R18

Code No: 153AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, April/May - 2023
ANALOG ELECTRONICS
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
1. Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
2. In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	Sketch a combinational Clipper Circuit.	[2]
b)	Define diffusion and transition capacitance of p-n junction diode.	[3]
c)	Define transconductance g_m and drain resistance of a FET.	[2]
d)	Why the input impedance of FET is higher than BJT?	[3]
e)	What is harmonics distortion in power amplifier?	[2]
f)	What are the advantages of direct coupled amplifiers?	[3]
g)	What are the advantages and disadvantages of Negative feedback in Amplifier?	[2]
h)	Write the equation for frequency of oscillations in RC phase shift Oscillator?	[3]
i)	Define CMRR.	[2]
j)	What are the applications of Op-Amp?	[3]

PART – B

(50 Marks)

2.a) Obtain the expression for Ripple factor for Full Wave Rectifier.
b) Explain the need for biasing in electronic circuits. What are the factors affecting the stability factor. [5+5]

OR

3.a) Obtain the DC conditions for voltage divider bias-circuit for a CE-BJT amplifier and give design constraints along with stability of Q-point.
b) Derive an expression for Voltage gain A_v of small signal CE BJT amplifier. [5+5]

4.a) Explain the construction and operation of Enhancement type Metal Oxide Semiconductor FET with neat diagrams.
b) Draw the small signal AC equivalent circuit of a Common Drain FET amplifier. Derive the expression for voltage gain, input impedance and output impedance. [5+5]

OR

5.a) How MOSFET is used as switch? What are applications of it?
b) Draw the small-signal high-frequency circuit of a Common Source amplifier and derive the expression for voltage gain. [5+5]

6.a) Draw the circuit of a Two stage RC-Coupled Amplifier and explain its working alongwith its advantages.

b) Derive the equation for Power Output and conversion efficiency of a Class A series fed Amplifier. [5+5]

OR

7.a) Derive the expression for voltage gain of a dual input balanced output differentialamplifier.

b) Discuss the operation of a class B power amplifier and derive its maximum power conversion efficiency. [5+5]

8.a) Briefly explain the four basic feedback topologies with necessary block diagram.

b) Explain the working of Colpitt's oscillator and also discuss the drawback of thisoscillator. [5+5]

OR

9.a) Explain the working of a voltage series feedback amplifier with a neat block diagram.Obtain the expressions for gain, input resistance and output resistance with feedback.

b) With a neat diagram explain the working of a Hartley oscillator. [5+5]

10.a) How do the open-loop voltage gain and closed-loop voltage gain of an op-amp differ?What is the limiting value of output voltage of Op Amp Circuit? Justify.

b) Draw the circuit diagram of an ideal differentiator using op-amp with correspondinginput and output waveforms. Why the circuit cannot be recommended for practical use? [5+5]

OR

11.a) Draw the inverting and non-inverting amplifier circuits of OP-AMP in closed loop configuration. Obtain the expressions for the closed loop gain in these circuits.

b) Design a three input summing amplifier using op-amp having resistors with values of 2,3 and 5 respectively for each input. [5+5]

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Code No: 153AC **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, August/September - 2022 ANALOG ELECTRONICS
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions All questions carry equal marks

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1.a) Explain the input and output characteristics of CE configuration and indicate various Regions.
b) For a germanium diode carrying 10mA the required forward bias is about 0.2V. Estimate the reverse saturation current and the bias voltage required for currents of 1mA and 10mA. [10+5]

2.a) Draw the circuit diagram of a full wave rectifier. Explain the operation of the circuit with relevant waveforms?
b) Discuss the h parameter equivalent circuit for a CE amplifier and derive the expressions for A_v and A_I. [8+7]

3.a) Explain the small signal model of CD MOSFET amplifier? Also derive the expression for amplification factor?
b) Draw and explain the drain characteristics of enhancement MOSFET. [10+5]

