RollNo. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV/DEC 2024

ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER - IV

EC5405 LINEAR INTEGRATED CIRCUITS

(Regulation2019)

Time:3hrs **Max. Marks: 100**

CO1	Ability to appreciate the significance and role of this course (or) Op-Amp in the present contemporary world.
CO2	Ability to apply and design Linear and Non-Linear analog circuits using Op-Amp.
CO3	Ability to analyze and develop Communication systems.
CO4	Ability to differentiate date Converters in real time scenario.
CO5	Ability to select and create IC'S and circuits for analog systems.

BL – Bloom's Taxonomy Levels

(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A(10x2=20Marks)

(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	Define virtual ground property of an Op-Amp.	2	CO1	L2
2	What is the maximum undistorted amplitude, that a sine wave input of 10KHz, can produce at the output of an Op-amp whose slew rate is 0.5V/μs.	2	CO1	L3
3	Draw the Voltage follower circuit of Op-Amp.	2	CO2	L1
4	Calculate the phase shift per stage in a 3-stage RC phase shift oscillator.	2	CO2	L4
5	What type of waveform is produced by an AM modulator.	2	CO3	L2
6	Draw the input frequency versus VCO control voltage characteristic of PLL, showing capture range and lock in range.	2	CO3	L3
7	Distinguish between conversion time and settling time.	2	CO4	L2
8	In-Weighted Resistor D to A converter, let us take two voltage levels 0= 0V, 1=4V, when the input ABCD = 1010.	2	CO4	L4
9	What is the principle of switch mode power supplies?	2	CO5	L1
10	Define slope overloaded noise and granular noise.	2	CO5	L1

PART- B(5x 13=65Marks)

Q.No.	Questions	Marks	CO	BL
11 (a)	(i) Draw the circuits of wilder current source and derive an expression for its output current.	8	CO1	L2
	(ii) obtain the Frequency response of an open-loop Operational Amplifier.	5	CO1	L2
	OR			
11 (b)	List and explain the DC performance Characteristics of an Operational Amplifier.	13	CO1	L2

12 (a)	Design an instrumentation amplifier whose gain can be varied continuously over the range $1 \leq A \leq 1000$. Assume all other relevant details.	**13**	CO2	L4
	OR			
12 (b)	(i) In an Astable Multivibrator using IC555 time, $R_A = 0.68K\Omega$, $R_B = 3.3K\Omega$ and $C = 0.1\mu F$. Calculate the free running frequency.	**8**	CO2	L4
	(ii) Design a circuit with will generate a Triangular wave of frequency 2KHz and amplitude 7 V_{PP}. Assume $V_{sat} = \pm 14V$.	**5**	CO2	L4
13 (a)	Describe the working principle of an Analog Multiplier using Emitter coupled transistor pair. Mention their applications.	**13**	CO3	L2
	OR			
13 (b)	Construct the block diagram and explain the principle and working characteristics of (i) Frequency Synthesizer (ii) FSK demodulator	**13**	CO3	L2
14 (a)	(i) Write a short notes on voltage to time converter.	**5**	CO4	L3
	(ii) Explain the working of R-2R ladder DAC by taking example of a 3-bit DAC circuit sketch the corresponding.	**8**	CO4	L3
	OR			
14 (b)	Explain in detail about the following Analog to Digital conversion techniques. Write merits and demerits. (i) Flash Type ADC (ii) Successive approximation type ADC.	**13**	CO4	L3
15 (a)	With a neat circuit diagram, explain the working of linear voltage regulator using operational amplifier.	**13**	CO5	L2
	OR			
15 (b)	(i) Difference between Power amplifier and Isolation amplifier.	**6**	CO5	L2
	(ii) Describe the working principle of a forward converter SMPS. Discuss its design considerations with relevant waveforms.	7	CO5	L2

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	(i) Design and derive Second order low pass filter at a cut-off frequency of 2KHz. (Assume $C = 0.001\mu F$).	**10**	CO2	L4
	(ii) Design and derive an Inverting Schmitt trigger for $V_{UT} = 2V$ $V_{LT} = -2V$, $V_{sat} = 12V$.	5	CO2	L4

ADDITIONAL CONTROLLER OF EXAMINATIONS AU CHENNAI 600 025