Code: 15A04401

R15

B.Tech II Year II Semester (R15) Regular Examinations May/June 2017

ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE and EIE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Identify different types of feedback available.
(b) Write the condition for generating oscillations.
(c) Draw the hybrid equivalent model of CE amplifier.
(d) Mention four h-parameters of CE amplifier.
(e) Identify different types of coupling used in amplifiers.
(f) Write the advantages of multistage amplifier.
(g) Draw the circuit of transformer couple power amplifier.
(h) Mention the efficiency of class-B power amplifier.
(i) List out applications of tuned amplifiers.
(j) Draw the circuit diagram of matched capacitive coupled amplifier.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 Draw the circuit of voltage shunt feedback amplifier and derive the expressions for Av, Ri, Ro.

OR

3 (a) Write the advantages and disadvantages of positive and negative feedback.
(b) Derive the expression for frequency of Wein bridge oscillator.

UNIT – II

4 Explain about Hybrid π capacitance and also briefly discuss miller's theorem.

OR

5 Derive the expressions for hybrid π model parameters g_m, g_{ce}, r_{ce}.

UNIT – III

6 Explain different types of coupling. When two identical stages are cascaded, obtain voltage gain, current gain and power gain.

OR

7 Draw and explain the circuit of cascade amplifier and mention the advantages.

UNIT – IV

8 Draw and explain class-B push pull amplifier.

OR

9 (a) Compare various types of power amplifier.
(b) Write about importance of heat sink in power amplifiers.

UNIT – V

10 Derive the expression for Q factor of double tuned amplifier.

OR

11 Write the effect of cascading single tuned amplifier on bandwidth.

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Code: 15A04401 **R15**

B.Tech II Year II Semester (R15) Supplementary Examinations December 2018

ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE and EIE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

*****

1 Answer the following: (10 X 02 = 20 Marks)

(a) An amplifier with open loop gain Av = 1000±100 is available It is necessary to have an amplifier whose voltage gain values by no more than ± 0.1 percent. Determine the reverse transmission factor (β) of the feedback network used.

(b) What is the condition required for sinusoidal oscillations to be sustained. Also write the expression for frequency of oscillations in RC phase shift oscillator.

(c) A modern bipolar transistor can have C_e = 1pF. If g_m = 50 mA/v. Determine (f_T) for a common emitter amplifier.

(d) What is the relationship between (f_β) and (f_T)?

(e) Distinguish between cascade and cascode amplifiers.

(f) Explain the effect of bypass capacitor in multistage amplifier.

(g) The expression for the efficiency of class B push-pull amplifier is _____ and max efficiency is ____.

(h) Write the expression for total harmonic distortion of an amplifier.

(i) Define stability of tuned amplifier with relevant expression.

(j) What is the effect of Bandwidth in an multistage amplifier?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) Explain the concept of feedback amplifier using block diagram.

(b) An amplifier without feedback given a fundamental output of 36 V with 7 percent (7%) second harmonic distortion when the input in 0.028 V. If 1.2% of the output in feedback into the input in a negative voltage series feedback circuit, what is the output voltage?

OR

3 (a) Derive an expression for oscillating frequency of Wein bridge oscillator and illustrate its operation.

(b) A crystal has the following parameters L = 0.33 H, C = 0.065 pF, C' = 1.0 pF and R = 5.5 kΩ.

(i) Find the series resonant frequency.

(ii) By what percent does the parallel resonant frequency exceed the series resonant frequency?

UNIT – II

4 (a) With the help of hybrid models determine the following high frequency parameters interns of low frequency parameters: (i) Transistor transconductance.

(ii) Input conductance.

(iii) Feedback conductance.

(b) The following transistor measurements made at room temperature:

Ic = 5 mA, V_{CE} = 10 V, h_{fe} = 100, h_{ie} = 600 Ω, C_e = 3 pF, [Aie] = 10 at 10 MHz. find f_β and f_T.

