Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–IV EXAMINATION – SUMMER 2016

Subject Code:X41103 **Date:01/06/2016**

Subject Name:Integrated Circuits and Applications

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.**

Q.1	**(a)**	Derive the expression for voltage gain, input resistance, output resistance and bandwidth of Inverting amplifier using non ideal op-amp.	**07**
	(b)	Define the following electrical parameters of op-amp: Input offset voltage, Input offset current, Input bias current, CMRR, PSRR, Equivalent input noise voltage and current, Slew rate.	**07**
Q.2	**(a)**	What is an instrumentation amplifier? Explain with the help of neat diagram the operation of an instrumentation amplifier employing three basic Op-amps and with provision for variation in the voltage gain.	**07**
	(b)	Draw and explain the circuit diagram for Vo = V1 + V2 – V3 – V4 by using Op-amp.	**07**
		OR	
	(b)	Draw and explain the Schmitt trigger comparator circuit with hysteresis width of 6V by using Op-amp. (+/-Vsat = +/- 12V)	**07**
Q.3	**(a)**	Draw and explain the circuit diagram of full wave rectifier by using Op-amp. How is it better in performance compared to full wave rectifier circuit without Op - amp.	**07**
	(b)	Design a differentiator to differentiate an input signal that varies in frequency fro 10 Hz to about 1 KHz.	**07**
		OR	
Q.3	**(a)**	Draw and Explain Working Op-amp based log amplifier	**07**
	(b)	(i) What is thermal drift? How does it affect the performance of an Op-amp circuit? (ii) What is error voltage? How can it be reduced?	**07**
Q.4	**(a)**	Analyze second order Butterworth High Pass filter. Draw its frequency response and state design procedure.	**07**
	(b)	Draw block diagram of the PLL system and explain function of each block. State the applications of PLL.	**07**
		OR	
Q.4	**(a)**	Draw and explain the circuit diagram of all pass filter by using Op-amp.	**07**
	(b)	Draw and explain the circuit diagram for voltage to current converter by using Op-amp with floating load as well as grounded load	**07**
Q.5	**(a)**	Design an astable multivibrator for an output frequency of 5 KHz and duty cycle 40%. Consider C=0.047 µF.	**07**
	(b)	What are the different types of voltage regulators? Discuss LM317 based adjustable voltage regulator. Indicate bypass capacitors to improve transient response and protective diodes in the connection diagram.	**07**
		OR	

Q.5	**(a)**	Explain working of monostable multivibrator using IC 555 with internal blocks. Mention applications of monostable using 555 timer.	**07**
	(b)	Draw and explain the circuit diagram of Op-amp based voltage limiter as well as clipper circuits.	**07**

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