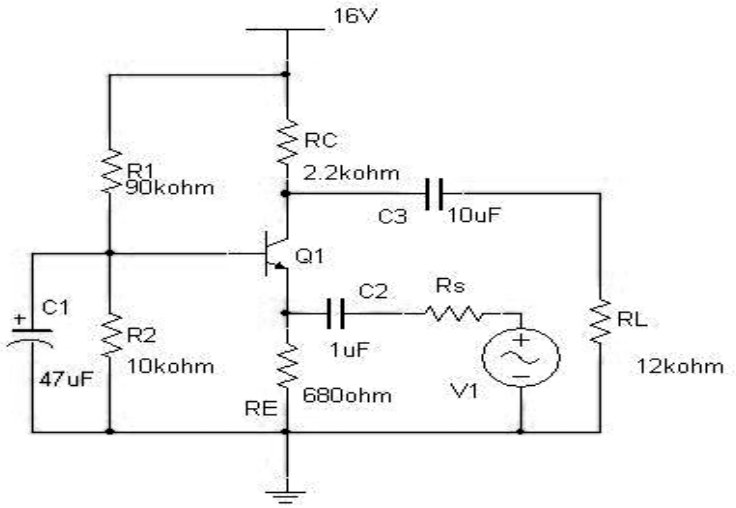
CODE NO: R09220402 | **R09** | **SET No - 1**

II B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
ELECTRONIC CIRCUIT ANALYSIS
(Common to Electronics & Communication Systems, Electronics & Computer Engineering, Electronics & Instrumentation Engineering, Electronics & Telematics, Instrumentation & Control Engineering)

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

Answer any FIVE questions
All Questions Carry Equal Marks
- - -

1.a) For the CB amplifier circuit shown, compute R_{IN} and R_{OUT} if C_1 is
i) Connected ii) Not connected
The h-parameters of the transistor in CE configuration are listed as:
h_{ie} = 2.1KΩ, h_{fe} = 81, h_{oe} = 1.66 μMhos and h_{re} is negligibly small.



b) Reason out the causes and results of Phase & Frequency distortions in transistor amplifiers. [9+6]

2.a) Differentiate between direct and capacitive coupling of multiple stages of amplifiers.
b) With the help of a neat circuit diagram, describe the working of a cascode amplifier.
c) What are the merits and demerits of a cascade amplifier over a simple Common Emitter amplifier? [4+7+4]

3.a) Derive the expressions for hybrid Π conductance, $g_{ce,}$ and $g_{bb'}$ of a transistor.
b) Explain how hybrid Π parameters, g_m and g_{ce} vary with I_c, V_{ce} and temperature.
c) Compute the overall lower cut-off frequency of an identical two stage cascade of amplifiers with individual lower cut-off frequency given as 432 Hz. [7+4+4]

4.a) Discuss the effect of different type of loads to a common source MOS amplifier.
b) Differentiate between cascode and folded cascode configurations. [8+7]

5.a) If negative feedback with a feedback factor, β of 0.01 is introduced into an amplifier with a gain of 200 and bandwidth of 6 MHz, obtain the resulting bandwidth of the feedback amplifier.
b) With the help of a suitable BJT based voltage series feedback amplifier diagram, explain the features and benefits of negative feedback in amplifiers. [6+9]

6.a) Substantiate the requirement of positive feedback in amplifier for oscillations. Relate the requirement to Barkhausen Criterion.

b) With the help of neat circuit diagram, explain how sustained oscillations are obtained in RC phase shift BJT based oscillator. Derive the expression for frequency of oscillation. [6+9]

7.a) A single stage class A amplifier V_{cc}=20V, V_{CEQ} =10V, I_{CQ} =600mA, R_L=16 Ω. The ac output current varies by ± 300mA, with the ac input signal. Find

i) The power supplied by the dc source to the amplifier circuit.
ii) AC power consumed by the load resistor.
iii) AC power developed across the load resistor.
iv) DC power wasted in transistor collector.
v) Overall efficiency
vi) Collector efficiency.