4.a) Explain the working of common emitter RC coupled amplifier.
b) Explain the operation of transformer coupled class-A power amplifier. [7+8]

5.a) Derive the voltage gain for balanced output differential amplifier.
b) Explain the operation of class-C power amplifier with neat circuit diagram. [7+8]

6.a) Draw the circuit of voltage series feedback amplifier and derive the expressions for input and output resistances.
b) Show that the gain of wein bridge oscillator must be atleast three for the oscillations to occur. [8+7]

7.a) The gain of an amplifier is decreased to 1000 with negative feedback from its gain of 5000. Calculate the feedback factor and the amount of negative feedback in dBs.
b) Show that gain of an inverting amplifier is $-R_f/R_i$.
c) Define the terms input offset current, slew rate and output offset voltage. [4+5+6]

8.a) Construct an op-amp differentiator circuit and explain.
b) Explain square wave generator using op-amp. [7+8]

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Code No: 153AC **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year I Semester Examinations, March - 2022

ANALOG ELECTRONICS

(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions All questions carry equal marks

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1.a) How does the reverse saturation current of a diode and voltage varies with temperature? Explain.

b) Derive the expressions for the following parameters of the half wave rectifier circuit: i) Average DC current ii) RMS value of current iii) Rectifier efficiency. [6+9]

2.a) Discuss the self bias circuit and derive the expression for S?

b) Explain the drain characteristics of depletion MOSFET. [7+8]

3.a) Explain the small signal model of CS MOSFET amplifier. Also derive the expression for amplification factor.

b) Write short note on MOSFET as a resistor. [10+5]

4.a) Explain the working of common emitter direct coupled amplifier.

b) Prove that class B push pull amplifier efficiency is 78.5%. [7+8]

5.a) Derive the voltage gain for unbalanced output differential amplifier.

b) Explain the operation direct coupled class-A power amplifier. [7+8]

6.a) Draw the circuit of current series feedback amplifier and derive the expressions for inputand output resistances.

b) Why are RC oscillators preferred for the generation of low frequencies? [10+5]

7.a) Calculate the gain, input impedance and output impedance of voltage series feedback amplifier having A = -300, R_i =50KΩ and $\propto$ = -1/20.

b) Explain non inverting op-amp circuit. [7+8]

8.a) Construct an op-amp integrator circuit to and explain.

b) Explain differential amplifier using one op-amp. [8+7]

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Code No: 153AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, March - 2021
ANALOG ELECTRONICS
(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any five questions All questions carry equal marks

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1.a) What is PN junction diode? Explain the working of PN junction under forward biasand reverse bias with neat diagram.
b) Explain the operation of a negative clipper with neat sketches. [10+5]

2.a) Draw the input and output characteristics of a NPN transistor in CB configuration andexplain.
b) Compare Half Wave and Full Wave Rectifiers. [10+5]

3.a) Draw the high frequency equivalent circuit of CS amplifier and derive the expressions forvoltage gain, input and output impedance.
b) Discuss MOSFET as a switch. [10+5]

4.a) Draw the circuit diagram of transformer coupled class-A power amplifier and explain its operation. Also derive the expression of conversion efficiency.
b) What are the limitations of single stage amplifiers and how are they overcome inmultistage amplifiers? [10+5]

5.a) Draw the circuit diagram of Hartley oscillator, derive the expression for frequency of oscillation.
b) For the voltage series feedback amplifier, derive the expression for gain, inputresistance. [8+7]

6.a) Explain different coupling schemes used in multistage amplifiers with their frequency response.
b) Calculate the gain, input impedance, output impedance of voltage series feedbackamplifier having A=-300, Ri=1.5K, Ro=50K and β=-1/20. [10+5]

7.a) Explain the following in detail:
i) Input offset voltage ii) Input offset current iii) CMRR iv) Slew Rate.
b) With the help of a circuit diagram explain the functioning of square wave generator. [8+7]

