

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 $h_{ie}=1.1k\Omega$ and $h_{fe}=60$. Also assume that the effects of h_{re} and h_{oe} are negligible. [5+5]

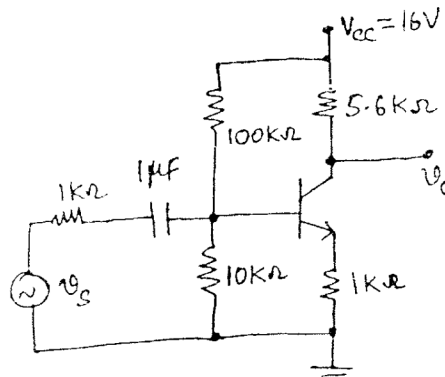


Figure: 1
OR

- 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]

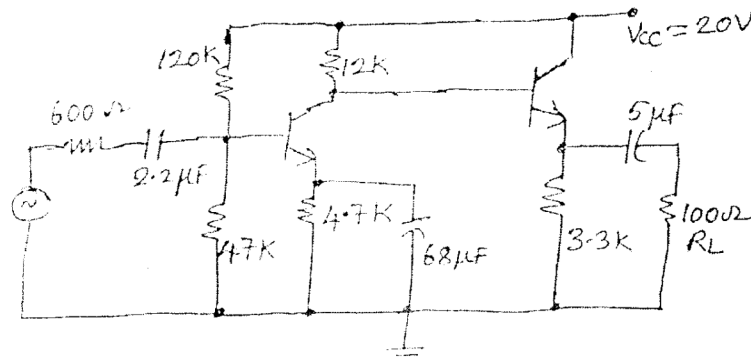


Figure: 2

- 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 π 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 $Z_{\max} = 70\text{k}\Omega$ at $f=100\text{kHz}$. The Q of the tuned circuit is 100. Compute the frequency at which the impedance becomes $50\text{k}\Omega$.

[5+5]

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