using circuit diagram function of a half wave rectifier, and indicate the direction of flow of current for any cycle of a.c. voltage. Hence derive an expression for mean output current I_{dc}.

Consider the half wave rectifier circuit given below.



(i) Find the secondary voltage V_s

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

(iii) Average dc voltage across R_L

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

(v) r.m.s voltage across R_L

(vi) Ripple factor

(vii) Peak inverse voltage

Prove any formula you may use.