OR

5 Derive an expression for voltage gain, input and output impedances of common drain FET amplifier.

UNIT – III

6 Illustrate the concept of Boot-strap emitter follower with expressions.

OR

7 Describe the two-stage FET amplifier with neat circuit diagram and relevant expression.

Contd. in page 2

UNIT – IV

8 Explain the operation of class-B amplifier with circuit diagram and also derive an expression for maximum efficiency of push-pull class B amplifier.

OR

9 (a) Describe the operation of complementary symmetry push-pull amplifier.

(b) A transistor supplies 0.85 W to a 4K-load. The zero signal dc collector current is 31 mA and the dc collector current with signal is 34 mA. Determine the percent second harmonic distortion.

UNIT – V

10 With neat circuit diagram, describe the operation of capacitance single tuned amplifier.

OR

11 (a) Explain about staggered tuned amplifiers.

(b) Describe briefly the effect of bandwidth of double tuned amplifier, when amplifiers are cascaded.

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Code: 13A04402

R13

B.Tech II Year II Semester (R13) Supplementary Examinations December/January 2015/2016

ELECTRONIC CIRCUITS ANALYSIS & DESIGN

(Common to ECE and EIE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) How are amplifiers classified according to the transistor configuration?

(b) What is the difference between Darlington pair and Cascode amplifier?

(c) Draw the hybrid π equivalent circuit of BJTs.

(d) The input power to a device is 10,000 W at a voltage of 1000 V. The output power is 500 W and the output impedance is 20 Ω. Find the power gain in decibels.

(e) Define positive and negative feedback of the amplifier.

(f) What are the conditions for oscillations?

(g) What is the function of power amplifier?

(h) Why heat sink is necessary in case of power transistor?

(i) What is a tuned amplifier? Mention its advantages and disadvantages.

(j) What is Q factor?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) Draw the circuit of Common Emitter Amplifier and its equivalent circuit. List out its characteristics.

(b) For the emitter follower with R_S = 500 Ω and R_L = 5 kΩ, Calculate A_I, A_V,A_{VS} and R_o. Assume h_{fe} = 50, h_{ie} = 1 kΩ, h_{oe} = 25 mA/V.

OR

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

UNIT – II

4 Derive the expression for CE short circuit current gain and explain the same for resistive load.

OR

5 (a) Explain the effect of Coupling and Bypass Capacitor in CE amplifier.

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

UNIT – III

6 (a) A voltage series negative feedback amplifier has a voltage gain without feedback of A = 500, input resistance R_i = 2 K, output resistance R_o = 15 K and feedback ratio = 0.01. Calculate the voltage gain, input resistance and output resistance of the amplifier with feedback.

(b) Explain the concept of feedback with block diagram.

OR

7 (a) Discuss about amplitude & frequency stability in oscillators.

(b) With neat diagram explain about crystal oscillator.

Contd. in page 2

UNIT – IV

8 (a) Draw the circuit diagram of class-A power amplifier with transformer coupled. Explain operation and calculate the efficiency.

(b) What are the advantages and disadvantages of push pull configuration? Show that in class –B push pull amplifier the maximum conversion efficiency is 78.5%.

OR

9 (a) A transistor in a transformer coupled (class – A) power amplifier has to deliver a maximum of 5 W to a load of 4 Ω. The quiescent point is adjusted for symmetrical swing, and the collector supply voltage is V_{CC} = 20 Volts. Assume V_{min} = 0 volts.

(i) What is the transformer turns ratio?

(ii) What is the peak collector current?

(b) Compare the series fed and transformer coupled class – A power amplifiers. Why is the conversion efficiency doubled in transformer coupled class – A amplifier?

UNIT – V

10 (a) Explain the working of single tuned amplifier. Draw the frequency response

(b) Explain the operation of a double tuned amplifier. Explain the advantages of double tuned circuit over single tuned circuit

OR

11 (a) Explain the effect of cascading single tuned amplifier on band width

(b) Derive the expression for bandwidth in terms of resonant frequency and quality factor in case of double tuned amplifiers.