8.a) List the characteristics of an Ideal operational amplifier.
b) Derive the transconductance g_m and drain resistance r_d of Field Effect Transistorsmall signal model. [6+9]

Code No: 153AC **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, October - 2020
ANALOG ELECTRONICS
(Electrical and Electronics Engineering)

Time: 2 hours **Max. Marks: 75**

Answer any five questions All questions carry equal marks

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1.a) Explain DC load line and Q point for any transistor configuration. Also state thenecessity of biasing and list biasing methods for transistor.
b) Explain positive and negative clippers. [8+7]

2.a) Draw and explain output characteristics of CE configuration.
b) Explain with neat figures the function of a half wave rectifier. [7+8]

3.a) Explain the working of N-channel E-MOSFET.
b) Explain about MOSFET CG amplifier and derive the expression for gain, inputimpedance output impedance. [6+9]

4.a) Describe the small signal equivalent circuit of the MOSFET and determine the values ofSmall signal parameters.
b) Compare in detail about CD and CG amplifier. [9+6]

5.a) For a class B power amplifier using a supply voltage of V_{cc} = 12V, and driving a load of80Ω, Determine the maximum load power, DC input power and collector efficiency.
b) Discuss the need for cascading amplifiers. [9+6]

6.a) Derive an equation for power output and conversion efficiency of a class A Directcoupled amplifier.
b) Define Coupling. Describe different types of coupling multistage amplifiers in detail. [8+7]

7.a) Explain current series feedback amplifier.
b) The RC network of a Wein bridge oscillator consists of resistors and capacitors of values R_1=R_2=220 kΩ and C_1=C_2=250 PF. Determine the frequency of oscillations. [10+5]

8.a) Discuss the functioning of a practical integrator and derive the necessary expression.
b) Derive the expression for voltage gain of a non-inverting amplifier. [8+7]

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Code No: 133AB **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, May/June - 2019
ANALOG ELECTRONICS
(Common to ECE, ETM)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

What are the types of distortion in amplifiers? [2]
b) Write the difference between cascade and cascode amplifiers? [3]
c) Define Gain Bandwidth Product. [2]
d) What are the elements in the hybrid π model? [3]
e) Distinguish between enhance mode and depletion mode of MOSFET. [2]
f) What is folded Cascode amplifier? [3]
g) What is meant by positive and negative feedback? [2]
h) What are the conditions for oscillation? [3]
i) Compare class A and class B amplifier. [2]
j) Define Q-Factor in tuned amplifiers. [3]

PART-B

(50 Marks)

2. Draw the h-parameter equivalent circuit for a typical common emitter amplifier and derive expression for A_i, A_V, R_i and R_O. [10]

OR

3.a) For any transistor amplifier, Prove that $R_i = (h_i/1-h_rA_v)$
b) Draw the circuit diagram of RC coupled amplifier. Explain the operation and its frequency response. [5+5]

4. Derive the expression for the CE short circuit gain A_i as a function of frequency using hybrid – π model. [10]

OR

5.a) In hybrid 'Pi' model of a transistor at high frequencies, show that the g_m is proportional to collector current.
b) Mention important characteristics of CE amplifier. [5+5]

6.a) With the help of a neat diagram explain the operation of an n-channel enhancement type MOSFET.
b) Explain how you set a Q point in a self- biased JFET. [5+5]

OR

7.a) Derive the relation between u and g_m of JFET amplifier.
b) A JFET has a drain current of 6mA. If I_{DSS} = 12mA and V_P = 4V find:
i) V_{GS}
ii) For an n-channel amplifier FET I_{DSS}=5.8 mA. V_P=-3V and V_{GS}=-2V find I_D and g_m.