b). List the advantages of complementary-symmetry configuration over push pull configuration. [9+6]

8. Describe the following briefly:

a) Stagger Tuned Amplifiers – Operation and comparison with synchronous tuning
b) Heat Sinks for tuned power amplifiers. [8+7]

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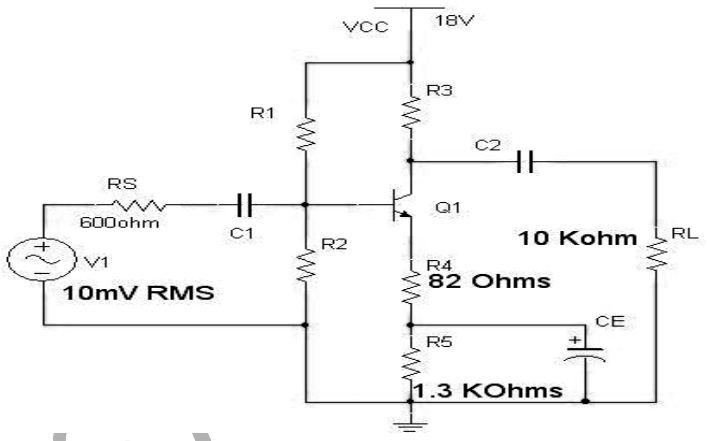
CODE NO: R09220402 | **R09** | **SET No - 2**

II B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
ELECTRONIC CIRCUIT ANALYSIS
(Common to Electronics & Communication Systems, Electronics & Computer Engineering, Electronics & Instrumentation Engineering, Electronics & Telematics, Instrumentation & Control Engineering)

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

Answer any FIVE questions
All Questions Carry Equal Marks
- - -

1. For the amplifier circuit shown with partially unbypassed emitter resistance, calculate the voltage gain with R_4 in place and with R_4 shorted. Consider h_{ie} = 1.1KΩ, h_{fe} = 100, h_{re} & h_{oe} are negligibly small. Assume R_1 and R_2 to be 100KΩ and 22 KΩ respectively.



b) Analyse what the output voltage should be if the DC power supply given to a CE amplifier is shorted to ground. [10+5]

2.a) With the help of circuit diagram and equivalent circuit of a Darlington amplifier generate the expression for the overall input impedance of the pair.

b) Develop a generalized expression for overall current gain(A_{IS}) when two transistor stages with $R_{OUT2} < R_L$, $R_{OUT1} > R_{IN2}$, $R_{IN1} > R_S$ and individual voltage gains are A_{V1}, A_{V2}. [7+8]

3.a) A transistor amplifier in CE configuration is operated at high frequency with the following specifications. f_T=6MHz, g_m=0.04,h_{fe} =50, $r_{bb'}$ =100 Ω, R_s =500 Ω , $C_{b'c}$ =10pF, R_L=100 Ω. Compute the voltage gain, upper 3dB cut-off frequency, and gain bandwidth product (GBW).

b) Derive an expression for the overall higher cut-off frequency of a two stage amplifier with identical stages of individual higher cut-off frequency, f_H. [7+8]

4.a) Discuss the effect of different type of loads to a common source MOS amplifier.

b) Differentiate between cascode and folded cascode configurations. [8+7]

5.a). If the non-linear distortion in a negative feedback amplifier with an open loop gain of 100 is reduced from 40% to 10%with feedback, compute the feedback factor, β of the amplifier.

b) Draw the circuit diagram of a current series feedback amplifier, Derive expressions to show the effect of negative feedback on input & output impedances, bandwidth, distortion of the amplifier. [6+9]

6.a) Differentiate between RC and LC type oscillators.

b) Derive the expression for frequency of oscillation in a Hartley Oscillator.

c) State Barkhausen Critterion for Oscillations [5+7+3]

7.a) Derive the expression for maximum conversion efficiency for a simple series fed Class A power amplifier.

b) What are the drawbacks of transformer coupled power amplifiers?

