Code No: R1622041 **R16** SET - 1

II B. Tech II Semester Regular/ Supplementary Examinations, April/May - 2019
ELECTRONIC CIRCUIT ANALYSIS
(Com to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What are the conditions for approximate h parameter model? (2M)
   b) What is the use of a transformer in a multi stage amplifier? (2M)
   c) What is the effect of negative feedback in stability? (3M)
   d) Draw the circuit and give the condition of oscillation for a Wein bridge oscillator. (3M)
   e) Write the significance of gain bandwidth product of an amplifier. (2M)
   f) What is stagger tuned amplifier? (2M)

PART -B

2. a) State and explain Millers theorem. (5M)
   b) A CE amplifier is drawn by a voltage source of internal resistance of 500 Ω and load impedance of 800 Ω. The h parameters hie = 2k Ω, hre = $2X10^{-4}$, hfe = 50, hoe = 25μA/V and compute A_I, R_I, A_V and R_O using exact analysis. (9M)

3. a) Discuss the effect of a coupling and by pass capacitors effects on CE amplifier. (5M)
   b) Draw the circuit diagram and equivalent circuit of an emitter follower amplifier and derive the expression for Av, Ai and input impedance. (9M)

4. a) Show that bandwidth increases in negative feedback amplifiers. (7M)
   b) An amplifier has an input resistance of 200 K ohms, with a certain negative feedback introduced in the above amplifier the input resistance is found to be 20 M ohms and overall gain is found to be 1000. Calculate the loop gain and feedback factor. (7M)

5. a) Establish the condition for frequency of oscillation in an RC phase shift oscillator. (7M)
   b) Derive the oscillation condition for LC circuits. (7M)

6. a) Prove the conversion efficiency of a class b power amplifier is 78.5%. (7M)
   b) How are the amplifiers are classified based on the duration of their conduction. (7M)

7. a) Draw and explain the operation of a transformer coupled class A power amplifier. (7M)
   b) Draw the equivalent circuit of a double tuned amplifier and derive the gain at resonance. (7M)
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Code No: R1622041 **R16** SET - 2

II B. Tech II Semester Regular/ Supplementary Examinations, April/May - 2019
ELECTRONIC CIRCUIT ANALYSIS
(Com to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Draw the circuit of FET common source amplifier at high frequencies. (2M)
   b) What the term f_β indicates at high frequency? (2M)
   c) What are the advantages of negative feedback amplifier? (2M)
   d) Classify oscillators. (3M)
   e) What are heat sinks and why they are used? (3M)
   f) What is the effect of cascading on double tuned amplifiers? (2M)

PART -B

2. a) Draw the CC amplifier and derive the expression for A_I, R_I, A_V, Y_O. (7M)
   b) A transistor in CB circuit has the following h parameters h_{ib}=15, h_{fb}=0.95, h_{rb}=3X10^{-4}, h_{ob}=0.5X10^{-6}. Find R_i, A_i, Y_o, A_v, if R_s=350 Ω and R_L=1k Ω. (7M)

3. a) Derive the overall current gain and overall input impedance of a darlington pair amplifier. (7M)
   b) Derive the expression for the bandwidth of a multi stage amplifier. (7M)

4. a) Explain the principle of negative feedback in amplifiers. Show quantitatively the effect of negative feedback on (i) Gain (ii) Stability (iii) Noise (iv) Distortion. (7M)
   b) Calculate the closed loop gain A_{CL} for a voltage series negative feedback amplifier if its open loop gain Av and feedback factor β are 10^3 and 0.01 respectively. Calculate A_{CL} if Av increases by 40%. (7M)

5. a) State and derive Barkhausan criterian for the oscillations. (7M)
   b) Derive the frequency of oscillation of Hartley oscillator. (7M)

6. a) Discuss about harmonic distortion. (4M)
   b) Draw the Class-A Power Amplifier and explain operation in detail with necessary equations. Also derive the expression for maximum conversion efficiency. (10M)

7. a) Differentiate between stagger tuning, synchronous tuning and cascaded tuned amplifiers. (5M)
   b) Derive the expression for the band width of a synchronous tuned circuit. (9M)
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Code No: R1622041 **R16** SET - 3

II B. Tech II Semester Regular/ Supplementary Examinations, April/May - 2019
ELECTRONIC CIRCUIT ANALYSIS
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Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Write the expression of rb'c and r b'e of π-Model? (2M)
   b) Draw the circuit of a darlington amplifier. (2M)
   c) How the stability of amplifier will affect by negative feedback amplifier. (2M)
   d) Draw the circuit diagram of Colpitts oscillator and write the expression for frequency of oscillations & conditions for sustained oscillations. (3M)
   e) What are the advantages of class-B operation? (3M)
   f) What is the coefficient coupling in a double tuned amplifier? (2M)