8.a) An amplifier has a midband gain of 125 and a bandwidth of 250KHz. If 4% negative feedback is introduced, find the new bandwidth and gain.

b) Derive an expression for frequency of oscillations of a RC phase shift oscillators. [5+5]

OR

9.a) What are the advantages and disadvantages of the introduction of negative feedback in amplifiers? Explain.

b) Draw and explain the operation of Colpitt's oscillator. [5+5]

10. Draw the circuit diagram of class B push pull amplifier and explain its operation. Also prove that its conversion efficiency is 78.5%. [10]

OR

11.a) Explain the principle of operation of class-AB power amplifier with a neat sketch.

b) Discuss in detail about frequency response of tuned amplifiers. [5+5]

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Code No: 133AB **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2018
ANALOG ELECTRONICS
(Common to ECE, ETM)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) What are the types of distortion in amplifiers. [2]
b) Classify the amplifiers according to the method of coupling. [3]
c) Why the h parameter model is not suitable to analyze transistor at high frequencies. [2]
d) What are the elements in the Hybrid 'Π' model? [3]
e) What is cascode amplifier? [2]
f) State the advantages and disadvantages of the source follower. [3]
g) What is meant by positive and negative feedback? [2]
h) State the Barkhausen criterion for oscillations. [3]
i) What are the requirements of a tuned amplifier? [2]
j) Give the definition of power amplifier. Also list the types in it based on location of Q point. [3]

PART-B

(50 Marks)

2. Draw the h-parameter equivalent circuit for a typical common emitter amplifier and derive expression for A_i, A_v, R_i and R_o [10]

OR

3. Draw simplified h parameter equivalent circuit and calculate A_i, A_v, A_{vs}, R_i' and R_o' for the cascode circuit shown in figure 1. Assume that transistors are identical with h_{fe}=10, h_{ie}=2 KΩ, h_{re}=h_{oe}=0. [10]

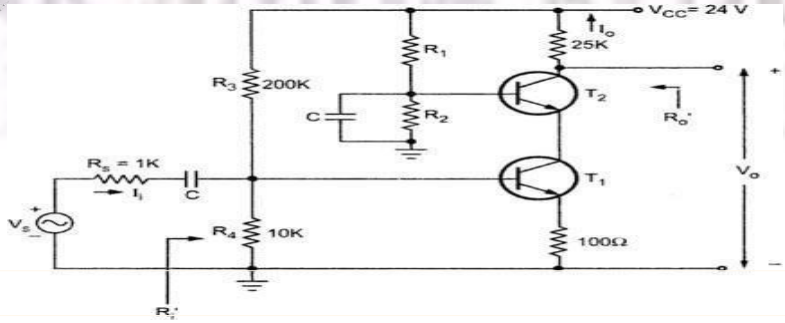


Figure: 1

4.a) Derive an expression for current gain with resistive load.

b) The hybrid- Π parameters of the transistor used in the circuit shown in figure 2 are g_m= 50 mA/V,$r_{b'e}$=1 KΩ, $r_{b'c}$=4 MΩ , r_{ce}=80 KΩ, C_c=3 pF, C_e=100 pF and $r_{bb'}$=100 Ω, find (i) upper 3 dB frequency of current gain (ii) the Magnitude of voltage gain at $A_{vs}=V_0/V_s$ at frequency of part (i) [5+5]

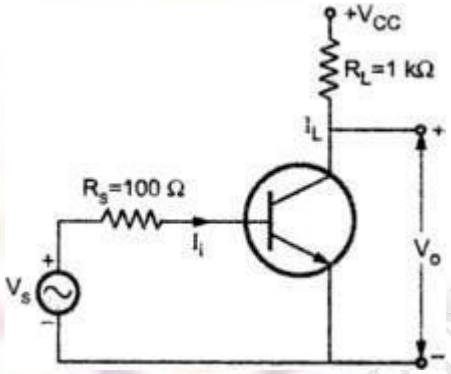


Figure: 2

OR

A single stage CE amplifier is measured to have a voltage gain bandwidth f_H of 5 MHz with R_L=500 Ω. Assume h_{fe}=100, g_m=100 mA/V, $r_{bb'}$=100Ω, C_C=1pF and f_T=400 MHz. (i) find the value of source resistance that will give the required bandwidth. (ii) with the value of Rs found in (i), find the mid band voltage gain V_0/V_s.

