Code: 9A04402

1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ELECTRONIC CIRCUIT ANALYSIS

(Common to EIE, E,Con.E and ECE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) What are the different types of distribution in amplifier? Explain each.
(b) By using Hybrid model derive performance characteristics for CB transistor amplifier.

2 Draw the circuit diagram of two stage RC-coupled transistor amplifier. Explain operation and calculate the mid and low frequency ranges.

3 (a) What is miller's theory? Derive millers' output capacitance using millers' effect capacitance.
(b) The input power to a device is 10000 W at a voltage of 1000 V. The output power is 500 W and output impendence is 20 Ω.
(i) Find the power gain in decibels.
(ii) Find the voltage gain in decibels.

4 (a) Explain the terms "impedance matching" and "cross-over distortion".
(b) Explain why the complimentary symmetry power amplifier has become more popular in modern circuits.

5 (a) Draw the equivalent circuit of a capacitance coupled single tuned amplifier and derive the equation for voltage gain.
(b) Calculate the maximum bandwidth of a cascaded single-tuned amplifier with a gain of 43.4 dB, given gm = 2 m A/v and C = 300 pF.

6 Explain the principle of stagger tuning technique of transformer-coupled amplifier that is used to obtain band pass characteristic with pass band of 10 KHz.

7 With reference to voltage regulators discuss about:
(a) Output resistance.
(b) Load regulation.
(c) Line regulation.
(d) Stability factor.
(e) Temperature co-efficient.
(f) Ripple regulation.

8 (a) List out the important features of 3-terminal regulators.
(b) What are the limitations of linear regulators over switched mode power supplies?
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Code: 9A04402 **2**

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ELECTRONIC CIRCUIT ANALYSIS

(Common to EIE, E,Con.E and ECE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Draw the circuit of an emitter follower and its equivalent circuit. List out its characteristics.
(b) The h-parameters of the transistor used in CE amplifier are h_{fe} = 50, h_{ie} = 1.1 K, h_{re} = 2.5 x 10^{-4}, h_{oe} = 24 $\mu A/V$. Find out current gain and voltage gain with and without source resistance, input and output impedances, given that R_L = 10 K and R_S = 1 K.

2 Draw the circuit diagram of two stages RC coupled transistor amplifier. Explain operation. Calculate the mid frequency range and low frequency range.

3 (a) Derive the expression for CE short circuit current gain and explain the hybrid π model.
(b) The low frequency parameters of a transistor are given below. V_{cc} = 5 V, $I_c = 10\ MA$, $h_{ie} = 500\ \Omega$, h_{oe} = 4 × 10^5 A/V, h_{fe} = 10^4, f_p = 50 MHz, C_{ob} = 3 pf.
Compute the values of all hybrid π parameters.

4 (a) What are the two disadvantages of push pull amplifier?
(b) Give the schematic of class B push pull amplifier with complimentary symmetry and explain its working.

5 (a) State the functions and frequency range of operations of tuned amplifiers with relevant reasons.
(b) Draw the circuit of typical single tuned RF amplifier stage employing a transistor. Explain its operation. If the tuned circuit contains L = 200 micro Henry, S_C = 120 pF and R_L = 5 kΩ, calculate its bandwidth.

6 Draw the circuit of a class C – tuned amplifier and explain its operation. Derive the efficiency of the amplifier is 100% making necessary assumption.

7 (a) Explain the need for voltage regulation?
(b) What is meant by voltage multiplier? List out the names of 4 different multipliers. Explain their working.

8 (a) What are the limitations of 3-terminal regulators?
(b) Design an adjustable voltage source using LM 317 for the following specifications :
$V_0 = 9$ and 15 v; $I_0 = 1\ A$.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ELECTRONIC CIRCUIT ANALYSIS

(Common to EIE, E,Con.E and ECE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Draw the small signal model of CE amplifier and derive the expression for it's A_I, A_V, R_i and R_0.
(b) For the emitter follower with $R_S = 500\ \Omega$ and $R_L = 5\ k\Omega$, Calculate A_I, A_v, A_{vs} and R_0. Assume h_{fe} = 50, h_{ie} = 1 kΩ, h_{oe} = 25 mA/V.