PART -B

2. a) State Millers Theorem and its duality? (6M)
   b) Draw the CE amplifier with un bypassed emitter resistance and derive the expression for its Ri and Av. (8M)

3. a) A transistor supplies 0.8W to a 5K load .The zero signal dc collector current is 30mA, and the dc collector current with signal is 36mA. Determine the percentage second-harmonic distortion. (7M)
   b) The 3-db bandwidth of an amplifier extends from 20 Hz to 20 kHz. Find the frequency range over which the voltage gain differs by only 1 dB from the mid band value. (7M)

4. a) What are characteristics of an amplifier that are modified by negative feedback? Draw the four types of feedback amplifiers naming them. (7M)
   b) Draw the block diagram of Current Shunt feedback system and derive the expression for Rif and Rof. (7M)

5. a) In a Hartely oscillator L2=0.04mH and C=0.004μF. If the frequency of oscillations is 150KHz, find L1. Neglect mutual inductance. (4M)
   b) Give the two Barkhausen conditions required in order for sinusoidal oscillations to be sustained. (4M)
   c) Derive an expression for frequency of oscillations of a wien bridge oscillator using transistor. (6M)

6. a) A transformer coupled class A large signal amplifier has maximum and minimum values of collector-to-emitter voltage of 25V and 2.5V. Determine its collector efficiency. (6M)
   b) Draw the circuit diagram of complementary symmetry class B pushpull amplifier and explain its working. (8M)
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7. a) A tank circuit has a capacitor of 50PF and an inductor of 500μH. The resistance of the inductor is 5Ω. Determine the (i) resonant frequency (ii) impedance at resonance (iii) Q-factor, and (iv) bandwidth. (7M)
   b) How is the bandwidth of tuned amplifier improved? Draw such a circuit and explain its working. (7M)

Code No: R1622041 **R16** SET - 4

II B. Tech II Semester Regular/ Supplementary Examinations, April/May - 2019
ELECTRONIC CIRCUIT ANALYSIS
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Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Draw the Small signal model of MOS amplifier. (2M)
   b) In Multistage amplifier Av1= 15, Av2=20 & Av3=25 find out overall gain of multistage amplifier? (2M)
   c) What are the different mixing techniques used in any feedback system? (3M)
   d) Write the expression for frequency of oscillations of a RC phase-shift oscillator using BJT. (3M)
   e) What is mean by crossover distortion? (2M)
   f) What is effect of cascading on single tuned amplifier? (2M)

PART -B

2. a) Derive the expression for CE short circuit Current gain. (7M)
   b) Draw the Hybrid- π model for a common emitter transistor. At room temperature (300K) at IC=10mA and VCE=8V. hie=500, hoe=2*10-4 μs, hfe=100 and hre=10-4. At the same operating point fT=50MHz and cob=3PF.Calculate the values of hybrid-π parameters. (7M)

3. a) Derive the equation for the lower 3dB frequency of CE configuration due to emitter bypass capacitor. (7M)
   b) Draw the circuit diagram of Direct Coupled Amplifier and explain its operation in detail. (7M)

4. a) Draw the circuit of a voltage series feedback amplifier and derive the expressions for Rif and Rof. (7M)
   b) The open loop gain of an amplifier is 100. What will be the overall gain when a negative feedback of 0.5 is applied to the amplifier. (7M)

5. a) Write short notes on Heatsink. (4M)
   b) Compare Frequency stability of crystal oscillator, RC and LC oscillators. (5M)
   c) What is the equivalent circuit of a crystal? Derive the expressions for series and parallel resonances. A crystal oscillator has the following parameters: L=0.5H, C=0.035pF, Cm=1.2pF and R=8 k ohm. i) Find the series resonant frequency. ii) Find the Q of the crystal (5M)
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6. a) Derive the bandwidth of a multistage amplifier, assuming that each stage has same upper and lower cut off frequencies. (7M)
   b) For an ideal class B transistor amplifier the collector supply voltage Vcc and the effective load resistance RL= $(N1/N2)^2$ RL are fixed as the base current excitation is varied. Show that the collector dissipation Pc is zero at no signal, rises as Vm increases and passes through a maximum at Vm = $2Vcc/\pi$. (7M)

7. a) Derive the expressions for Bandwidth and Q-factor of single tuned, capacitively coupled amplifiers. List the assumptions made for the derivation. (7M)
   b) How to reduce the instability in tuned amplifier? Explain them with neat circuit diagram. (7M)