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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: IV**

Branch: EIE/MD **Duration: 3 hrs.**

Course Code: 23ES4PCLIC / 22ES4PCLIC **Max Marks: 100**

Course: Linear Integrated Circuits

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	*CO*	*PO*	Marks
1	a)		Define any four DC characteristics of an operational amplifier and specify their ideal and practical values.	*CO2*	*PO2*	**08**
	b)		With a neat circuit, derive an expression for the gain of an instrumentation amplifier.	*CO2*	*PO2*	**08**
	c)		Explain the working of an I-V converter using Op-amp.	*CO3*	*PO3*	**04**
			OR			
2	a)		What are the common errors in practical op-amp circuits and how are they minimized?	*CO2*	*PO2*	**07**
	b)		Design a precision full-wave rectifier using op-amps and explain how it overcomes the diode threshold voltage limitation.	*CO3*	*PO3*	**07**
	c)		What is the highest frequency of a triangular wave of 20V peak to peak amplitude that can be reproduced by an Op amp whose slew rate is 10V/μs? For a sine wave of same frequency, what is the maximum amplitude of output signal that remains undistorted?	*CO3*	*PO3*	**06**
			UNIT - II			
3	a)		Explain the working of an inverting Schmitt Trigger with hysteresis. Design a for a UTP =2V and LTP = -2V. assuming supply voltage = ± 12V.	*CO3*	*PO3*	**10**
	b)		Describe the design and working of a triangular waveform generator.	*CO3*	*PO3*	**10**
			OR			
4	a)		Discuss the working of a Wien bridge oscillator. What is the condition for oscillation? Design a Circuit to generate a 10 KHz sinusoidal Signal.	*CO3*	*PO3*	**10**

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		b)	With neat diagram, explain the working and applications of a 555 timer/opamp in astable mode and derive an expression for the output frequency.	*CO3*	*PO3*	**10**
			UNIT - III			
	5	a)	Explain with neat circuit, waveforms and transfer function, the design a first-order low-pass filter using Op-Amp.	*CO3*	*PO3*	**10**
		b)	Explain the working and application of an all-pass lead or all-pass lag filter.	*CO3*	*PO3*	**10**
			OR			
	6	a)	Draw and explain a practical differentiator using an Op-Amp. Also discuss its frequency response.	*CO3*	*PO3*	**7**
		b)	Design a second-order Butterworth low-pass filter for f_l = 1KHz, assume $\alpha = 1.414$.	*CO3*	*PO3*	**8**
		c)	Implement a first order high pass filter and illustrate its frequency response.	*CO1*	*PO1*	**5**
			UNIT - IV			
	7	a)	Explain the working of a binary-weighted resistor DAC and derive its output expression.	*CO3*	*PO3*	**10**
		b)	Explain the principle of successive approximation ADC with neat circuit diagram.	*CO3*	*PO3*	**10**
			OR			
	8	a)	Describe the R-2R ladder DAC. How does it overcome limitations of binary-weighted DAC?	*CO2*	*PO2*	**10**
		b)	Explain the working of a 3-bit flash ADC with neat circuit and function table	*CO2*	*PO2*	**10**
			UNIT - V			
	9	a)	Explain the basic principle of Phase Locked Loop with a neat block diagram.	*CO2*	*PO3*	**10**
		b)	Discuss the working of a Voltage Controlled Oscillator with a neat circuit diagram.	*CO2*	*PO3*	**10**
			OR			
	10	a)	Explain the role of Low Pass Filter in a PLL.	*CO2*	*PO2*	**08**
		b)	List and explain applications of PLL in communication and signal processing.	*CO2*	*PO2*	**12**

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