c) A push pull amplifier utilizes a transformer whose primary has a total of 160 turns and whose secondary has 40 turns. It must be capable of delivering 40W to an 8 Ω load under maximum power conditions. What is the minimum possible value of V_{cc}? [5+4+6]

8.a) List possible configurations of tuned amplifiers.

b) Derive an expression for bandwidth of a capacitive coupled tuned amplifier in CE configuration. Make necessary assumptions and mention them. [6+9]

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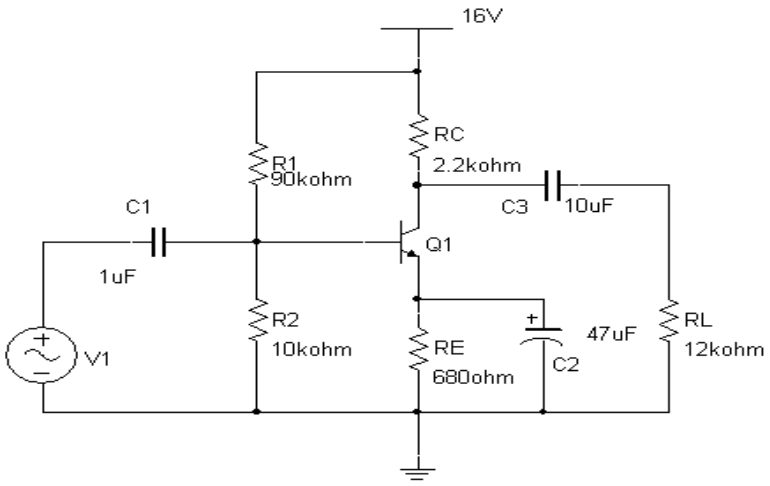
CODE NO: R09220402 | **R09** | **SET No - 3**

II B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
ELECTRONIC CIRCUIT ANALYSIS
(Common to Electronics & Communication Systems, Electronics & Computer Engineering, Electronics & Instrumentation Engineering, Electronics & Telematics, Instrumentation & Control Engineering)

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

Answer any FIVE questions
All Questions Carry Equal Marks
- - -

1.a) For the common emitter amplifier shown, draw the AC and DC load lines. Determine the peak-to-peak output voltage for a sinusoidal input voltage of 30mV peak-to-peak. Assume C_1, C_2 and C_3 are large enough to act as short circuit at the input frequency. Consider h_{ie} = 1.1KΩ, h_{fe} = 100, h_{re} & h_{oe} are negligibly small.



b) State Miller's theorem. Specify its relevance in the analysis of a BJT amplifier.
c) Write expressions for A_V and R_{IN} of a Common Emitter amplifier. [7+4+4]

2.a) Derive expressions for overall voltage gain and overall current gain of a two-stage RC coupled amplifier.
b) List out the special features of Darlington pair and cascode amplifiers. [9+6]

3.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) Describe how an emitter follower behaves at high frequencies. [8+7]

4.a) Discuss the effect of different types of loads to a common source MOS amplifier.
b) Differentiate between cascode and folded cascode configurations. [8+7]

5.a) The β and the open loop gain of an amplifier are -10% and -80 respectively. By how much % the closed loop gain changes if the open loop gain increases by 25%?
b) Compare the characteristics of feedback amplifiers in all the four configurations.
c) Reason out why 2 stages are required to implement current shunt feedback. [5+6+4]

6. Starting from the description of a generalized oscillator, derive the expression for frequency of oscillation in a colpitts oscillator. [15]

7.a) With the help of a suitable circuit diagram, show that the maximum conversion efficiency of a class B power amplifier is 78.5%.

b) Explain how Total harmonic distortion can be reduced in a Class B push-pull configured amplifier. [7+8]

8.a) Derive an expression for the bandwidth of a synchronous tuned circuit.

b) Discuss the necessity of stabilization circuits in tuned amplifiers. [8+7]

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CODE NO: R09220402 | **R09** | **SET No - 4**

