Code No: 155SF **RA**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, January/February - 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) Define the terms f_α and f_β. [2]
b) Draw high frequency model of transistor. [3]
c) Discuss the effect of feedback on bandwidth. [2]
d) Draw current shunt feedback amplifier block diagram. [3]
e) Draw the equivalent circuit of crystal. [2]
f) What is the typical value of gain for RC wein bridge oscillator using BJT? [3]
g) Draw the input and output waveforms of Class-A power amplifier? [2]
h) Sketch the frequency response of stagger tuned amplifier. [3]
i) Name some of the applications of Schmitt trigger. [2]
j) What are the ideal values of gain in Bootstrap and miller circuits and compare them? [3]

PART - B

(50 Marks)

2.a) Draw the High frequency model of a CE amplifier and determine the short circuit current gain.
b) Derive high frequency current gain with resistive load. [5+5]

OR

3.a) A two stage amplifier in CE configurations has h-parameters h_{ie}=1 Kohm, $h_{re}=5 \times 10^{-4}$, h_{fe}=50, h_{oe} =0.4 × 10 $^{-4}$ mhos. Determine input impedance, overall gain when load impedance is 15 k ohms.
b) Draw the circuit of Darlington pair and discuss its requirement. [5+5]

4.a) Draw the CE amplifier and derive the expression for A_I, R_I, A_V using feedback concepts.
b) An amplifier with open-loop gain of 1000 delivers 10 W of output power. If 0.01 feedback is applied determine input power before and after feedback for the same output. [6+4]

OR

5.a) An amplifier with 2.2 K input impedance and 40 K output impedance has a voltage gain of 80. The amplifier is now modified to provide 10% negative feedback in series with the input. Calculate voltage gain, input and output impedances.
b) How voltage–shunt negative feedback effects the input impedance and the output impedance. [4+6]

6.a) Sketch the generalized resonant circuit oscillator topology using z_1, z_2 and z_3. At what frequency will this circuit oscillate?

b) Draw the circuit diagram of RC-Phase shift oscillator using FET and derive the conditions for oscillations. [5+5]

OR

7.a) Design a Hartley oscillator for a frequency of 5 KHZ. Derive equation used.

b) Draw the LC oscillator circuit diagram and analyze it. [5+5]

8.a) Describe the operation of Class A transformer coupled amplifier and derive expression for conversion efficiency.

b) What are the advantages of class-B push pull amplifiers? [5+5]

OR

9.a) Derive the expression for bandwidth in terms of resonant frequency and quality factor in case of single tuned amplifier.

b) Explain the principle of stagger tuned amplifier and its advantages. [5+5]

10.a) With a neat circuit diagram and relevant waveforms, explain Bistable Multivibrator operation.

b) Design a collector coupled monostable multivibrator with the following specifications. V_{cc} = +12V, V_{bb} = -6V, h_{FEmin} = 50, V_{EBO} = 5V, I_c = 20mA. Transistors are of silicon npn type. Output pulse width = 500μsec. [5+5]

OR

11.a) Draw the circuit diagram of Miller time base generator and explain the operation with the help of waveforms.

b) With the help of a neat circuit diagram, explain the working of a transistor current time-base generator. [5+5]

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