



R20 Regulation

Subject code: 3P3BC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, December 2024

ANALOG ELECTRONICS (Electrical and Electronics Engineering)

Maximum Marks: 70

Date: 06.12.2024

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 which carries 10M.
 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)		CO	Bloom Tx
1	What are the different configurations of BJT?	1	L1
2	Give some characteristics of CE amplifier?	1	L1
3	Why non-linear distortion is called harmonic distortion?	2	L1
4	State the Barkhausen criterion for oscillations.	2	L1
5	Classify power amplifiers.	3	L1
6	What is thermal runaway?	3	L1
7	Write the condition of RC circuit to work as Integrator.	4	L1
8	What is the condition of RC circuit to work as Differentiator.	4	L1
9	Write the applications of Bi-stable multi-vibrator.	5	L1
10	List the Transistor Switching Times.	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	Derive the equations for voltage gain, current gain, input impedance and output admittance for a BJT using low frequency h-parameter model for CE configuration. [10M]	1	L3
OR			
12	Derive the expression for CE amplifier on low frequency response. [10M]	1	L3
13	a) Discuss quantitatively about the effect of negative feedback on i) Gain ii) Bandwidth iii) Distortion [5M] b) Give the block diagram of a general feedback amplifier. State the function of each block. [5M]	2	L3
OR			
14	a) Derive the expression for the frequency of Hartley oscillators. [5M] b) A Hartley oscillator is designed with $L = 20\mu\text{H}$ and a variable capacitance. Find the Range of capacitance values if the frequency of oscillation is varied between 950 KHz to 2050 KHz. [5M]	2	L3

15	a) Derive the expression for Max. Theoretical efficiency in the case of class B push pull amplifier. [6M] b) What are its advantages and disadvantages? [4M]	3	L3
OR			
16	What is class A amplifier? Why is it employed? Give its circuit, design equations, characteristics & limitations. [10M]	3	L3
17	Derive the expression for rise time of integrator circuit and prove that it is proportional to time constant and inversely proportional to upper 3 dB frequency. [10M]	4	L3
OR			
18	Sketch the response of RC High pass circuit for pulse input and Ramp input and derive the output equations for the above inputs. [10M]	4	L3
19	a) Explain switching times in a transistor. [6M] b) Design a high-speed common emitter transistor switch operating with 2 power supplies $V_{CC} = 12\text{ V}$ and $-V_{BB} = -10\text{ V}$. The transistor is expected to operate at $I_C = 8\text{ mA}$, $I_B = 0.75\text{ mA}$. The static current gain h_{fe} of the transistor is 30, $V_{BE}(\text{sat}) = 0.9\text{ V}$, $V_{CE}(\text{sat}) = 0.3\text{ V}$ and $R_2 = 3R_1$. Determine the values of three resistors R_C , R_1 and R_2 . [4M]	5	L3
OR			
20	What is Astable Multivibrator? Explain the principle of operation of a Astable multivibrator with the help of neat circuit diagram and derive the expression for time period. [10M]	5	L3