Code No: 07A3EC14 **Set No.1**

II B.Tech. I Semester Regular Examinations, November -2008
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) Define h-parameter of a transistor in a small signal amplifier. What are the benefits of h-parameters?
   (b) In a typical single stage CE amplifier, R_s=1kΩ, R_L=1.2kΩ using h_{fe}=50, h_{oe}=25×10^{-6} A/V, h_{re}=2.5×10^{-4}, h_{ie}=1100Ω. Find A_I, A_V, Z_1 and Z_o. [8+8]

2. (a) Draw and explain the two stage amplifier with Darlington connection. Give the advantages of this circuit.
   (b) An amplifier consists of 3 identical stages in cascade. The bandwidth of overall amplifier extends from 20 Hz to 20 kHz. Calculate the bandwidth of individual stage. [8+8]

3. (a) Draw the hybrid-π equivalent of a CE transistor valid for high frequency and explain significance of each parameters.
   (b) At I_C=1mA and V_{CE}=10V, a certain transistor data shows C_C= $C_{b'C}$=3PF, h_{fe}=200 and ω_T=-500 Mrad/sec. Calculate g_m, $\gamma_{b'e}$, C_e,=$C_{b'e}$ and W_β. [8+8]

4. (a) Explain the classification of power amplifiers based on class of operation and compare them.
   (b) A power amplifier supplies 3w to a load of 6KΩ. The zero signal d.c collector current in 55 mA and the collector current with signal in 60mA. How much is the percentage in second harmonic distortion? [8+8]

5. (a) Draw and explain the circuit diagram of single tuned inductively coupled amplifier using BJT?
   (b) Draw its HF circuit and explain it. [8+8]

6. (a) Draw the circuit diagram of BJT tuned class B/C amplifier and briefly explain its working. What are the applications of tuned amplifiers?
   (b) In a tuned amplifier circuit C=500PF, L=20μH, R_L=1.5K and the transistor has h_{fe}=50 and input resistance of 200 Ω. The coil used has Q factor=30. Calculate
      i. resonant frequency of the tuned circuit
      ii. impedance of the tuned circuit
      iii. Voltage gain of the stage. [8+8]

7. (a) Explain the operation of simple zener skunt voltage regulator.

(b) The zener diode used in the shunt voltage regulator circuit has a breakdown of voltage of 10V. The series current limiting resistance is 200 Ω. Calculate the un regulated d.c input voltage when the zever current in 15mA and the load current is 50mA. If now the input voltage changes to 30V, calculate the new zener current, assuming constant load. [8+8]

8. (a) Explain the principal of IC 723 voltage regulator.

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

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Code No: 07A3EC14 **Set No.2**

II B.Tech. I Semester Regular Examinations, November -2008
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 low frequency ν parameter equivalent circuit of a CE amplifier and explain the significance of each parameter.
   (b) In a single stage CE amplifier R_S=1kΩ, R_1=50k, R_2=2k, R_C=1K, R_L=1.2k, h_{fe}=50, and h_{ie}=1.1k. Find A_I, R_i, R_o, and voltage gain. [8+8]

2. (a) Derive the expression for voltage gain and input impedance of bootstrap emitter follower circuit.
   (b) A multistage in to be constructed using four identical stages, each of which has a lower cutoff frequency 15Hz and upper cutoff frequency 30kHz.
      i. What will be the lower and upper cutoff frequencies of the multistage amplifier?
      ii. If the mid band voltage gain of each stage in 8.2, What will be approximate gain of the multistage amplifier at 7.5Hz and at 300KHZ? [8+8]

3. (a) Derive the expression of gain bandwidth product for voltage?
   (b) Short circuit CE current gain of transistor in 25 at a frequency of 2MHz if f_β=200kHz. Calculate
      i. f_T
      ii. h_{fe}
      iii. Find |Ai|at frequency of 10 MHz and 100 MHz. [8+8]

4. (a) Explain with neat circuit diagram, the working of a Transformer coupled class A power amplifier. What are its advantages and disadvantages?
   (b) A class B, push pull amplifier drives a load on 16Ω, connected to the secondary of the ideal transformer. The supply voltage in 25V. If the turns on the primary in 200 and the No. of turns the secondary in 50, Calculate maximum power o/p, d.c power input, efficiency and maximum power dissipation per transistor. [8+8]

5. (a) Draw and explain the circuit diagram of a single tuned capacitance coupled amplifier. Explain its operation.
   (b) Explain the significance of Gain versus frequency curve of tuned amplifier. Draw the ideal and actual frequency response curves of single tuned amplifier. [8+8]

6. (a) Compare and explain the frequency response of single tuned, double tuned and staggered tuned amplifiers.