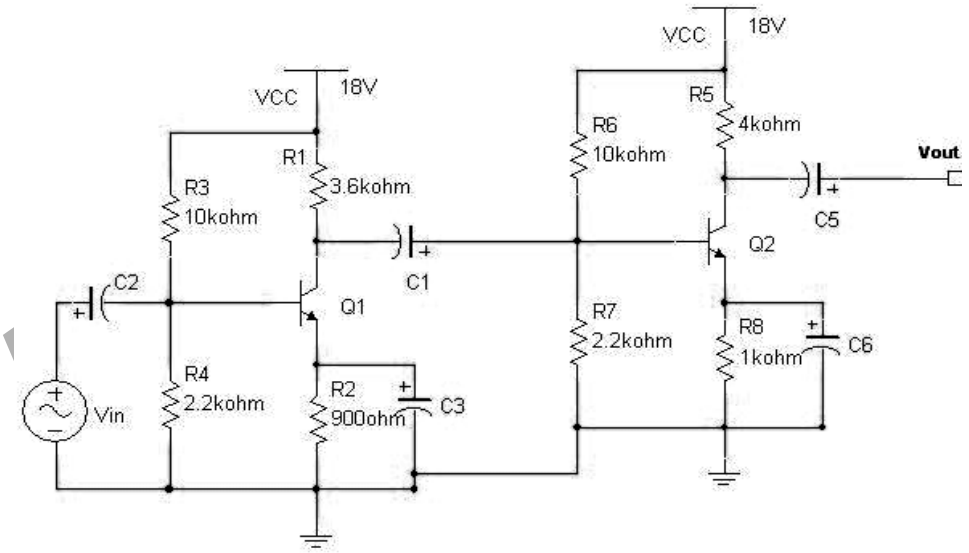
II B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
ELECTRONIC CIRCUIT ANALYSIS
(Common to Electronics & Communication Systems, Electronics & Computer Engineering, Electronics & Instrumentation Engineering, Electronics & Telematics, Instrumentation & Control Engineering)

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

Answer any FIVE questions
All Questions Carry Equal Marks
- - -

1.a) Draw the circuit diagram of a common collector amplifier along with its equivalent circuit. Derive expressions for A_V and R_I.
b) What is meant by small signal for analyzing a BJT based amplifier?
c) What is non-linear distortion? List the causes for this type of distortion in amplifiers. [7+4+4]

2.a) Discuss various possibilities of inter-stage coupling of amplifiers.
b) For the two-stage RC coupled amplifier circuit shown, calculate the Individual stage voltage gains and the overall voltage gain. Input impedance of individual stages is given as 2.4 KΩ and β of individual transistors as 80. [6+9]



3.a) A transistor has f_α = 8MHz, and β=80.when connected as an amplifier, it has stray capacitance of 100pF at the output terminal. Calculate its upper 3dB frequency when R_{load} is
i) 10KΩ ii) 100KΩ.
b) Discuss the effect of coupling capacitors of a CE amplifier on the overall frequency response of the amplifier. [8+7]

4.a) Discuss the effect of different type of loads to a common source MOS amplifier.
b) Differentiate between cascode and folded cascode configurations. [8+7]

5.a) An amplifier has a gain of 50 with negative feedback. For a specified output voltage, if the input required is 0.1V without feedback and 0.8V with feedback, Compute β and open loop gain.

b) Through the block schematics, show four types of negative feedback in amplifiers.

c) List the advantages of negative feedback in amplifiers. [5+5+5]

6.a) List out the merits × demerits of oscillators.

b) With the help of suitable schematic and description, show that both positive and negative feedback are used in a Wien Bridge oscillator. Establish the condition for oscillations. [7+8]

7.a) State the merits of using push pull configuration? Describe the operation of class B push pull amplifier and show how even harmonics are eliminated.

b) A single ended class A amplifier has a transformer coupled load of 8 Ω. If the transformer turns ration is 10, find the maximum power output delivered to the load. Take the zero signal collector current of 500mA. [7+8]

8.a) Derive the expressions for Bandwidth and Q-factor of single tuned, capacitively coupled amplifiers. List the assumptions made for the derivation.

b) What is stagger tuning? Suggest possible applications. [9+6]

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