R17 Regulation *Subject code: 1P3DB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech II Year I Semester Supplementary Examinations, July 2024

ANALOG ELECTRONICS

(ECE)

Maximum Marks: 70 Date:20.07.2024 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)

1	State Miller's theorem.
2	What are the main characteristics of a Darlington amplifier?
3	Define logarithm and db.
4	Define a short circuit Gain of a transistor in CE configurations at high frequencies.
5	Draw the small signal model of JFET.
6	Draw the characteristics of MOSFET.
7	What are the conditions for sustained oscillator or what is Barkhausen criterion.
8	Define sensitivity.
9	What is thermal runaway?
10	Differentiate power amplifier with that of a normal small signal amplifier in the aspects of its construction and applications.

Part-B

Answer All the following questions. (10M X 5=50Marks)

11	(a) Write the analysis of a CE amplifier circuit using h parameters. Derive the expressions for $A_{I,}, R_{I,}, A_V$ & R_O. (b) The single stage CE amplifier has R_s=1k,R_1=50k,R_2=2k,h_{re}=2.5*10^{-4},R_c=2k,R_L=2k, h_{fe}=50,h_{ie}=1.1k,h_{oe}=25*10^{-6} A/V. Calculate A_I,R_I,A_V & R_O. (6+4)
	OR
12	(a)Derive expressions for overall voltage gain and overall current gain of a two-stage RC coupled amplifier. (b)List out the special features of Darlington pair and cascode amplifiers. [5+5]
13	(a) Derive the expression for the CE short-circuits current gain A_i with resistive load. (b) Explain why the 3-dB frequency for current gain is not the same as f_H for voltage gain. [6+4]
	OR
14	(a)Draw the high frequency equivalent circuit of a BJT and explain the same. (b) Derive the expression of gain bandwidth product for voltage. [4+6]

15	(a) Explain MOS small signal model. (b) Derive the expression for voltage gain of common source MOS amplifier with resistive load. [4+6]
	OR
16	(a)Explain the Analysis of CD JFET Amplifier (b)Explain how FET can be used as an Amplifier.[6+4]
17	Give the equivalent circuits, and characteristics of ideal and practical amplifiers of the following types (i) Voltage amplifier, (ii) Current amplifiers, (iii) Trans-resistance amplifier, (iv) Trans-conductance amplifier [10]
	OR
18	Draw the circuit and explain the principle of operation of RC phase-shift oscillator circuit. What is the frequency range of generation of oscillations? Derive the expression for the frequency of oscillations. [10]
19	(a) Derive the expression for Max. efficiency of class B push pull amplifier. (b) What are its advantages and disadvantages of class B push pull amplifier? [6+4]
	OR
20	(a)What is the Stagger tuned amplifier and explain it's advantages. (b)Differentiate between single tuned and double tuned amplifiers . [5+5]