Code No: 114CV **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester Examinations, September/October - 2023
ELECTRONIC CIRCUIT ANALYSIS
(Electronics and Communication Engineering)

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) An n number of stages are connected in cascade. Derive the expressions for the overall lower and higher cutoff frequencies. [2]
b) What are advantages of direct coupled amplifiers? [3]
c) Draw the frequency response of an CE amplifier. [2]
d) What is the relation between f_T, f_β? [3]
e) What is effect of negative feedback on amplifier gain? Prove it [2]
f) Why LC Oscillators are not used at low frequencies? [3]
g) State the advantages of push-pull configuration. [2]
h) Classify the Power Amplifiers. [3]
i) What is the relation between Q factor and bandwidth? [2]
j) What is difference between single and staggered tuned amplifiers? [3]

PART - B

(50 Marks)

2.a) Draw and explain the two stage amplifier with Darlington connection. Give the advantages of this circuit.
b) An amplifier consists of 3 identical stages in cascade. The bandwidth of overall amplifier extends from 20 Hz to 20 kHz. Calculate the bandwidth of individual stage. [6+4]

OR

3. Differentiate between direct and capacitive coupling of multiple stages of amplifiers. With the help of a neat circuit diagram, describe the working of a cascade amplifier. [10]

4. Determine the all hybrid $-\pi$ parameters of a Transistor operating at Collector Current $I_C(Q) = 2mA$, $V_{CE}(Q) = 20V$ and $I_B(Q) = 20\mu A$.Transistor specifications are $\beta_0 = 100$, unity gain frequency $f_T = 50MHz$, $C_{OB}=3pF$, hie = 1.4KΩ, hre=$2.5*10^{-4}$, hoe = 25μmhos. Assume that the Operating temperature is 300K. [10]

OR

5.a) Discuss the effect of different types of loads to a common source MOS amplifier
b) Explain the effect of coupling capacitor on frequency of an amplifier. [6+4]

6.a) Draw the current series feedback amplifiers with discrete components and derive for its gain, input impedance and output impedance.

b) What are the effects of Feedback on input and output Resistances? Discuss. [5+5]

OR

7.a) Draw the circuit diagram of Wein-bridge oscillator and explain its operation.

b) In the Wein-bridge oscillator, if the RC network consists of resistors of 200K and the capacitors of 300pF, find its frequency of oscillation. [6+4]

8.a) Draw the circuit diagram of class B push pull power amplifier and derive an expression for its conversion efficiency.

b) A single transistor is acting as ideal Class B amplifier with load of 1KΩ, if DC collector current is 10mA, VCC=30V. Determine its efficiency. [5+5]

OR

9.a) Derive the expression for conversion efficiency of Class A transformer coupled power amplifier.

b) Compare Series fed class A and transformer coupled class A power amplifier. [6+4]

10. Draw the circuit diagram of a Double tuned amplifier and derive the expression for 3-dB bandwidth. [10]

OR

11.a) Draw and explain the circuit diagram of a single tuned capacitance coupled amplifier. Explain its operation.

b) Explain the significance of Gain versus frequency curve of tuned amplifier. Draw the ideal and actual frequency response curves of single tuned amplifier. [5+5]

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