RR

I B.Tech (RR) Supplementary Examinations, January 2010
ELECTRONIC DEVICES AND CIRCUITS
(Common to Electrical & Electronic Engineering, Electronics & Communication
Engineering, Computer Science & Engineering, Electronics & Instrumentation Engineering,
Bio-Medical Engineering, Information Technology, Electronics & Control Engineering,
Computer Science & Systems Engineering, Electronics & Computer Engineering and
Instrumentation & Control Engineering)

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) An electron is moving perpendicular to magnetic field 'B'. Derive the expression for radius 'R' of the trajectory and period of rotation T
   (b) Derive the expression for the electro magnetic deflection sensitivity in the case of the CRT. [8+8]

2. (a) Explain about various current components in a forward biased p-n junction diode.
   (b) Find the value of D.C. resistance and A.C resistance of a Germanium junction diode at 25^0 C with $Io = 25\mu A$ and at an applied voltage of 0.2V across the diode. [8+8]

3. (a) What is the cause of surge in rectifier circuits using capacitor filter. How is the current limited?
   (b) In a full wave rectifier the required dc voltage is 9V and the diode drop is 0.8V calculate ac rms input voltage required in case of bridge rectifier circuit and center tapped full wave rectifier circuit.
   (c) Derive the expression for the ripple factor of half wave rectifier and full wave rectifier. [4+6+6]

4. (a) What are the different configurations of BJT. Explain?
   (b) Define I_{CBO} and I_{CEO} ?
   (c) What is the order of magnitude of I_{CBO} for Si transistor and Ge transistor. How does I_{CBO} vary with temperature? [8+4+4]

5. (a) Draw the structure of an n-channel JFET and explain its principle of operation. Why is the name field effect used for the device? Show the circuit symbol of JFET.
   (b) Draw the static characteristic curves of an n-channel JFET and explain the different portions of the characteristics. Define the pinch-off voltage and indicate its location on drain characteristics. [8+8]

6. (a) Draw the circuit diagram of a collector to base bias circuit of CE amplifier and derive expression for S.
   (b) Determine the quiescent currents and the collector to emitter voltage for a germanium transistor with β=50 in self biasing arrangement. Draw the circuit with a given component value $V_{CC} = 20V$, $R_C = 2K$, $R_e = 100\Omega$ $R_1 = 100K\Omega$ $R_2 = 5K$. Also find out stability factor. [8+8]

7. (a) Briefly discuss about the effect of feedback on amplifier Bandwidth.
   (b) Draw the frequency response of an amplifier with and without feedback and show the bandwidth for each case and how these two curves are related to gain bandwidth product.
   (c) We have an amplifier of 60db gain. It has an output impendence $Z_o = 10k\Omega$. it is required to modify its output impendence to 500Ω by applying negative feedback.Calculate the value of the feedback factor Also find the percentage change in the over all gain, for 10% change in the gain of the internal amplifiers.

   [4+6+6]

8. (a) Draw the circuit diagram of a RC phases shift oscillator using BJT. Derive the expression for frequency of oscillators.
   (b) Classify different type of oscillators based on frequency range.
   (c) Why RC oscillators are not suitable for high frequency applications. [8+4+4]

⋆ ⋆ ⋆ ⋆ ⋆