   (b) A single tuned RF amplifier uses a transistor with an output resistance of 60K, output capacitance of 20PF and input resistance of next stage in 20kΩ. The tuned circuit consists of 47PF capacitance is parallel with series combination of 1μH inductance and 4 Ω resistance. Calculate:

   i. Resonant frequency
   ii. Effective quality factor
   iii. Bandwidth of the circuit. [8+8]

7. (a) Draw a neat circuit diagram of a series regulator and explain its working.

   (b) For the emitter follower series voltage regulator shown in figure 1, calculate the output voltage and the zener current if R_L=1k Ω. [8+8]

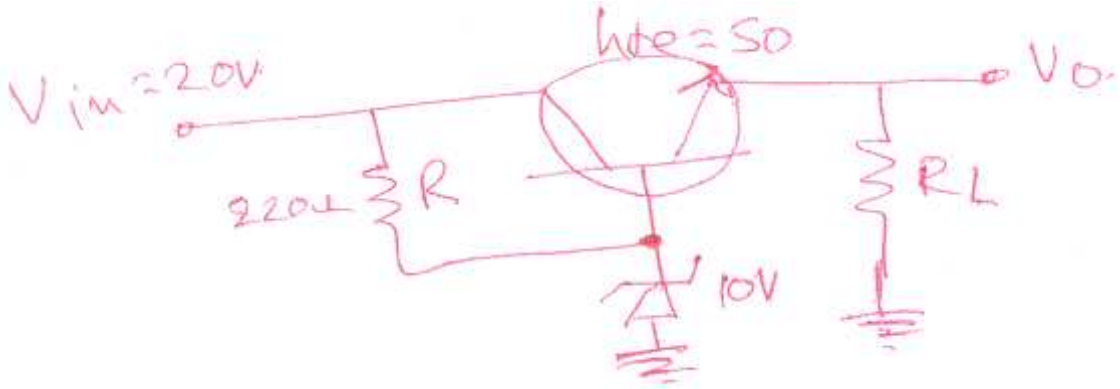

Figure 1:

8. (a) Explin how 3 terminal IC 7805 in used as a current source with a neat circuit diagram.

   (b) Draw the circuit of volatage multiplier and explain its principle. What are its applications. [8+8]

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Code No: 07A3EC14 **Set No.3**

II B.Tech. I Semester Regular Examinations, November -2008
ELECTRONIC CIRCUIT ANALYSIS
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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Draw hybrid-π equivalent of a transistor in CE configuration at low frequency. Discuss the significance of different parameters of the equivalent circuit.
   (b) The h-parameter a.c equivalent circuit of a transistor in CE mode is shown in figure 2. Calculate A_I, $A_V = \frac{V_L}{V_S}$, Z_{in} and Z_{out}. [8+8]

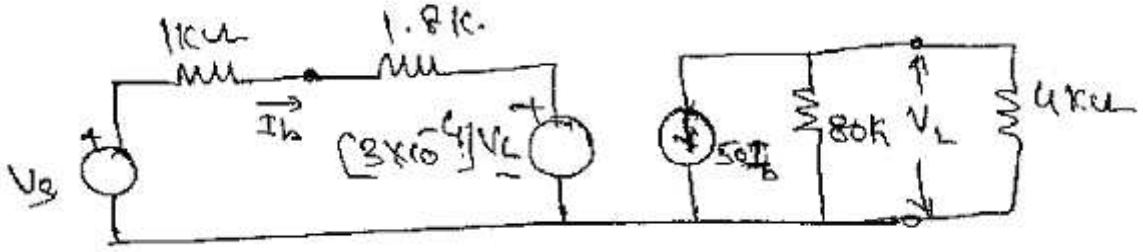

Figure 2:

2. (a) Compare emitter follower and darlington emitter follower configurations in respect of
      i. current gain
      ii. input impedance
      iii. voltage gain
      iv. output impedance.
   (b) For the circuit shown in figure 3, calculate R_i, A_i, A_v and R_o. Assume h_{ie}=1.1K, h_{fe}=50, h_{re}=$2.5\times10^{-}4$, h_{oe}=25 μA/v. [8+8]
3. (a) Derive the expression of gain bandwidth product for current.
   (b) A HF amplifier uses a transistor which in driven from a source with R_s=0. Calculate value of f_H, if R_L=0 and R_L=1KΩ. Typical values are $r_{b'e} = 1K$, C_e=100PF and, C_c=3PF and g_m=50 mA/V. [8+8]
4. (a) Draw a neat circuit diagram of pushpull class B amplifier. Explain its working.
   (b) In a class B complementary power amplifier V_{cc}=+15V, -V_{cc}=15V and R_L=4Ω. Calculate
      i. maximum a.c power which can be developed

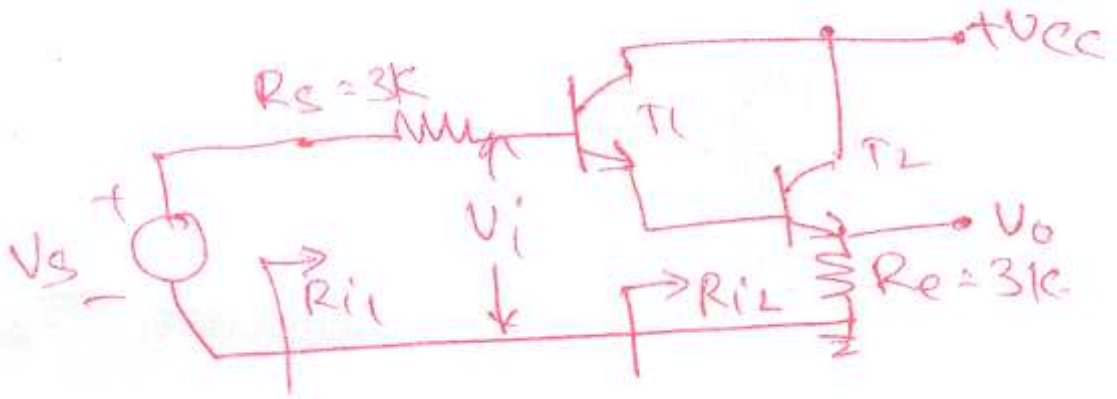

Figure 3:

ii. collector dissipation while developing maximum a.c power

iii. efficiency

iv. maximum power dissipation per transistor. [8+8]

5. Draw the HF equivalent circuit of a single tuned capacitine coupled BJT amplifier and derive the expression for

   (a) voltage gain

   (b) voltage gain at resonance

   (c) 3 dB bandwidth. [16]

6. (a) Explain the concept of staggered tuned amplifier with the help of frequency response.

   (b) A single tuned transistor amplifier is used to amplifier modulated RF carrier of 500 KHz and bandwidth of 20KHz. The circuit has a total output resistance R_t=40KΩ and output capacitance Co=50PF. Calcualte values of inductance and capacitance of the tuned circuit. [8+8]

7. (a) Draw a neat circuit of transistor shunt regulator and explain its principle.

   (b) A simple zener diode regulator uses a 12V zener diode with series resistance of 100 Ω. The unregulated Supply is 15V. Determine:

      i. the necessary power rating of the zener.

      ii. the highest load current that can be supplied with the diode if R_z is 10Ω and I_{zmin}=5mA. [8+8]

8. (a) What in catcher diode and explain the necessity of catcher diode in switch regulator with the help of circuit diagram.

   (b) List the operating ratings and electrical characteristics of IC 723. [8+8]

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Code No: 07A3EC14 **Set No.4**

II B.Tech. I Semester Regular Examinations, November -2008
ELECTRONIC CIRCUIT ANALYSIS
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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are h-paraneters? Why they called so? Define them and what are the benefits of h-parameters.
   (b) In a single stage CE amplifier with un bypassed emitter resistance, R_s=1KΩ, R_1=50, R_2=2K, R_C=1K, R_E=270, and R_L=1.2KΩ. Find A_I, A_V, R_i and Ro. The h-parameters given are hie=1100, hfe=50. [8+8]

2. (a) Compare the four types of coupling methods used in multistage amplifiers.
   (b) For the circuit shown in figure 4, calculate R_i, A_i, A_v and R_o for h_{ie}=1KΩ, h_{fe}=50,h_{re}=2×10^{-4}, h_{oe}=20μA/V. [8+8]

