COMMON ENRANCE EXAMINATION 1st YEAR 1st CYLCE (ENSET_BAMBILI)

Department: Electrical and Power Engineering **Session: 2011**

Option: F2 (Electronic) **Duration: 3hrs**

Paper (Major): Electronics **Coefficient: 4**

Instructions: Choose the good answer, each question carries 1mark.

EXERCISE 1: Turn on and Turn off of SCR (silicon controlled rectifier)

$$i_{GT} = 50mA, i_L = 50mA, tgt = 5\mu s, tq = 100\mu s$$

When the SCR is on: $U_{AK} = 1.5V, U_{GK} = 1V = RG = 100\Omega$

1. What is the minimal value of E_0 which can turn on the SCR
2. . E_0 Equals to 15V. Which has to be the minimal value of T_0 so that SCR starts?
3. The impulse of trigger is supposed to be sufficient to turn on the thyristor, the continue voltage U= 120V. Which value must have Rc so that the SCR starts or turn on?
4. The SCR (thyristor) to turn it off, a device applies a voltage U_{AK} = - V_{EM} for a time T. what is the minimal value of T to success the blockage?

EXERCISE 2: Using of Operational Amplifier

1) What is the functioning domain of this opamp? Justify your answer.
2) Give the definition of offset voltage
3) How can we adjust this offset voltage?
4) Analyze the diagram and give its function

Exercise 3: Stabilization zener

The characteristic of the zener diode in reverse polarization (after breakdown) is comparable with a diode passing by the points (I_z = 200mA, U_z = 6.2V) and (I_z = 100mA, U_z = 7V). It is admitted that the diode functions out of stabilization of tension if I_z lies between 5mA and 100Am.

a) Determine the equation of the useful characteristic of the zener diode

b) In load study(Rc = 100Ω)

c) Calculate I, J, I_z and U for e = 18V and R = 10 Ω between which limits RC can it vary so that the diode functions in its useful zone (e = 18V and R = 100 Ω)?

Exercise 4: Bipolar Transistor

1. Give the equation of attack (input line) and the equation of static load line or continues made of the first stage
2. Determine the output quiescent point of the first stage (VBE = 0.7V).
3. Deduce the dynamic line load of the second stage
4. Give the equivalent diagram of the amplifier in small signals or dynamics (Bypass emitter)
5. Calculate the voltage amplification A_{v1}, A_{v2} respectively of the first and second stage
6. Deduce the total amplification A_v

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