Code No: R1631042 **R16** SET - 1

III B. Tech I Semester Regular Examinations, October/November - 2018

LINEAR IC APPLICATIONS

(**Common to** Electronics and Communication Engineering, Electronics and Instrumentation Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	What does the term "balanced output" mean?	[2M]
	b)	Define CMRR.	[2M]
	c)	What is an instrumentation amplifier?	[3M]
	d)	What is all-pass filter?	[2M]
	e)	Draw the pin diagram of 555 Timer.	[3M]
	f)	Define resolution of a convertor.	[2M]

PART -B

2.	a)	Derive the expression for voltage gain of a single input, balanced output differential amplifier.	[7M]
	b)	Draw the circuit diagram of two-stage differential amplifier and explain it.	[7M]
3.	a)	Explain about integrated circuit package types.	[7M]
	b)	Explain the following: i) Input offset voltage ii) Input offset current.	[7M]
4.	a)	Draw the circuit diagram of log amplifier and explain its operation.	[7M]
	b)	Design an op-amp differentiator that will differentiate an input signal with f_{max} = 100 Hz.	[7M]
5.	a)	Design and plot the frequency response of a first order high pass filter for pass band gain of 2 and lower cut-off frequency of 2 KHz. .	[7M]
	b)	Explain the operation of Four-Quadrant Multiplier.	[7M]
6.	a)	Draw the functional diagram of astable multivibrator using 555 timer and explain its operation.	[7M]
	b)	Derive the expression for lock in range.	[7M]
7.	a)	Explain about IC 1408 D/A convertor.	[7M]
	b)	Explain about counter type A/D convertor.	[7M]

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2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Define differential amplifier?	[2M]
	b)	List out the temperature ranges for ICs.	[2M]
	c)	What is meant by buffer?	[2M]
	d)	Define band pass and band reject filter.	[3M]
	e)	List the basic building blocks of PLL.	[3M]
	f)	Write the significance of linearity in a convertor.	[2M]

PART -B

2.	a)	Derive the expression for voltage gain of a dual input, unbalanced output differential amplifier.	[7M]
	b)	Draw the circuit diagram of level translator using emitter follower and explain it.	[7M]
3.	a)	Draw the high frequency model of an op-amp with single break frequency and analyze the open loop voltage gain as a function of frequency.	[7M]
	b)	Explain the following: i) Slew rate ii) thermal drift.	[7M]
4.	a)	Draw the circuit diagram of sample and hold circuit. Explain its operation.	[7M]
	b)	Find R_1 and R_F in the lossy integrator so that peak gain is 20 dB and the gain is 3 dB down from its peak value when ω = 10000 rad/s. use a capacitance of 0.01 μF.	[7M]
5.	a)	Draw the circuit diagram of second order generalized active filter and derive the expression for transfer function.	[7M]
	b)	Design a second order Butterworth low-pass filter having a upper cut-off frequency of 1 kHz.	[7M]
6.	a)	Draw the functional diagram of monostable multivibrator using 555 timer and explain its operation.	[7M]
	b)	Explain the following: i) PLL used as Frequency translation ii) PLL used as AM demodulator	[7M]
7.	a)	Explain about weighted resistor DAC and write the drawbacks of it.	[7M]
	b)	Explain about successive approximation ADC.	[7M]

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Code No: R1631042 **R16** SET - 3

III B. Tech I Semester Regular Examinations, October/November - 2018

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Time: 3 hours Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	What is level translator circuit?	[2M]
	b)	Define PSRR.	[2M]
	c)	List out the applications of comparator.	[2M]
	d)	Define notch filter.	[2M]
	e)	List out the applications of VCO.	[3M]
	f)	Find the resolution and dynamic range of a D/A convertor, if the maximum peak to peak output voltage is 5 V and the input signal is a 10 bit word.	[3M]

PART -B

2.		Draw the circuit diagrams of all four differential amplifier configurations and write the expressions for voltage gain, input resistance and output resistance.	[14M]
3.	a)	Draw the block diagram of a typical op-amp and explain it.	[7M]
	b)	What is meant by an integrated circuit? Give the classification of ICs based on number of components integrated on the same chip.	[7M]
4.	a)	Explain the operation of square wave generator using op-amp.	[7M]
	b)	Design an adder circuit using an op-amp to get the output expression as $V_0 = -(0.1\ V_1 + V_2 + 10\ V_3)$.	[7M]
5.	a)	Draw the circuit diagram of first order high-pass filter using op-amp and explain its operation.	[7M]
	b)	Design a wide-band pass filter having f_l = 400 Hz, f_h = 2 kHz and a pass band gain of 4. Find the value of Q of the filter.	[7M]
6.	a)	Explain the operation of FSK generator using 555 Timer.	[7M]
	b)	Draw the block diagram of 565 PLL and explain it.	[7M]
7.	a)	Explain about R-2R DAC.	[7M]
	b)	Explain about Dual-Slope ADC.	[7M]

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Code No: R1631042 **R16** SET - 4

III B. Tech I Semester Regular Examinations, October/November - 2018

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Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	List out the four differential amplifier configurations.	[2M]
	b)	Write the difference between digital ICs and linear ICs.	[3M]
	c)	Draw the ideal and practical transfer characteristics of a comparator.	[3M]
	d)	Draw the Sample and Hold Circuit.	[2M]
	e)	Define capture range and lock in range.	[2M]
	f)	What is the difference between A/D and D/A convertor? Give one application of each one.	[2M]

PART -B

2.	a)	Draw the circuit diagram of differential amplifier in common mode configuration and explain it.	[7M]
	b)	Derive the expression for input resistance and output resistance of a dual input, unbalanced output differential amplifier.	[7M]
3.	a)	What is an operational amplifier? List out the ideal characteristics of operational amplifier.	[7M]
	b)	What is meant by frequency compensation? Explain about pole-zero compensation.	[7M]
4.	a)	Explain the operation of triangular wave generator using op-amp.	[7M]
	b)	Explain about V to I convertor using op-amp. Write the applications of it.	[7M]
5.	a)	Draw the circuit diagram of first order low-pass filter using op-amp and explain the operation.	[7M]
	b)	Design a second order Butterworth high-pass filter having a lower cut-off frequency of 1 kHz.	[7M]
6.	a)	Draw the circuit diagram of Schmitt trigger using 555 timer and explain its operation.	[7M]
	b)	Give the block diagram of IC 566 VCO and explain its operation.	[7M]
7.	a)	Explain about Inverted R-2R ladder DAC.	[7M]
	b)	Explain the important specifications of D/A and A/D convertors.	[7M]

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