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Code: 13A04402 **R13**

B.Tech II Year II Semester (R13) Regular Examinations May/June 2015

ELECTRONIC CIRCUITS ANALYSIS & DESIGN

(Common to ECE & EIE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory question)

1 Answer the following: (10 X 02 = 20 Marks)

(a) Voltage gain of a single stage amplifier is 30. Bandwidth is 20 kHz. Two such stages are cascaded. Find the overall voltage gain and bandwidth.

(b) List out the advantages and disadvantages of RC coupled amplifier.

(c) Draw the frequency response of RC coupled amplifier and indicate bandwidth, low, mid and high frequency ranges.

(d) A multistage amplifier is to be constructed using four identical stages, each of which has a lower cutoff frequency 15 Hz and upper cutoff frequency 30 kHz. What will be the lower and upper cutoff frequency of the multistage amplifier?

(e) Draw the equivalent circuit of transconductance amplifier.

(f) An amplifier has a gain of 300, when the -ve feedback is applied gain is reduced to 240. Find feedback factor.

(g) Differentiate between power amplifier and voltage amplifier.

(h) What are the advantages of push pull amplifier configuration?

(i) List out the advantages of tuned circuit.

(j) Distinguish between single tuned and double tuned amplifiers.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) Explain the effect of cascading of amplifiers on bandwidth.

(b) Compare various coupling schemes used in amplifiers.

(OR)

3 (a) Give the analysis of transformer coupled amplifier in mid band region.

(b) Derive the expression for voltage gain and current gain of cascade amplifier.

UNIT – II

4 (a) Draw the small signal simplified hybrid equivalent circuit of an CE amplifier and discuss the effect of bypass capacitor on the frequency response of an amplifier.

(b) Determine the low frequency response of CE amplifier using the following specifications:

$V_{CC} = 10\ V$ $R_C = 2.2\ K\Omega$ $R_E = 1\ K\Omega$

$R_1 = 62\ K\Omega$ $R_2 = 22\ K\Omega$ $R_S = 600\ \Omega$

$C_B = 0.1\ \mu f$ $C_E = 10\ \mu f$ $C_C = 0.1\ \mu f$

$h_{ie} = 1.6\ K\Omega$ $h_{fe} = 99.$

(OR)

5 (a) Draw the hybrid – π model for a transistor in CE configuration and explain the significance of each component in the model.

(b) Explain the variation of hybrid parameters with increasing $|I_C|$, $|V_{CE}|$ and temperature.

UNIT – III

6 (a) What is the effect of –ve feedback on the input impedance of an amplifier?

(b) Derive the expression for frequency of oscillations of RC phase shift oscillator.

(OR)

7 (a) State and explain Barkhausen's criteria.

(b) Explain the working of Hartley oscillator. Also derive the expression for its frequency of oscillations.

UNIT – IV

8 (a) Show the conversion efficiency of transformer coupled class A amplifier is 50%.

(b) Explain the operations of class B push pull amplifier.

(OR)

9 (a) Explain ideal and practical performance of class–D amplifier.

(b) What is cross over distortion? Explain how it can be eliminated.

UNIT – V

10 Explain the operation of a single tuned capacitive coupled amplifier and derive the expression for bandwidth.

(OR)

11 (a) Define resonant frequency and derive an expression for the impedance of tuned circuit.

(b) What are the limitations of single tuned amplifiers?

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Code: 13A04402 **R13**

B.Tech II Year II Semester (R13) Regular & Supplementary Examinations May/June 2016

ELECTRONIC CIRCUITS ANALYSIS & DESIGN

(Common to ECE & EIE)

Time: 3 hours Max. Marks: 70

PART - A

(Compulsory Question)

*****

1 Answer the following: (10 X 02 = 20 Marks)

(a) What is the function of multistage amplifier?

(b) List out the applications of cascade amplifier.

(c) What is the significance of frequency response of BJT amplifier?

(d) Draw the circuit diagram of RC coupled amplifier and give its application.

(e) Explain the concept of negative feedback.

(f) What are the conditions for oscillators?

(g) Compare class C and class D power amplifier.

(h) What are the limitations of push pull amplifier?

(i) What do you understand by the term “Frequency of oscillation”?

(j) Compare the current series and current shunt amplifiers.

