Code No: 124CV **R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, February -2024

ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE, EIE)

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

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

1.a)	Draw the simplified h- parameter model of CE amplifier.	[2]
b)	State and derive equivalent input, output impedance of Miller's theorem	[3]
c)	What is the role of bypass capacitor in BJT CE-amplifier circuit?	[2]
d)	Discuss about the Gain bandwidth product.	[3]
e)	State Barkhausen criteria for oscillation.	[2]
f)	Compare positive feedback and negative feedback.	[3]
g)	State the advantages of push-pull configuration.	[2]
h)	Discuss about series fed class A power amplifier?	[3]
i)	What is use of transformer in tuned amplifier circuit?	[2]
j)	What is Heat-sink? Classify the different types of Heat sinks.	[3]

PART - B

(50 Marks)

2.a) Derive the expression for current gain, input resistance, voltage gain and output resistance of CB amplifier using simplified h parameter model.

b) In a single stage CE amplifier R_S=1 KΩ, R_1=50 KΩ, R_2=2 KΩ, R_C=1 KΩ, R_L=1.2 KΩ, h_{fe}=50 and h_{ie}=1.1KΩ. Find A_I, R_i, R_o and A_V. [6+4]

OR

3.a) Derive the expressions for higher and lower cut-off frequency of a multistage amplifier.

b) Derive expressions for overall voltage gain and overall current gain of a two stage RC coupled amplifier. [5+5]

4.a) Derive the expression for the CE short circuit current gain at high frequencies.

b) Derive the voltage gain equation for emitter follower amplifier at high frequencies. [5+5]

OR

5.a) Derive the expressions for hybrid pi conductance of CE transistor at high frequencies.

b) Explain the small signal model of MOS transitor? [5+5]

6.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.

b) Draw the circuit diagram of voltage series feedback amplifier and derive expressions for input and output resistances. [6+4]

OR

7.a) Explain the concept of frequency and amplitude stability of oscillators.

b) Derive an expression for frequency oscillation of Hartley oscillator using transistor. [5+5]

8.a) What is meant by distortion in power amplifiers? Discuss crossover distortion.

b) Show that the maximum conversion efficiency of a push-pull class-B power amplifier is 78.5%. [5+5]

OR

9.a) Derive the expression for the harmonic distortion in a power amplifier.

b) Draw and explain complementary symmetry class B push-pull amplifier. [5+5]

10.a) Derive an expression for bandwidth of an n-stage synchronously tuned amplifier.

b) Draw the circuit of single tuned capacitance coupled amplifier and explain its operation. [5+5]

OR

11.a) Discuss the necessity of stabilization circuits in tuned amplifiers.

b) Draw the circuit of staggered tuned capacitance coupled amplifier and explain its Operation. [4+6]

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