O.P.Code: 23EC0408	R23	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR

(AUTONOMOUS)

B.Tech. II Year II Semester Regular Examinations July/August-2025

ELECTRONIC CIRCUITS ANALYSIS

(Electronics & Communications Engineering)

Time: 3 Hours **Max. Marks: 70**

PART-A

(Answer all the Questions **10 x 2 = 20** Marks)

1	a	What is the need for multistage amplifiers?	CO1	L1	2M
	b	What is a Differential amplifier?	CO2	L2	2M
	c	List the internal capacitances of BJT differential amplifier.	CO1	L1	2M
	d	Define fT and fβ.	CO1	L1	2M
	e	List the four basic feedback topologies.	CO1	L2	2M
	f	Explain Barkhausen criterion.	CO1	L2	2M
	g	Define Power amplifier. List the different types of power amplifiers.	CO3	L1	2M
	h	What are the advantages of power MOSFETs over power BJTs?	CO3	L1	2M
	i	A tuned amplifier has a resonant frequency of 1 MHz and bandwidth of 10 kHz. Calculate the Quality Factor (Q) of the amplifier.	CO2	L4	2M
	j	Define Multivibrator and mention its applications.	CO2	L1	2M

PART-B

(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2	a	Discuss various coupling schemes used in multistage amplifiers.	CO2	L2	5M
	b	Explain the operation of RC coupled amplifier with frequency response curve.	CO1	L2	5M

OR

3	a	Construct the basic structure of MOS and BJT differential amplifiers.	CO1	L2	5M
	b	Analyze BJT differential amplifier with a neat circuit diagram for common mode operation.	CO2	L3	5M

UNIT-II

4	a	Derive the break frequencies of CS (Common Source) amplifier at low frequencies. Obtain the expression for overall gain or transfer function and draw the frequency response	CO2	L3	8M
	b	Draw the high frequency model of MOSFET.	CO1	L1	2M

OR

5	a	With relevant circuit diagrams, explain the internal capacitive effects of MOSFET.	CO2	L2	5M
	b	With relevant diagrams, explain the internal capacitive effects of BJT.	CO2	L2	5M

UNIT-III

6	a	Draw the general structure of feedback amplifier and derive the equation for gain of feedback amplifier.	CO3	L1	5M
	b	A feedback amplifier has a gain of 1000 without feedback. If 10% of the output voltage is fed back to the input in a negative feedback configuration. Calculate the gain of the amplifier with feedback.	CO3	L4	5M

OR

7	a	Construct an RC phase shift oscillator using BJT and derive the expressions for frequency of oscillations and condition for sustained oscillations.	CO4	L3	6M
	b	Determine the frequency of oscillations when a RC phase shift oscillator has R=10kΩ, C=0.01μF and RC = 2.2 KΩ. Also find the minimum current gain needed for this purpose.	CO4	L3	4M

UNIT-IV

8	a	Sketch the collector current waveforms for class A, class B, class AB and class C amplifier stages.	CO3	L3	5M
	b	The loudspeaker of 8 Ω is connected to the secondary of the output transformer of a class A Amplifier. The quiescent collector current is 140 mA. The turns ratio of transformer is 3:1. The collector supply voltage is 10 V. If ac power delivered to the loudspeaker is 0.48 W, assuming ideal transformer, determine (i) AC power developed across primary, (ii) RMS value of load voltage, (iii) RMS value of primary voltage, (iv) RMS value of load current.	CO3	L3	5M

OR

9	a	Compare push-pull Class B and Complementary symmetry Class B power amplifiers.	CO3	L3	5M
	b	Describe the structure of Power MOSFET.	CO3	L2	5M

UNIT-V

10	a	Compare different types of tuned amplifiers.	CO1	L2	5M
	b	A single tuned RF amplifier uses a transistor with an output resistance of 50 KΩ, output capacitance of 15 pF and internal resistance of next stage is 20 kΩ. The tuned circuit consists of 47 pF capacitance in parallel with series combination of 1μH inductance and 2Ω resistance. Determine resonant frequency, effective quality factor and bandwidth of the circuit.	CO3	L3	5M

OR

11	a	Explain the operation of Schmitt trigger.	CO3	L2	5M
	b	Determine the value of capacitors to be used in an Astable multivibrator to provide a train pulse 2μs wide at a repetition rate of 100 KHz, if R1 =R2 =20kΩ.	CO5	L3	5M

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