PART - B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT - I

2 With a neat diagram, explain in detail about the operation of direct and transformer coupled amplifiers.

OR

3 Explain about various types of distortions in amplifiers and with a neat diagram discuss the analysis of cascade RC coupled BJT amplifier.

UNIT - II

4 Discuss in detail about the hybrid-pi(π) common emitter transistor model with diagrams.

OR

5 Explain in detail about the single state CE transistor amplifier response.

UNIT - III

6 Discuss in detail about voltage series and voltage shunt feedback configuration with diagrams.

OR

7 Derive the expression for frequency of oscillation of Colpitts oscillator and explain its operation.

UNIT - IV

8 Discuss the concept of power transistor heat sinking and amplifier distortion.

OR

9 With respect to any five parameters, compare the transformer coupled class A amplifier and complementing symmetry class-B power amplifier.

UNIT - V

10 Define Q-factor and explain in detail the effect of cascading single tuned amplifiers on bandwidth.

OR

11 Explain the operation and applications of stagger tuned amplifier.

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Code: 13A04402 **R13**

B.Tech II Year II Semester (R13) Supplementary Examinations May/June 2017

ELECTRONIC CIRCUITS ANALYSIS & DESIGN

(Common to ECE & EIE)

Time: 3 hours Max. Marks: 70

PART - A

(Compulsory Question)

*****

1 Answer the following: (10 X 02 = 20 Marks)

(a) What is a cascade amplifier? What is its advantage?

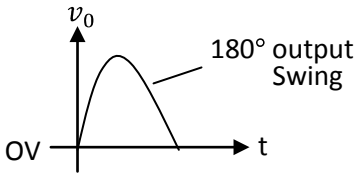
(b) An amplifier consists of 3 identical stages in cascade. The bandwidth of overall amplifier extends from 20 Hz to 20 kHz. Calculate the bandwidth of individual stage.

(c) Draw the small signal equivalent circuit for an emitter follower stage at high frequencies.

(d) State Barkhausen criteria for sustained oscillations.

(e) Distinguish between small signal and large signal amplifiers.

(f) The following is an example of the output swing for a class ------- amplifier. Explain.



(g) Why gain bandwidth product remains constant with the introduction of negative feedback?

(h) Why RC oscillators are not suitable for high frequency applications.

(i) What is the fundamental difference between audio amplifier and tuned amplifier?

(j) What is staggered tuning?

PART - B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT - I

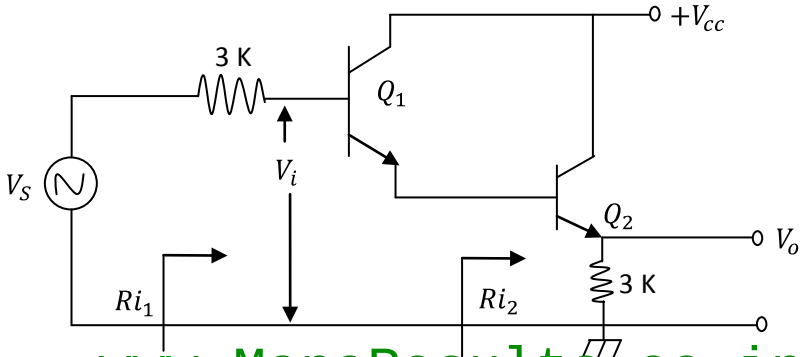
2 (a) Discuss the classification of amplifiers based on frequency range and type of coupling, power delivered and signals handled.

(b) Design a single stage emitter follower having $R_i = 500\ K\Omega$ and $R_o = 20\Omega$. Assume $h_{fe} = 50,\ h_{ie} = 1\ K,$ $h_{oe} = 25\ \mu A/V$.

OR

3 (a) What are the different types of distortions possible in amplifier outputs? Explain.

(b) For the circuit shown in figure below, calculate Ri, Ai, Av and Ro. Assume h_{ie} = 1.1 K, h_{fe} = 50, h_{re} = 2.5 x 10^{-4}, h_{oe} = 25 $\mu A/V$.



