Code No: RT22041 **R13** SET - 1

II B. Tech II Semester Regular Examinations, April/May - 2016
ELECTRONICS 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 **THREE** Questions from **Part-B**

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PART-A

1. a) Write a short note on hybrid-π capacitances.
   b) List the features of Darlington pair amplifier.
   c) Write advantages of negative feedback in amplifier?
   d) Classify different types of oscillator.
   e) What are the types of distortions possible in an amplifier.
   f) What is the importance of stagger tuning.

PART-B

2. a) Derive the equation for g_m, which gives relation between g_m, I_C and temperature.
   b) Draw the equivalent circuit of hybrid-model and derive the expression for hybrid -π impedance in terms of low frequency h-parameters.

3. a) Draw the circuit diagram of cascade amplifier circuit and analyze its performance.
   b) Draw and explain the emitter coupled differential amplifier.

4. a) Give comparison of positive and negative feedback.
   b) Discuss the effect of negative feedback with respect to closed loop gain, bandwidth and distortion.

5. a) A phase shift oscillator is to be designed with FET having g_m =5000μs ,r_d=4kΩ while the resistance in the feedback circuit is 9.7kΩ. Select the proper value of c and R_D to have the frequency of oscillations as 5KHz.
   b) Perform the generalized analysis of LC oscillators with suitable block diagram and obtain the condition for Hartley and colpitt's oscillators.

6. a) Differentiate between push-pull and complementary symmetry configuration of a class B power amplifier.
   b) For a class B amplifier driven from a 24V power supply and driving a 8Ω load, compute i) Input d.c power, ii) output power, iii) conversion efficiency if the peak to peak output voltage across the load resistance is 22 Volts maximum.

7. a) Explain how the stagger –tuned design is superior to synchronously tuned design in the design of a multistage amplifier?
   b) Write about wideband amplifiers.

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Code No: RT22041 **R13** SET - 2

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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 **THREE** Questions from **Part-B**

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PART-A

1. a) How Hybrid-π parameters vary with temperature?
   b) Write a note on difference amplifier.
   c) Classify the amplifiers.
   d) Explain the Barkhausen criterion in detail.
   e) Write features of Power amplifiers.
   f) Write advantage and disadvantage of tuned amplifier.

PART-B

2. a) Derive the expressions for the CE current gain and voltage gain including source resistance Rs.
   b) Derive the expression for f_H and input admittance for emitter follower amplifier at high frequencies.

3. a) Draw the circuit diagram of a cascade amplifier and derive its overall voltage gain and impedance from its equivalent circuit.
   b) Derive the expression for voltage gain and input impedance of bootstrap emitter follower amplifier.

4. a) Explain the method of analysis of feedback amplifier.
   b) Calculate the voltage gain, input impedance and output impedance of a voltage series feedback amplifier having an open loop gain A=300, R_i=1.5KΩ , R_0=50KΩ and β=1/20.

5. a) Draw the diagram of Colpitt's oscillator and explain its working.
   b) What are the factors that affects the frequency stability of an oscillator? How frequency stability can be improved in oscillators?

6. a) Derive the expression for efficiency of a direct coupled Class A power amplifier.
   b) A single transistor operates as an ideal class B amplifier. If d.c current drawn from the supply is 25mA, calculate the a.c power delivered to load for load of 2KΩ.

7. a) Derive the expression for the gain of a single-tuned capacitance coupled amplifier, Discuss about its Selectivity .
   b) Explain the Mismatching technique in tuned amplifiers.

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Code No: RT22041 **R13** SET - 3

II B. Tech II Semester Regular Examinations, April/May - 2016
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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 **THREE** Questions from **Part-B**

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PART-A

1. a) Write about Gain-Bandwidth product.
b) Explain the need of cascading amplifiers.
c) Explain how the noise is reduced due to the negative feedback.
d) Write advantages and disadvantages of wien bridge oscillator.
e) What you meant by cross over distortion.
f) Classify tuned amplifier.

PART-B

2. a) Draw the circuit diagram of cascade- transistor amplifier circuit and analyze its performance.
b) Explain the differential mode and Common Mode operation of emitter coupled differential amplifier.

3. a) Draw the circuit diagram of Darlington pair circuit and derive its important characteristics.
b) Compute the value of overall current gain and input impedance of a Darlington pair with 1KΩ emitter resistance connected to the emitter of a second transistor if h_{fc} , h_{ic},h_{oc} and h_{rc} of both the transistor are given as - 51,1.1kΩ,0 and 1 respectively.

4. a) What are the different types of feedback amplifiers? Give their equivalent circuits.
b) An amplifiers with negative feedback gives an output of 12.5 with an output of 1.5V. When feedback is removed, it requires 0.25V input for the same output. Find i) values of voltage gain without feedback. ii) value of β, if the input and output are in phase and β is real.

5. a) Calculate the value of 'C' in the frequency –determining network of a FET RC phase shift oscillator circuit having R=2.5KΩ , assuming frequency of oscillation f=1.625KHz. Repeat same if it is BJT RC phase shift oscillation with R_C=4KΩ.
b) Draw the circuit of Hartley oscillator and explain its working .Derive the expressions for frequency of oscillation and condition for starting of oscillation.

6. a) Derive the expression for maximum value of conversion efficiency of class A power amplifier.
b) Write a note on Heat sinks.

7. a) Draw the circuit diagram of a double –tuned circuit and explain its working and derive the expression for I_2 max.
b) What is the effect of cascading single tuned amplifier on bandwidth? Derive the expression for it.

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Code No: RT22041 **R13** SET - 4

II B. Tech II Semester Regular Examinations, April/May - 2016
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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 **THREE** Questions from **Part-B**

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PART-A

1. a) Why h-parameter model is not suitable for high frequency analysis?
   b) Write about CMRR.
   c) Give characteristics of negative feedback amplifier.
   d) Explain the principle of operation of oscillator.
   e) Explain the term impedance matching.
   f) Write about stability of tuned amplifies.

PART-B

2. a) Draw the circuit for Darlington pair amplifier and derive the expressions for A_I, A_v, R_i And Ro.
   b) Draw the circuit diagram of emitter coupled differential amplifier and obtain its d.c analysis.

3. a) Compare the three types of coupling methods used in multistage amplifiers.
   b) Perform the analysis of boot – strapped emitter follower circuit.

4. a) Draw the circuit diagram of current shunt feedback and derive expressions for input and output resistance.
   b) Explain the concept of feedback with block diagram.

5. a) Discuss and explain the basic circuit of an LC oscillator and derive the conditions for the oscillations.
   b) A Hartley oscillator is to span a frequency range from 50KHz to 150KHz. The variable capacitance has the values in the range 50pF to 450pF.The transistor to be used as hfc=50 and Δ he = 0.5. Determine the values of the inductances. Neglect mutual inductance between the coils and use CE circuit configuration.

6. a) A single transistor is operating as an ideal class B amplifier with a 500Ω load. A d.c meter in the collector circuit reads 10mA. How much signal power is derived to the load?
   b) Draw a neat circuit diagram of push pull class B amplifier. Explain its working.

7. a) Explain the operation of a single tuned amplifier circuit and its frequency response.
   b) Draw the circuit diagram of double tuned amplifier and simplify the same with its equivalent circuit.

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