Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– IV (New) EXAMINATION – WINTER 2019

Subject Code: 2141002 **Date: 07/12/2019**

Subject Name: Analog Circuit Design

Time: 10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	What do you mean by Voltage regulator? List different types of voltage regulators.	**03**
	(b)	What are the characteristics of an ideal Op-amp?	**04**
	(c)	Draw the hybrid Π common emitter transistor model. Derive the expression for input conductance.	**07**
Q.2	**(a)**	Draw and explain block diagram of Op-amp.	**03**
	(b)	How Op-amp can be used as an integrator?	**04**
	(c)	Explain Op-amp based Zero Crossing Detector with circuit diagram and waveforms.	**07**
		OR	
	(c)	Explain wide band-pass filter with necessary circuit, derivation and waveforms.	**07**
Q.3	**(a)**	Explain procedure of offset null for Op-amp IC.	**03**
	(b)	What is thermal drift? How does it affect the performance of an Op-amp circuit?	**04**
	(c)	What is the need of clipper circuit? Explain Op-amp based positive clipper circuit with necessary waveforms.	**07**
		OR	
Q.3	**(a)**	How Op-amp can be used as a summing amplifier?	**03**
	(b)	Draw block diagram of Phase Locked Loop (PLL) and briefly explain its working. State applications of PLL.	**04**
	(c)	Write short note on: Sample and Hold Circuits.	**07**
Q.4	**(a)**	Define the terms: (i) CMRR (ii) Slew Rate (iii) Offset voltage.	**03**
	(b)	Draw Op-amp based two-sided voltage limiter circuit and its response.	**04**
	(c)	Draw and explain triangular and sawtooth wave generator circuit using Op-amp.	**07**
		OR	
Q.4	**(a)**	Design Op-amp based RC phase oscillator for the frequency of 5 KHz.	**03**
	(b)	What is an oscillator? Explain the concept of oscillation with Barkhausen criteria.	**04**
	(c)	Explain in detail operation of Full wave precision rectifier with circuit diagram and waveforms.	**07**
Q.5	**(a)**	Draw the circuit of Peak Detectors using Op-amp.	**03**
	(b)	Explain the working of Monostable multivibrator using IC 555.	**04**
	(c)	Explain the working of a Schmitt trigger using Op-amp.	**07**
		OR	
Q.5	**(a)**	Explain voltage-to-Current converter circuit using Op-amp.	**03**
	(b)	List advantages of Schmitt trigger over the conventional comparators.	**04**
	(c)	Explain the working of Hartley oscillator. Derive the expression for frequency of oscillation.	**07**

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