Seat No.: _____ Enrolment No.: _____

C U SHAH UNIVERSITY

Faculty of Technology and Engineering

B.Tech- SEMESTER-4FINAL EXAM. May-2015

Subject Code: 4TE04LIC1 **Date:**

Subject Name: Linear Integrated Circuits (LIC)

Time: **Total Marks: 70**

Instructions:

1. **Make suitable assumptions whenever necessary.**
2. **Figures to the right indicate full marks.**
3. **Question one and four is compulsory.**

SECTION – I

Q.1	(a)	Define the following parameters of Op-Amp: (i) Input bias current. (ii) Input offset voltage.	02
	(b)	What is slew rate? List causes of slew rate.	02
	(c)	Why open loop op-amp configuration are not used in linear application?	02
	(d)	Define Supply Voltage Rejection Ratio.	01
Q.2	(a)	Draw the DC and AC equivalent circuit diagram of Single Input Balanced Output Differential Amplifier and derive the equation of differential gain.	05
	(b)	Derive the expression for voltage gain and input resistance of an inverting amplifier using op-amp with negative voltage shunt feedback.	05
	(c)	What is ICs? Explain briefly the difference between Linear ICs and Digital ICs?	04
		OR	
Q.2	(a)	Derive expression for voltage gain and input resistance of a Differential Amplifier with two Op-Amp.	05
	(b)	Explain in detail the Differential Amplifier with Constant Current Bias circuit.	05
	(c)	Draw and explain the block diagram of Op-Amp.	04
Q.3	(a)	What is Common Mode Rejection Ratio? Draw and explain the circuit diagram of Op-Amp connected in common mode configuration (i) without feedback and (ii) with feedback.	05
	(b)	What type of feedback is present in the non-inverting amplifier? Derive expression for voltage gain, input resistance, output resistance and bandwidth of a non-inverting amplifier using a non-ideal op-amp.	05
	(c)	What is the major difference among SSI, MSI, LSI and VLSI ICs?	04
		OR	
Q.3	(a)	Draw and explain the three open loop op-amp configurations in detail.	05
	(b)	What are the characteristics of an ideal op-amp? Draw its equivalent circuit along with voltage transfer curve.	05
	(c)	Explain the three basic types of Linear IC packages.	04

SECTION – II

Q.4	(a)	Explain working of op-amp based Zero Crossing Detector.	02
	(b)	List the important characteristics of comparator.	02
	(c)	What do you understand by precision rectifier?	02
	(d)	What is Window Detector?	01
Q.5	(a)	Draw schematic of AC inverting amplifier single supply based op-amp. Explain its working along with necessary input and output waveforms.	05
	(b)	Draw and explain working of basic differentiator circuit. What are the limitations of this circuit? How it can be corrected?	05
	(c)	Draw and explain working of Summing and Averaging amplifier.	04
		OR	
Q.5	(a)	Draw and explain working ofop-amp basedvoltage to current converter with grounded load.	05
	(b)	Implement an integrator using Op-Amp. Obtain the expression for the output voltage. Sketch the output waveform for an input square waveform.	05
	(c)	Write short note on Peaking Amplifier.	04
Q.6	(a)	Explain working of op-amp based Schmitt trigger circuit along with schematic and input/output waveforms.	05
	(b)	Describe the working principle of Phase-Locked Loop with basic blocks.	05
	(c)	Write short note on sample and hold circuit.	04
		OR	
Q.6	(a)	Explain the application of op-amp as a positive and negative clipper circuit.	05
	(b)	Explain working of AstableMultivibrator using IC 555.	05
	(c)	Write short note onPeak Detector.	04