CBCS Scheme

Fifth semester B.E. Degree Examination
Analog Electronic Circuits– Model paper

Time : 3 hrs **Max. Marks:100**

Note: Answer FIVE full questions, choosing one full question from each module

Module – 1

1. a) Explain with the help of a neat circuit diagram the operation of a double ended clipping. 6M

   b) A Voltage divider bias circuit has R_1 = 47 kΩ, R_2 = 10 kΩ, R_c = 2.2 kΩ, R_E = 560Ω, V_{cc} = 14v. The silicon transistor used has β of 100. Determine the Q-point and S_{ICO} for the circuit. 8M

   c) Explain the various time components involved in practical transistor switching. 6M

OR

2. a) What is a clamping circuit? Analyze the circuit given in Fig Q2a. & draw the output waveform.

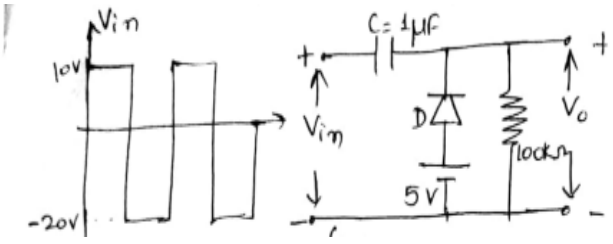

Fig. Q2a 8M

   b) For the collector feedback biasing circuit given in fig Q2b determine the Q point and S_{IXO}. 8M

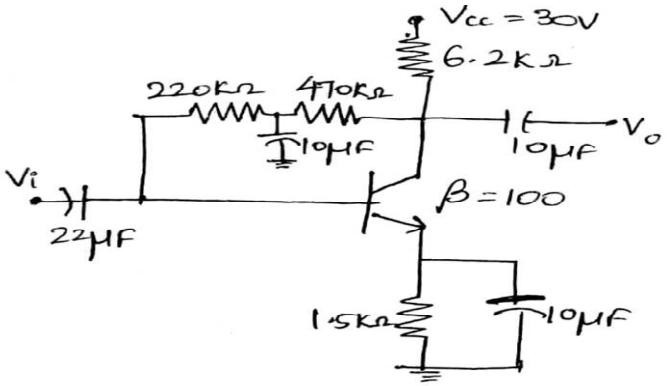

Fig. Q2b

c) Derive the expression for S_{ICO} for a fixed bias CE amplifier circuit. 4M

Module – 2

3. a) With the help of h-parameter model deduce an expression for voltage gain, input impedance and output impedance for an voltage divider biased amplifier with R_E un-bypassed. Discuss the significance of un-bypassing R_E 8M

   b) A transistor in CE mode has h_{ie} = 1100Ω, h_{re} = $2.5x10^{-4,}$ h_{fe} = 100, h_{oe} = 25μA/V. Find Voltage gain, input impedance, output impedance and output impedance. Take R_L = Rs = 1KΩ. 8M

   c) A transistor in CE mode has h-parameter h_{ie} = 1100Ω, h_{re} = $2.5x10^{-4,}$ h_{fe} = 100, h_{oe} = 25μA/V. Determine the equivalent CB parameters. 4M

OR

4. a) Derive expression for input impedance, voltage gain and output impedance for an Emitter follower circuit using h-parameter model for the transistor. 6M

   b) A Voltage divider bias circuit has R_1 = 47 kΩ, R_2 = 10 kΩ, R_c = 2.2 kΩ, R_E = 560Ω, V_{cc} = 14v. Assuming R_E is bypassed determine voltage gain, input impedance and output impedance. Take the h-parameters of the transistor to be h_{ie} = 1100Ω, h_{fe} = 100, h_{oe} = 25μA/V. 8M

   c) State and prove millers theorem. 6M

Module – 3

5. a) What is a Darlington pair? Justify why it's called super-β transistor? 6M

   b) Discuss the advantages of using negative feedback. 6M

   c) Derive an expression for voltage gain with feedback and input impedance with feedback for a current series feedback circuit. 8 M

OR

6. a) With the help of a neat circuit diagram explain cascade connection. 6M

   b) What do you understand by positive and negative feedback? Mention the various types of feedback amplifiers. 6M

   c) Determine the voltage gain, input impedance and output impedance with feedback for voltage series feedback having A = -80, Z_{in} = 10kΩ and Z_o = 20kΩ for feedback of i) β = -0.2 ii) β = - 0.6. 8M

Module – 4

7. a) Explain the operation of a Class-B push pull power amplifier. Prove that the maximum efficiency of a class-B configuration is 78.5%. 8M

b) A power amplifier has harmonic distortion D_2 = 0.1, D_3 = 0.02, D_4= 0.01, the fundamental current amplitude is I_1 = 4A and R_L = 8 ohms. Calculate the total harmonic distortion, with and without push pull configuration. 6M

c) With a circuit diagram explain how barkhausen criterion is satisfied in RC phase shift oscillator. Give the expression for frequency of oscillation and the minimum h_{fe} value for sustained oscillation. 6M

OR

8. a) Explain the operation of Class A transformer coupled power amplifier and prove that the maximum efficiency is 50%. 8M

b) Calculate the efficiency of class B push-pull power amplifier for a supply voltage of V_{cc} = 22V driving a 4Ω load with peak output voltages of (i) V_m = 22v (ii) V_m = 20v (iii) V_m = 04v 6M

c) A collpits oscillator has C_1 = 0.01µF, C_2 = 0.01µF and L = 1 mH. Calculate the frequency of oscillation and what should be the minimum gain of the circuit. 6M

Module – 5

9. a) Discuss the construction, working and characteristics of an n-channel JFET. 8M
b) Draw the transfer characteristics for n-channel JFET with Take I_{DSS} = 8mA, V_P = -4v. 4M
c) For the voltage divider biased JFET circuit has R_1 = 3.3MΩ, R_2 = 330kΩ, R_D = 2kΩ and R_S = 1.2kΩ. Take I_{DSS} = 8mA, V_P = -4v. Determine the value of I_{DQ}, V_{GSQ} and V_{DS}. 8M

OR

10. a) Discuss the construction, working and characteristics of an enhancement type MOSFET. 8M
b) With necessary equivalent circuit obtain the expression for voltage gain, input impedance output impedance for a fixed biased CS- JFET amplifier. 8M

c) Draw the transfer characteristics for p-channel JFET with Take I_{DSS} = 8mA, V_P = 4v. 4M