b) In hybrid 'pi' model of a transistor at high frequencies, show that the g_m is proportional to the collector current. [5+5]

6.a) Discuss the input and output characteristics of a folded cascade amplifier with NMOS input.

b) Derive expression for A_v and R_o for common gate amplifier. [5+5]

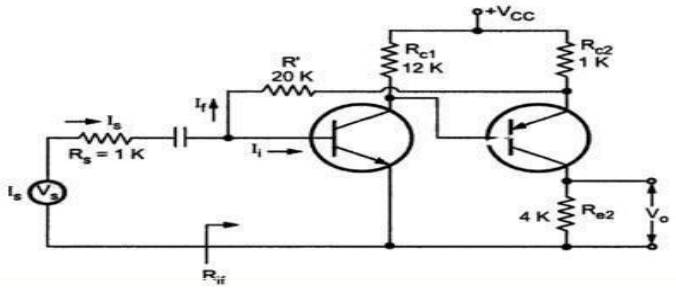
OR

7.a) Draw and explain the CS stage with diode connected load.

b) Discuss the MOSFET characteristics in depletion mode. [5+5]

8.a) Show that for a current series feedback amplifier the input and output resistances are increased by a factor if (1+Aβ) with feedback.

b) Identify the topology of feedback in the circuit of figure 3 giving Justification. Two transistors are identical with h_{ie}=2 K and h_{fe}=100. Calculate i)R_{if} (ii) A_{if} (iii)A_{vf} [5+5]



OR

9.a) Explain the principle of operation of the wein bridge oscillator.
b) Mention the features and advantages of the crystal oscillator. [5+5]

10.a) Show that the transformer coupled class A amplifier maximum efficiency is 50%.
b) Compare the push-pull class B and complementary symmetry class B amplifier. [5+5]

OR

11.a) A tuned amplifier is required to have a voltage gain of 30 at 10.7 MHz with 200 KHz BW. An FET with g_m=5 mA/V and r_d=100 KΩ is available. Calculate the values of tank circuit elements.
b) Draw and explain the frequency response of tuned amplifier. [5+5]

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Code No: 133AB **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, April/May - 2018
ANALOG ELECTRONICS
(Electronics and Communication Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1. a) Write thecharacteristic of CE amplifier. [2]
   b) Discuss the need of Darlington pair circuit. [3]
   c) What is meant by gain bandwidth product? [2]
   d) Short circuit CE current gain of a transistor is 25 at a frequency of 2 MHz. if f_β=200 kHz calculate f_T, h_{fe} and $|A_i|$ at frequency of 10 MHz and 100 MHz. [3]
   e) State the advantages and disadvantages of cascode stage. [2]
   f) What is the folded cascode amplifier? Discuss. [3]
   g) Classify the various negative feedback amplifers. [2]
   h) For a phase shift oscillator, the feedback network uses R=6 KΩ and C=1500 pF. The transistorized amplifier used, has a collector resistance of 18 KΩ. Calculate the frequency of oscillation and minimum value of h_{fe} of the transistor. [3]
   i) What is the use of the heat sink in power amplifiers? [2]
   j) What is meant by loaded and unloaded Q. [3]

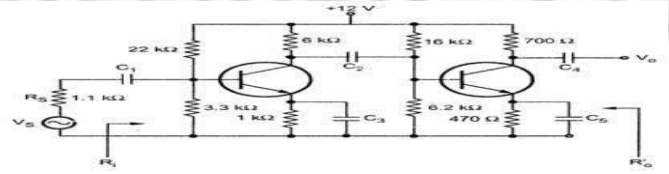
PART-B

(50 Marks)

