Code No: RR210401 **Set No.1**

II B.Tech. I Semester Regular Examinations, November -2005
ELECTRONIC CIRCUITS ANALYSIS
(Electronics & Communication Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) i. For the given circuit, draw it's a.c. equivalent circuit and derive the expression for R_i.{As shown in the Figure1}

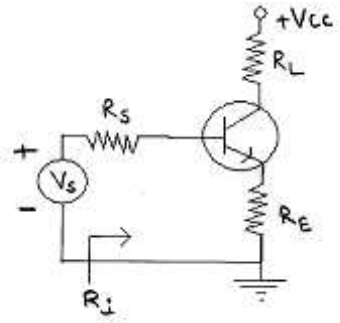

Figure 1:

ii. If $R_L = R_E = 1K\Omega$ and using typical values of h-parameters $h_{ie} = 1.1K$, $h_{fe} = 50$, $h_{re} = 2.5 \times 10^{-4}$, $h_{oe} = 25\ \mu A/V$. What is the value of R_i?

(b) For CD amplifier as shown in figure2 $g_m = 2.5mS$, $r_d = 25K\Omega$, calculate R_i, R_o and A_V. [8+8]

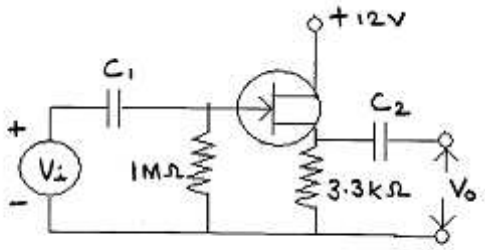

Figure 2:

2. (a) Define f_β and f_T and derive the relation between f_β and f_T.

(b) The h-parameters of a transistor at $I_c = 8mA$, $V_{CE} = 10v$, and at room temperature are $h_{ie} = 1K\Omega$, $h_{oe} = 2 \times 10^{-5}$ A/V, $h_{fe} = 50$, $h_{re} = 2.5 \times 10^{-4}$. At the same operating point, $f_T = 60$ MHz, and $C_{ob} = 2PF$. Compute the values of hybrid - π parameters. [6+10]

3. (a) Derive the relation between f_2 and f_2n when such, n-identical amplifier stages are cascaded.
   (b) Draw High frequency model of an RC coupled amplifier, and derive the expression for voltage gain. [8+8]

4. (a) Draw a simple series fed class A Amplifier circuit and derive a relationship for output power in terms of load resistance R_L.
   (b) Sketch the output waveforms for class A, class B and class C with respect to conduction angle. [8+8]

5. (a) What is thermal resistance? What is the unit of thermal resistance.
   (b) Derive a relation to prove that the effective surface area of the transistor case could be increased, the resistance of heat flow could be decreased. [8+8]

6. (a) Mention the three methods of stabilization of the double-tuned transformer coupled amplifier circuit performance against the feedback path through the parasitic capacity between input and output and also mention the reasons for neutralization schemes.
   (b) Mention the frequency ranges of application of the double tuned amplifiers with neutralization schemes
   (c) Explain the method of adjusting the amplifiers for stabilization of the responses. [10+4+4]

7. (a) With reference to voltage regulators discuss about
      i. Output resistance
      ii. Load regulation
      iii. Line regulation
   (b) Explain the limitations of unregulated power supplies. To derive regulated DC output from AC mains, what are the important building blocks required. Explain about each block. [9+7]

8. (a) Draw the circuit of 7805 voltage regulator IC and explain its working.
   (b) Using 7805 IC voltage regulator, design current source to deliver 0.25A current to 48 ohms, 10 watts load. [8+8]

⋆ ⋆ ⋆ ⋆ ⋆

II B.Tech. I Semester Regular Examinations, November -2005
ELECTRONIC CIRCUITS ANALYSIS
(Electronics & Communication Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Draw ac equivalent circuit for a CE amplifier
   i. with a bypassed emitter resistor and
   ii. with an unbypassed emitter resistor. Briefly explain each circuit.
   (b) Using the approximate h-parameter model, derive expressions for current gain, input resistance, voltage gain and output admittance of a CE amplifier with a resistor in emitter circuit. [8+8]

2. (a) Draw an approximate equivalent Hybrid π circuit for the calculation of the short-circuit CE current gain and derive the same.
   (b) Derive the frequencies f_β and f_T from the above derivation. [8+8]

3. (a) How is the High frequency gain of a single stage amplifier dependent on frequencies f_1 and f_2.
   (b) In an RC-coupled BJT amplifier, we have R_L=6.8k, effective ac load after C_c is R_{ac}=1k, C_c=1 μ f, CE=24μF, R_E=2.2k, h_{fe} =49, R_S=5k and h_{ie}=1k, find the low frequency cut off point. [8+8]