Contd. in page 2

UNIT - II

4 (a) Discuss the effect of emitter bypass capacitor and input & output coupling capacitors on the lower cut-off frequency if number of amplifiers are cascaded.

(b) The following low-frequency parameters are known for a given transistor at $I_C = 10\ mA$, $V_{CE} = 10\ V$ and at room temperature, $h_{ie} = 500\Omega$, $h_{oe} = 4 \times 10^{-5}\ A/V$, $h_{fe} = 100$, $h_{re} = 10^{-4}$. At the same operating point, $f_T = 50\ MHz$ and $C_c = 3PF$, compute the values of all the hybrid –π parameters.

OR

5 (a) Define f_α, f_β and f_T and derive the relation between f_β and f_T.

(b) What are the typical values of various components in hybrid – p model? Show that at low frequencies the hybrid – p model with r_{be} and r_{ce} taken as infinite reduces to the approximate CE h – parameter model.

UNIT - III

6 (a) An amplifier with an open loop voltage gain of 1000 delivers 10 W of power output at 10% harmonic distortion when input is 10 mV. If 40dB negative feedback is applied and output power is to remain at 10 W, determine required input signal Vs and second harmonic distortion with feedback.

(b) Draw the circuit diagram of a RC phase shift oscillator using BJT. Derive the expression for frequency of oscillations.

OR

7 (a) Explain effect of negative feedback on gain, stability, distortion and bandwidth of an amplifier.

(b) Discuss and explain the basic circuit of an LC oscillator and derive the condition for the oscillations.

UNIT - IV

8 (a) Explain with a neat circuit diagram, the working of a transformer coupled class A amplifier. Prove that the maximum efficiency is 50%.

(b) A transistor with a maximum junction temperature specification of 150℃ dissipates a maximum power of 40 watts at a case temperature of 25℃ and 2 watts at an ambient temperature of 25℃. Find
(i) The thermal resistance between the junction and the case.
(ii) The thermal resistance between the junction and ambient.
Maximum power dissipation capability for safe operation in free space at a temperature of 50℃.

OR

9 (a) Derive the expression for maximum collector power dissipation Pc(Max) in the case of class B power amplifiers.

(b) What are the advantages and disadvantages of push pull configuration? Show that in class-B push pull amplifier the maximum conversion efficiency is 78.5%.

UNIT - V

10 (a) Derive the expression for the 3dB bandwidth of a capacitance coupled single tuned amplifier.

(b) Explain the principle of stabilizing the double tuned transformer coupled amplifier response against the internal feedback.

OR

11 (a) Explain the reasons for oscillations in a tuned amplifier. Briefly explain the methods used to stabilize the tuned amplifiers against oscillations.

(b) Explain the operation of a double tuned amplifier. Explain the advantages of double tuned circuit over single tuned circuit.

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Code: 13A04402 **R13**

B.Tech II Year II Semester (R13) Supplementary Examinations December 2016

ELECTRONIC CIRCUITS ANALYSIS & DESIGN

(Common to ECE and EIE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

*****

1 Answer the following: (10 X 02 = 20 Marks)

(a) Define class AB amplifier.

(b) Write the advantages of transformer coupling.

(c) Calculate h_{fe} for short circuit current gain of transistor is 25 at a frequency of 2 MHz, if $f_\beta = 200\,kHz$.

(d) An amplifier has a value of R_{in} = 4.2 kΩ, A_V = 220 and $\beta = 0.01$. Determine the value of input resistance of the feedback amplifier.

(e) Write the advantages of negative feedback amplifier.

(f) A wein-bridge oscillator has a frequency of 500 Hz, if the value of C is 100 pF, determine the value of R.

(g) Describe the types of heat sinks.

(h) Explain FET as voltage variable resistor.

(i) What are the advantages of the double tuning?

(j) Define the Q – factor in tuned circuits.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 Explain RC-coupled CE transistor stages. Show the middle and low frequency model for one stage. Write the expressions for current gains.

OR

3 With a neat diagram, analyze the complementary Darlington transistor.

UNIT – II

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

OR

5 Write a short note on gain bandwidth product of amplifier and derive the expression on the following:

(a) Product of voltage.