2. a) Discuss the low frequency response of BJT amplifier and the effect of coupling and bypass capacitors.
   b) Explain the different coupling schemes used in amplifiers. [5+5]

OR

3. For a two stage amplifier shown in figure 1 calculate (a)Av (b) Avs, (c) Ri (d) Ro Neglect the effect of all capacitances, Assume hat the both the transistors are identical with following parameters. h_{fe}=50, h_{ie}=1.1KΩ, h_{re}= 2.5×10^{-4} h_{oe}=24×10^{-6} A/V. [10]



4.a) For a single stage CE amplifier whose hybrid Π parameters are given below. What value of Rs will give 3 dB frequency $f_{H'}$ which is half the value obtained with R_s=0. Hybrid 'Π' parameters are: g_m=50 mA/V, $r_{bb'}$=100Ω, $r_{b'e}$=1 K , C_C=3 pF, C_e=100 pF.

b) A BJT has the following parameters measured at I_c=1 mA, h_{ie}=3 K Ω, h_{fe}=100, f_T=4 MHz, C_C=2pF and C_e=18 pF. Find $r_{b'e}$, $r_{bb'}$, g_m and f_H for R_L=1 KΩ. [5+5]

OR

5. a) Prove that $h_{fe}=g_m r_{b'e}$.

b) Derive the expression for CE short circuit current gain A_i as a function of frequency. [4+6]

6. a) Compare the performance of BJT and FET amplifiers.

b) Draw and explain the CS amplifier with current source load. Derive an expression for A_v. [5+5]

OR

7.a) Draw and explain the MOS small signal model.

b) Discuss the analysis of CD JFET amplifier. [5+5]

8.a) What are the advantages and disadvantages of negative amplifier in detail?

b) For the given circuit shown in figure 2, calculate R_{mf}, A_{vf} and R_{if}. The transistors with parameters h_{ie}=2 K, h_{fe}=100. Neglect h_{oe} and h_{re}. [5+5]

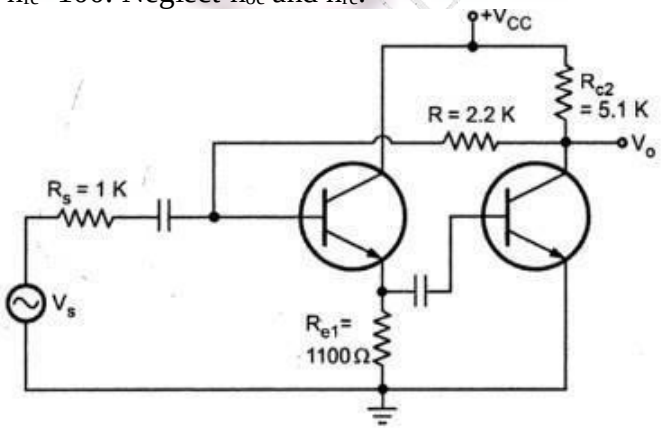


Figure: 2

OR

In a colpitt's oscillator, the values of the inductors and capacitors in the tank circuit are L=40mH, C_1=100 pF , C_2=500 pF .

i) Find the frequency of oscillation.

ii) if the output voltage is 10 V, find the feedback voltage.

iii) find the minimum gain , if the frequency is changed by changing 'L' alone.

iv)find the value of c_1, for a gain of 10.

v)also find the new frequency of oscillation.

b) Compare the RC phase shift and wein bridge oscillators. [5+5]

10.a) Explain the principle of operation of class C amplifier.

b) Design a class B power amplifier to deliver 25 W to a load resistors R_L=8 Ω using transformer coupling, V_m=V_{CC}=25 V. Assume reasonable data where ever necessary.

[5+5]

OR

An RF tuned voltage amplifier using FET with r_d=100 KΩ and g_m=500μs has tuned circuit, consisting of L=2.5mH and C=200 pF as its load. At its resonant frequency, the circuit offers an equivalent shunt resistance of 100 KΩ. For the amplifier, determine the (i) the resonant gain (ii) the effective Q and (iii) the bandwidth.

b) Draw and explain the double tuned amplifier with the help of the frequency response.

