Code No: RR100207 **RR**

I B.Tech Year(RR) Supplementary Examinations, May/June 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

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1. (a) Derive the expression for trajectory of an electron placed in combined electric(E) and magnetic fields(B). Both the fields are perpendicular to each other and the initial velocity is zero
   (b) The magnetic flux density $B = 0.02wb/m^2$ and electric field strength $E = 10^5 v/m$ are uniform fields, perpendicular to each other.A pure source of an electron is placed in a field. Determine the minimum distance from the source at which an electron with 0v will again have 0v in its trajectory under the influence of combined Electric and magnetic fields [8+8]

2. (a) How many types of break down mechanisms are associated with semiconductor diode? Explain about each mechanism.
   (b) Give the equivalent circuits for a semiconductor diode for the following conditions: [8+8]
      i. $R_f \neq 0 \quad V_r \neq 0 \quad R_r = \alpha$
      ii. $R_f = 0 \quad V_r \neq 0 \quad R_r = \alpha$
      iii. $R_f \neq 0 \quad V_r = 0 \quad R_r = \alpha$

3. (a) Explain the action of a full wave rectifier with centre tapped transformer and sketch the wave forms of input and output voltages.
   (b) Derive the expression for ripple factor in a full wave rectifier with resistive load.
   (c) Determine the value of ripple factor operating at 50 Hz with 100μF capacitor filter and 100 Ω load. [6+6+4]

4. (a) Define the following terms and explain.
      i. Emitter efficiency
      ii. Transport factor.
      iii. Large signal current gain.
   (b) The reverse leakage current of the transistor when connected in CB configuration is $0.2\mu A$ while it is $18\mu A$ when the same transistor is connected in CE configuration. Calculate α_{dc} and β_{dc} of the transistor.
   (c) If $\alpha_{dc} = 0.99$ and $I_{CBO} = 50\mu A$, find Emitter current. 6+6+4]

5. (a) Give symbol of UJT and mark required polarities for operation.
   (b) Give the equivalent circuit of UJT.
   (c) Explain how UJT can be used as a-ve resistance device, with the help of static characteristics. [4+4+8]

6. (a) Draw the circuit diagram of fixed bias circuit in CE configuration and obtain the expression for I_B. Why the circuit is not suitable if the β of the transistor is changed.
   (b) How to obtain bias stability in CE configuration circuit.
   (c) Briefly explain about thermal stability. [8+4+4]

7. (a) Classify the amplifiers based as feedback topology and give their block diagram. How the input and output impendence are effected in each case.
   (b) Draw the circuit diagram of a current feed back circuit and derive Expressions for Voltage gain and output resistance, and input resistance. [8+8]

8. (a) What type of feedback is employed in oscillators? And what are the advantages. Discuss the conditions for sustained oscillations.
   (b) Find the capacitor C and h_{fe} for the transistor to provide a resonating frequency of 10KHZ of a phase-shift oscillator. Assume R_1=25kΩ, R_2=60kΩ, R_c=40kΩ, R=7.1kΩ and h_{ie}=1.8kΩ. [10+6]

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