(b) Product of current.

UNIT – III

6 What are the different types of negative feedback? Briefly explain how the input and output impedances of an amplifier are affected by the different types of negative feedback.

OR

7 Draw the circuit diagram of current shunt feedback and derive expressions for input and output resistances.

UNIT – IV

8 Draw the push pull power amplifier circuit. Derive the expression for the output current in push amplifier with base current as $I_b = I_{bn} \sin(wt)$.

OR

9 Explain the thermal run away, thermal resistance, thermal stability and thermal instability factors.

UNIT – V

10 Derive the expression for quality factor of a single tuned inductively coupled amplifier.

OR

11 What is the importance of stagger tuning? Explain briefly about stagger-tuned amplifier.

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Code: 13A04402 **R13**

B.Tech II Year II Semester (R13) Regular Examinations May/June 2015

ELECTRONIC CIRCUITS ANALYSIS & DESIGN

(Common to ECE & EIE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory question)

1 Answer the following: (10 X 02 = 20 Marks)

(a) Voltage gain of a single stage amplifier is 30. Bandwidth is 20 kHz. Two such stages are cascaded. Find the overall voltage gain and bandwidth.

(b) List out the advantages and disadvantages of RC coupled amplifier.

(c) Draw the frequency response of RC coupled amplifier and indicate bandwidth, low, mid and high frequency ranges.

(d) A multistage amplifier is to be constructed using four identical stages, each of which has a lower cutoff frequency 15 Hz and upper cutoff frequency 30 kHz. What will be the lower and upper cutoff frequency of the multistage amplifier?

(e) Draw the equivalent circuit of transconductance amplifier.

(f) An amplifier has a gain of 300, when the -ve feedback is applied gain is reduced to 240. Find feedback factor.

(g) Differentiate between power amplifier and voltage amplifier.

(h) What are the advantages of push pull amplifier configuration?

(i) List out the advantages of tuned circuit.

(j) Distinguish between single tuned and double tuned amplifiers.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) Explain the effect of cascading of amplifiers on bandwidth.

(b) Compare various coupling schemes used in amplifiers.

(OR)

3 (a) Give the analysis of transformer coupled amplifier in mid band region.

(b) Derive the expression for voltage gain and current gain of cascade amplifier.

UNIT – II

4 (a) Draw the small signal simplified hybrid equivalent circuit of an CE amplifier and discuss the effect of bypass capacitor on the frequency response of an amplifier.

(b) Determine the low frequency response of CE amplifier using the following specifications:

$V_{CC} = 10\ V$ $R_C = 2.2\ K\Omega$ $R_E = 1\ K\Omega$

$R_1 = 62\ K\Omega$ $R_2 = 22\ K\Omega$ $R_S = 600\ \Omega$

$C_B = 0.1\ \mu f$ $C_E = 10\ \mu f$ $C_C = 0.1\ \mu f$

$h_{ie} = 1.6\ K\Omega$ $h_{fe} = 99.$

(OR)

5 (a) Draw the hybrid – π model for a transistor in CE configuration and explain the significance of each component in the model.

(b) Explain the variation of hybrid parameters with increasing $|I_C|$, $|V_{CE}|$ and temperature.

UNIT – III

6 (a) What is the effect of –ve feedback on the input impedance of an amplifier?

(b) Derive the expression for frequency of oscillations of RC phase shift oscillator.

(OR)

7 (a) State and explain Barkhausen's criteria.

(b) Explain the working of Hartley oscillator. Also derive the expression for its frequency of oscillations.

UNIT – IV

8 (a) Show the conversion efficiency of transformer coupled class A amplifier is 50%.

(b) Explain the operations of class B push pull amplifier.

(OR)

9 (a) Explain ideal and practical performance of class–D amplifier.

(b) What is cross over distortion? Explain how it can be eliminated.

UNIT – V

10 Explain the operation of a single tuned capacitive coupled amplifier and derive the expression for bandwidth.

(OR)

11 (a) Define resonant frequency and derive an expression for the impedance of tuned circuit.

(b) What are the limitations of single tuned amplifiers?

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