4. (a) Briefly explain the operation of Transformer coupled class A power amplifier.
   (b) Calculate the effective load resistance R_L seen looking into the primary of a 10:1 transformer connected to an output load of 16 ohms.
   (c) Define conversion efficiency of an amplifier. [6+5+5]

5. (a) Explain the method of determination of total harmonic distortion in push pull power amplifiers using 5 - point analysis.
   (b) Calculate the harmonic distortion components for an output signal, in push pull power amplifiers; having fundamental amplitude of 2.5 Volts, second harmonic amplitude of 0.25 Volts, third harmonic amplitude of 0.1 Volts, fourth harmonic amplitude of 0.05V. Also calculate the total harmonic distortion.

   [8+8]

6. (a) Explain about synchronous tuning of Tuned amplifiers with a block diagram for the system concept.
   (b) Draw the circuit of double-tuned transformer-coupled amplifier. Discuss the nature of responses of the amplifier for different values of KQ=1; KQ>1 and KQ<1. [6+10]

7. (a) List out the advantages of a voltage regulator circuit over unregulated power supply.

   (b) Define the following terms.

      i. Line regulation

      ii. Load regulation

   (c) Draw the circuit of a simple Zener regulator circuit and state how to determine the component value. Explain the operation of the circuit with the help of load characteristics. [6+4+6]

8. (a) Draw the circuit of a half-wave voltage doubler circuit and explain its operation. Sketch the input and output waveforms. What is its output voltage under no load conditions?

   (b) Draw the circuit of 7815 voltage regulator circuit along with unregulated circuit. Derive expression for load current. [8+8]

⋆ ⋆ ⋆ ⋆ ⋆

II B.Tech. I Semester Regular Examinations, November -2005
ELECTRONIC CIRCUITS ANALYSIS
(Electronics & Communication Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Give the typical values for h-parameters of CC configuration. Prove that
$$Y_o = h_o \left(\frac{R_s + R_{i\infty}}{R_s + R_{io}}\right)$$
Where $R_i\infty \equiv R_i$ for $R_L = \infty$, and $R_{io} \equiv R_i$ for $R_L = 0$.
   (b) For a CE amplifier, what is the maximum value of R_s for which R_o differs by not more than 10% of its value for $R_s = 0$? Given $h_{ie} = 1.1K\Omega$, $h_{fe} = 50$, $h_{re} = 2.5 \times 10^{-4}$, $h_{oe} = 25\mu A/V$.
   (c) Derive the condition to obtain A_V=1 in CC single stage amplifier. [6+6+4]

2. (a) Draw the Hybrid-π equivalent circuit of BJT and explain the significance of each parameter. Mention typical values of hybrid-π parameters.
   (b) Given the following transistor measurements made at I_C = 5 mA, V_{CE} 10V and at room temperature h_{fe} = 100, h_{ie}= 600 Ω, [A_{ie}] = 10 at 10MHz, C_e = 3 Pf. Find f_β, f_T, C_e, $r_{b'e}$ and $r_{bb'}$. [8+8]

3. (a) How is the High frequency gain of a single stage amplifier dependent on frequencies f_1 and f_2.
   (b) In an RC-coupled BJT amplifier, we have R_L=6.8k, effective ac load after C_c is R_{ac}=1k, C_c=1 μ f, CE=24μF, R_E=2.2k, h_{fe} =49, R_S=5k and h_{ie}=1k, find the low frequency cut off point. [8+8]

4. (a) Determine the input power, output power and efficiency for a class B power amplifier circuit with V_{cc}=30 V , I_m=1 Amp and R_L=10 Ω.
   (b) Draw the circuit of transformerless pushpull amplifier circuit with loud speaker as the load resistance. Justify the circuit operation with "emitter follower" circuit working. [8+8]

5. (a) Assume a graphical representation of a distorted output signal of a push pull power amplifier show the fundamental sinusoidal component second harmonic component the third harmonic component on a graph paper to scale.
   (b) Explain 'cross over' distortion in class-B complementary symmetry amplifier. [8+8]

6. (a) Draw the circuit of single tuned amplifier and explain its operation.
   (b) Draw the ideal and actual response characteristics of single tuned amplifiers
   (c) Discuss the significance of the pass band characteristic of tuned amplifiers when they are used in Radio receivers. [6+6+4]

7. (a) Define the following terms.
   i. Load regulation
   ii. Line regulation
   iii. Temperature Stability.
   (b) Give the circuit of a short circuit overload protection that is to be provided in a voltage regulator circuit and explain its working. [6+10]

8. (a) Draw the circuit for 7805 voltage regulator along with unregulated power supply and explain its working.
   (b) Explain how 78XX can be used as a current source. Draw the circuit and explain. [8+8]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: RR210401 **Set No.4**

II B.Tech. I Semester Regular Examinations, November -2005
ELECTRONIC CIRCUITS ANALYSIS
(Electronics & Communication Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) The CB amplifier circuit is shown in figure3.