[5+5]

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R16

Code No: 133AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November/December - 2017
ANALOG ELECTRONICS
(Electronics and Communication Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

1.a) What is Bias? What is the need for biasing? [2]
b) How does the input impedance increases due to darlington connection? [3]
c) Define Gain bandwidth product. [2]
d) Mention important characteristics of CE amplifier. [3]
e) Write the expression for basic current equation in MOSFET. [2]
f) Compare the AC circuit characteristics of the CS, CG and CD. [3]
g) List the four basic feedback topologies. [2]
h) State Barkhausen criterion for sustained oscillation. What will happen to the oscillation if the magnitude of the loop gain is greater than unity? [3]
i) Define Harmonic distortion and intermodulation distortion. [2]
j) What are the advantages of push pull amplifiers? [3]

PART-B

(50 Marks)

2.a) In a single stage CB – amplifier circuit, R_E = 20K, R_c = 10K, V_{EE} = -20V, V_{cc} = 20V, R_L = 10K. Find out R_i, R_o , A_i, A_v and power gain in dB.
b) Draw the circuit of two stage R-C coupled transistor amplifier and explain the working of it. [6+4]

OR

3.a) The h-parameters of CE-amplifier are h_{ie} = 1100Ω, h_{re} = 2.5 × 10^{-4} , h_{fe} = 50, h_{oe} 24 μA/V and R_s = 1KΩ, R_L = 10KΩ. Find out current and voltage gains with and without source resistance, input and output impedances.
b) Discuss briefly Cascode amplifier. [6+4]

4. Derive the expression for the CE short circuit current gain Ai as a function of frequency using Hybrid - π model. [10]

OR

5. Define f_β and f_T and derive the relation between f_β and f_T . [10]

6.a) What is square law distortion? What is its effect in FET amplifiers?

b) Draw the small-signal high-frequency circuit of a common source amplifier and derive the expression for voltage gain. [4+6]

OR

7.a) Why self-bias is not suitable for depletion type and enhancement type MOSFET?

b) In a Drain-to-gate bias circuit V_{CD} = 12V, R_d = 2k,R_f = 10m. Calculate V_{GS}, I_D and V_{DS} for $I_{D(ON)}$ = 6mA, $V_{GS(ON)}$ = 8V, $V_{GS(TH)}$=3V. [4+6]

8.a) Explain with the help of mathematical expressions, how the negative feedback in amplifiers increases amplifier bandwidth and reduces distortion in amplifiers.

b) In a transistorized Hartley oscillator the two inductances are 2mH and 20μH while the frequency is to be changed from 950KHZ to 2050KHZ. Calculate the range over which the capacitor is to be varied. [5+5]

OR

9.a) An amplifier circuit has a gain of 60 dB and an output impedance Z_o=10KΩ. It is required to modify its output impedance to 500Ω by applying negative feedback. Calculate the value of the feedback factor. Also find the percentage change in the overall gain, for 10% change in the gain of the internal amplifiers.

b) What are the factors that affect the frequency stability of an oscillator? How frequency stability can be improved in oscillators. [5+5]

10.a) Derive the equation for maximum efficiency of a class A transformer coupled amplifier.

b) Explain the principle of stagger tuning technique of transformer – coupled amplifier that is used to obtain band pass filter characteristic with pass band of 10 KHZ with all necessary diagrams for illustration. [5+5]

OR

11.a) Design a class B power amplifiers to deliver 25w to a load resistor R_L=8ohms, using transformer coupling. V_m=V_{cc}=25V. Assume necessary data.

b) Draw the circuit of double-tuned transformer-coupled amplifier. Discuss the nature ofresponses of the amplifier for different values of KQ=1; KQ>1 and KQ<1. [5+5]

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