Code No: R059210404 **Set No. 4**

II B.Tech I Semester Regular Examinations, November 2007
ELECTRONIC CIRCUIT ANALYSIS
(Common to Electronics & Communication Engineering and Electronics & Telematics)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Draw the circuit diagram of CB- amplifier and its h-parameter equivalent circuit. List out the characteristics of a CB amplifier.
   (b) In a single stage CB amplifier circuit, $R_E = 20K, R_C = 10K, V_{EE} = -20V, V_{CC} = 20V, R_L = 10K and R_S = 0.5K$. Find A_I, R_i, R_o, A_V . (8+8)

2. (a) How multistage amplifiers are classified depending upon the type of coupling.
   (b) Write a note on distortions in amplifiers.
   (c) In an R-C coupled amplifier, $A_{VM} = 60, f_L = 50Hz$ *and* f_H=100KHz. Find the values of frequencies at which the gain reduces to 50 on either side of mid band region. [4+6+6]

3. (a) What are the typical values of various components in Hybrid - π model? Show that at low frequencies the Hybrid - π model with $r_{b'e}$ and r_{ce} taken as infinite reduces to the approximate CE h- parameter model.
   (b) The following low- frequency parameters are known for a given transistor at $I_C = 10mA, V_{CE}$ =10 V, and at room temperature,
   h_{ie} = 500 Ω
   h_{oe} = 4x10^{-5} A/V
   h_{fe} = 100
   h_{re} = 10^{-4}.
   At the same operating point, f_T = 50MHz and C_c=3PF, compute the values of all the Hybrid - π parameters [8+8]

4. (a) Define thermal resistance of a power BJT.
   (b) A transistor with a maximum junction temperature specification of 150^0C dissipates a maximum power of 40 watts at a case temperature of 25^0C and 2 watts at an ambient temperature of 25^0C. Find
      i. The thermal resistance between the junction and the case.
      ii. The thermal resistance between the junction and ambient.
      iii. Maximum power dissipation capability for safe operation in free space at a temperature of 50^0C. [4+4x3]

5. (a) What is meant by the term Tuned amplifier and briefly explain the various methods of classification of tuned amplifiers?

(b) A constant generator drives a parallel tuned circuit consisting of a loss less capacitor 'C' and a coil 'L' (having small resistance 'R'). Derive the expression for the frequency of resonance? [8+8]

6. (a) Explain the principle of a wideband amplifier?

   (b) Derive the expression for Optimum value of collector circuit resistor (R_C, opt) of one stage of a CE cascade amplifier. Draw the graph showing the variation of Bandwidth, Gain and Gain bandwidth product as a function of R_C and write the comments from the graph to improve the bandwidth. [4+12]

7. (a) With the help of a neat circuit diagram, explain the operation of BJT shunt voltage regulator.

   (b) What is a voltage reference? Why is it needed?

   (c) What is the function of a series pass transistor? [8+4+4]

8. (a) Explain how three terminal IC 7805 is used as a current source with a neat circuit diagram. [8]

   (b) What is a Voltage multiplier? Draw and explain any one circuit of it and give its applications. [8]

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