R13

Code No: 114CV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech II Year II Semester Examinations, May - 2015

ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE, EIE)

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) State and explain Miller's theorem. [2M]

b) How are amplifiers classified based on their duration of transistor conduction? [3M]

c) Write the significance of Gain- Band width product of an amplifier. [2M]

d) List out the elements of a CE amplifier which influence its lower cut-off frequency. [3M]

e) What is the effect of negative feedback in current series type feedback amplifier? [2M]

f) State Barkhausen criteria for oscillations. [3M]

g) List the merits and demerits of push-pull configuration in power amplifiers. [2M]

h) What are the heat sinks? Why are they needed? [3M]

i) Define Q-Factor of a tuned amplifier. What is its ideal value? [2M]

j) Differentiate between synchronous tuning and staggered tuning of cascaded tuned amplifiers. [3M]

PART – B

(50 Marks)

2.a) Draw the circuit diagram of Darlington amplifier and derive the expressions for overall current gain and overall input impedance.

b) Compute the voltage gain, current gain and input impedance for the amplifier circuit shown in figure 1. Assume h_{ie}=1.1kΩ and h_{fe}=60. Also assume that the effects of h_{re} and h_{oe} are negligible. [5+5]

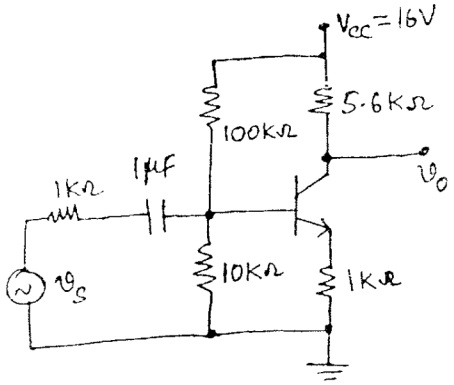

Figure: 1

OR

3.a) Draw the circuit diagram, equivalent circuit of an emitter follower amplifier and derive the expression for its voltage gain, current gain and input impedance.

b) For the CE-CC amplifier cascade shown in figure 2, obtain overall voltage gain. Assume typical values of h-parameters. [5+5]

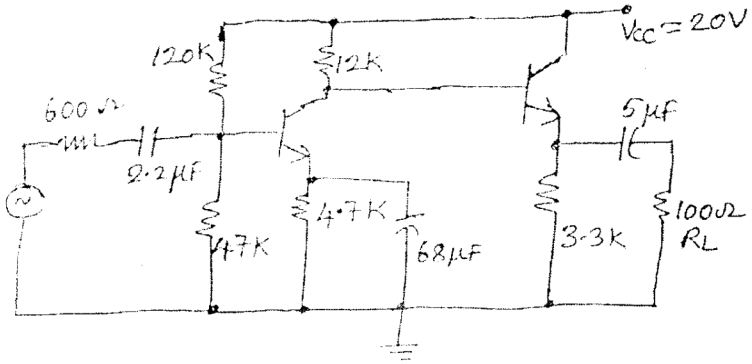

Figure: 2

4.a) Discuss the effect of coupling and bypass capacitors on the frequency response of a CE amplifier.

b) Draw the circuit diagram of a MOS common source amplifier and explain its operation. Derive the expressions for voltage and current gains based on its equivalent circuit. [4+6]

OR

5.a) Draw the hybrid $-\pi$ equivalent circuit of a BJT in CE configuration. Obtain its conductance of g_{ce} and g_{be} in terms of its low frequency h- parameters.

b) Draw the MOS small signal model, circuit diagram and equivalent circuit of MOS CS amplifier. [5+5]

6.a) Establish the conditions for oscillations in a BJT based RC phase shift oscillator.

b) Draw the block schematics of voltage series and current shunt feedback amplifiers and explain the operation. [5+5]

OR

7.a) Establish the gain and phase conditions for oscillations in a colpitts oscillator.

b) Calculate the closed loop gain A_{CL} for a voltage series negative feedback amplifier if its open loop voltage gain A_v and feedback factor β are listed as 10^5 and 0.01 respectively. Calculate A_{CL} if A_v increases by 40%. [6+4]

8.a) Show that the maximum conversion efficiency in a class B power amplifier is 78.5%.

b) Draw the circuit diagram of a transformer coupled class A power amplifier and explain its operation. [5+5]

OR

9.a) Draw the circuit diagram of a class B complementary- symmetry power amplifier and explain its operation. Obtain the expressions for conversion efficiency and collector circuit efficiency.

b) Explain how temperature related problems are handled in power amplifiers.[6+4]

10. Draw the circuit diagram, equivalent circuit of a capacitively coupled single tuned amplifier and derive the expression for Q- Factor, voltage gain and band width. [10]

OR

11.a) Discuss about the need and procedure for ensuring stability in a tuned amplifier.

b) An RLC circuit used as load in a tuned amplifier has Z_{max} = 70kΩ at f=100kHz.The Q of the tuned circuit is100.Compute the frequency at which the impedance becomes 50kΩ. [5+5]

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