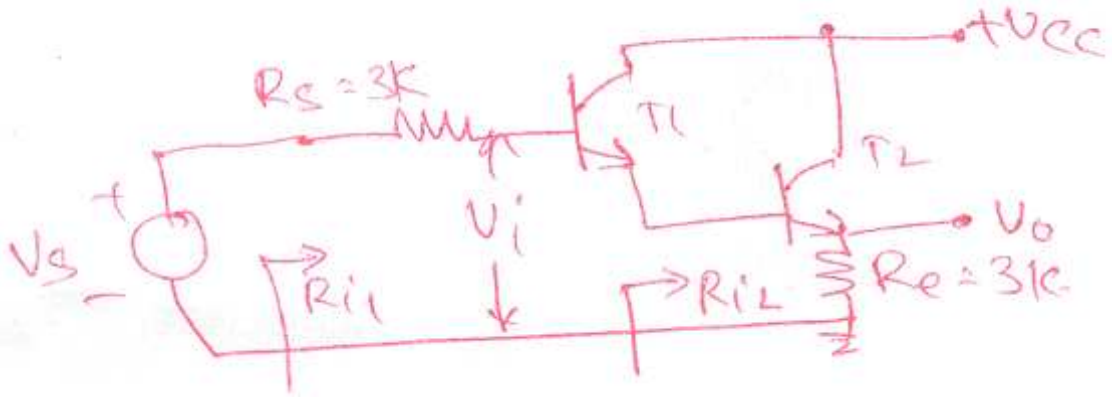

Figure 4:

3. (a) Define f_α f_β and f_T and Derive the relation between f_β and f_T
   (b) A HF amplifier uses a transistor which is driven from a source with R_s=1K. Calculate value of f_H, i_α, R_L=0 and R_L = 2KΩ. Typical values for hybrid-π parameters are: $r_{b'e} = 1K$, $\gamma_{bb'} = 100\Omega$, C_e = 100PF, C_C = 3PF and g_m = 50mA/V. [8+8]

4. (a) Prove that the maximum efficiency of a class B amplifier in 78.5%
   (b) A series fed class A amplifier uses a supply voltage of 10V and load resistance of 20Ω. The a.c input voltage results in a base current of 4mA peak. Calculate
      i. d.c input power
      ii. a.c output power

iii. %efficiency. [8+8]

5. Draw the HF equivalent circuit of a Tapped single tuned capacitance coupled amplifier using BJT and derive the expressions for

   (a) voltage gain

   (b) voltage gain at resonance. [16]

6. (a) Draw the circuit diagram of BJT tuned class B/C amplifier and briefly explain its working. What are the applications of tuned amplifiers?

   (b) In a tuned amplifier circuit C=400PF, L=30μH R_L=1.5K and the transistor has h_{fe}=60 and input resistance of 200Ω. The coil used has Q factor = 30. Calculate

      i. f_r of the tuned circuit

      ii. impedance of the tuned circuit

      iii. voltage gain of the stage. [8+8]

7. (a) Explain the principle of simple series regulator circuit using transistor.

   (b) For the shunt regulator shown in figure 5, determine the output voltage and the circuit currents. [8+8]

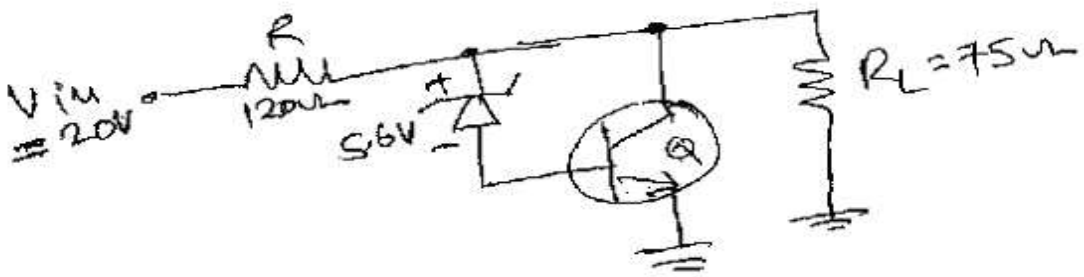

Figure 5:

8. (a) Draw the diagram of IC 723 voltage regulator and explain its principle.

   (b) With a neat circuit explain the working of voltage multiplier. What are its applications. [8+8]

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