2 (a) Describe the operation of transformer coupled amplifier and also derive the expression for its current gain.
(b) With relevant circuit explain the different coupling schemes used in amplifiers.

3 (a) Describe the emitter follower at high frequency and also derive the equation for higher cutoff frequency.
(b) With hybrid π equivalent circuit, derive the expressions for hybrid conductances.

4 (a) Distinguish between cross-over distribution and harmonic distortion. How they can be eliminated?
(b) Determine the component values of class A series feed amplifier to deliver 75 mW of output power to a load of 4 ohm V_{CC} = 16 V. At the operating point $I_B = 200$ micro Amp, P_o(max) = 200 mW.

5 (a) Draw the circuit of double-tuned transformer coupled amplifier. Discuss the nature of the response of the amplifier for different values $kQ = 1;\ kQ > 1\ and\ kQ < 1$.
(b) How many stages are required to obtain gain of A = 100 using a tuned amplifier with BW of 500 KHz at f_O = 10 MHz. C = 100 pF and gm = 2 mA/V.

6 (a) Explain the method of adjusting the amplifiers for stabilization of the response.
(b) Explain the low frequency compensation technique to increase the BW of an amplifier.

7 (a) List out different types of voltage regulators. What are the advantages and disadvantages of each type?
(b) A certain voltage doubler has 20 V rms at its input. What is the output voltage? Sketch the circuit indicating the input terminals and PIV rating of the diode.

8 (a) Draw the circuit diagram of a 3-terminal regulator as a current source and explain its operation.
(b) Design a voltage regulator using 723 to given an output voltage of 5 V at 0.1 A current. V_i = 10 V and V_{SC} = 0.65 V.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ELECTRONIC CIRCUIT ANALYSIS

(Common to EIE, E,Con.E and ECE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Draw the small signal hybrid model of CB amplifier and derive and expression for its A_V, A_i, R_j and R_0.
(b) The h-parameters of CE amplifier are h_{ie} = 1100 Ω, h_{fe} = 50, h_{re} = 2.5 × 10^4, h_{oe} = 24 μA/v and R_S = 1 kΩ, R_L = 10 kΩ. Find the current and voltage gain, (with and without source resistance) input & output impedances.

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) If four identical amplifiers are cascaded each having $f_L = 100$ Hz, determine the overall lower 3 dB frequency. Assume non interacting stages.
(c) Write a short note on Gain-Band width product of amplifiers.

3 (a) Derive all components in the hybrid π model in terms of h parameters in CE configuration.
(b) Describe the emitter follower at high frequency and also derive the equation for higher cutoff frequency.

4 (a) Compare series fed and transformer coupled class A power amplifiers.
(b) Draw the circuit of transformer coupled amplifier and explain the operation graphically.

5 (a) Draw a simple BJT tuned amplifier circuit and its ideal response characteristic.
(b) Calculate the resonant frequency, BW and Q of the tuned transformer amplifier with R_L = 10 kΩ, C = 30 pF and L = 10 mH and turns ratio = 10.

6 (a) What are the main advantages of class-C RF amplifier and explain its operation with necessary waveforms?
(b) Mention the 3-methods of stabilization of double-tuned transformer coupled amplifier circuit performance against the feedback path through the parasitic capacity between input and output and also mention reasons for neutralization schemes.

7 (a) 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.
(b) A certain voltage doubler has 20 V rms at its input. What is the output voltage? Sketch the circuit indicating the input terminals and PIV rating of the diode for (i) Voltage Tripler and (ii) Quadrupler.

8 (a) Draw the circuit of 7805 voltage regulator and explain its operations.
(b) 7824 regulator IC can deliver a maximum current of 700 mA. Design a circuit using 7824 to deliver a current of 3 A.

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