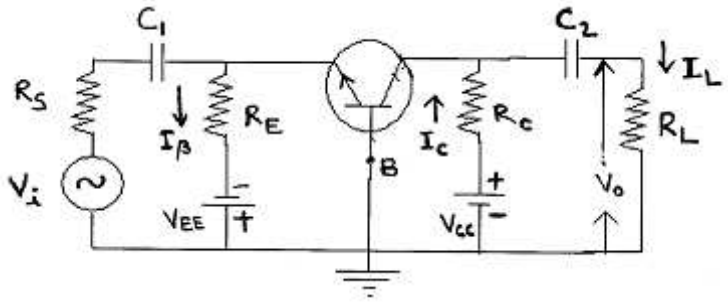

Figure 3:

Derive the expression for A_i, R_i, A_V and R_o.

(b) Calculate A_i,R_i,A_v and R_o for the above CB amplifier, with R_L=5k, R_S=500 ohms, h_{fe}=50, h_{ie}=1k, $h_{oe} = 50k$, $R_E = 10k$ and $R_e = 10k$ [8+8]

2. (a) Define f_β and f_T and derive the relation between f_β and f_T.

(b) The h-parameters of a transistor at I_c = 8mA, V_{CE} = 10v, and at room temperature are h_{ie} = 1KΩ , h_{oe} = 2 x 10^{-5} A/V, h_{fe} = 50, h_{re} = 2.5 x 10^{-4}. At the same operating point, f_T = 60 MHz, and C_{ob} = 2PF. Compute the values of hybrid - π parameters. [6+10]

3. (a) Obtain the theoretical expressions for f_1n and f_2n when n-stages of identical amplifiers are cascaded.

(b) For a given transistor (BJT), h_{fe} = 100. f_B = 5 KHzs. Determine the Band-width of the transistor. If the lower cut off frequency f_1 = 100 Hzs and upper cut off frequency f_2 = 100 KHzs, then determine the midband frequency f_0 of the amplifier circuit. [10+6]

4. (a) Show that in the case of series fed class A power amplifiers, maximum theoretical efficiency is 25%.

(b) Show that the even harmonics are eliminated in class B pushpull configuration.

[8+8]

5. (a) Draw the complementary - symmetry class-B power amplifier circuit with single power supply and explain its working .

(b) In complementary - symmetry class-B power amplifier circuit, V_{CC}=25 Volts; R_L=16Ω and I_{max}=2 Amps. Determine the input power, output power and efficiency. [8+8]

6. The schematic circuit diagram of a basic class-C tuned amplifier is shown in the following figure4.

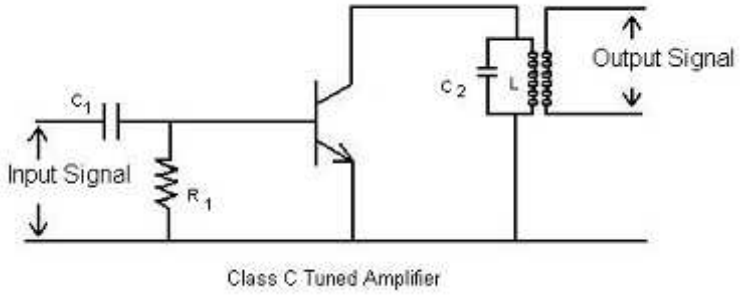

Figure 4:

(a) Explain the mechanism of dynamic d.c. bias to the transistor

(b) Draw the various signal waveforms in the stage.

(c) Explain how the conversion of d.c power to a.c signal power is much more efficient in class-C operation than that in either class-A or class-B operation of the amplifier [5+5+6]

7. (a) Draw and explain a series voltage regulated power supply. Calculate stability factor and output resistance.

(b) What are the merits and limitations of series regulators? [8+8]

8. (a) Draw the circuit of a half-wave voltage doubler circuit and explain its operation. Sketch the input and output waveforms. What is its output voltage under no load conditions?

(b) Draw the circuit of 7815 voltage regulator circuit along with unregulated circuit. Derive expression for load current. [8+8]

⋆ ⋆ ⋆ ⋆ ⋆