Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC - SEMESTER– IV • EXAMINATION – SUMMER 2015

Subject Code: X41103   **Date:02/06/2015**
Subject Name: INTEGRATED CIRCUITS AND APPLICATIONS
Time:10.30am-01.00pm   **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)**	Draw and explain basic block diagram of op-amp and list out ideal characteristics of op-amp	**07**
	(b)	Derive the equation of differential gain and input resistance for differential amplifier with two op-amp. Also List advantage of two op-amp differential amplifier over single op-amp differential amplifier.	**07**
Q.2	**(a)**	The 741c op-amp having following parameters is connected as a noninverting amplifier with R_1= 1.8kΩ and R_F=18kΩ, A=200000, R_i=2MΩ, R_o=75Ω, f_o=5Hz, supply voltage= +/-15V, output voltage swing=+/-13V. 1) Calculate the exact close-loop gain 2) Calculate the ideal close-loop gain 3) Explain the results obtain in parts 1) and 2)	**07**
	(b)	Derive the equation of maximum slew rate and discuss effect of slew rate in applications	**07**
		OR	
	(b)	Explain peaking amplifier in detail.	**07**
Q.3	**(a)**	Explain summing, scaling, and averaging amplifier using inverting configuration.	**07**
	(b)	Explain voltage to current converter with floating load and explain how to make diode match finder using voltage to current converter with floating load.	**07**
		OR	
Q.3	**(a)**	The peaking amplifier of figure has the following values: R_1= 1kΩ, L= 100µH with a 3Ω internal resistance, C= 0.01µF, R_F= 6.8kΩ, and R_L= 10kΩ. Determine: 1)The peak frequency f_p 2)The gain of the amplifier at f_p 3)The bandwidth of the amplifier	**07**
	(b)	Explain non-inverting comparator using op-amp in detail.	**07**
Q.4	**(a)**	Explain comparator characteristics and list out limitations of op-amp as comparator.	**07**
	(b)	Explain positive and negative clipper circuit in detail.	**07**
		OR	
Q.4	**(a)**	Explain negative small-signal half –wave rectifier using one diode and using two diode in detail.	**07**
	(b)	Explain peak detector in detail.	**07**
Q.5	**(a)**	Explain 555 timer as astable multivibrator in detail.	**07**
	(b)	Why analog filters are preferred over passive and distributed filters.	**07**
		OR	
Q.5	**(a)**	Design a lowpass filter using only resistors and capacitors with a half-power frequency of 1000 rad/s.	**07**
	(b)	Explain RC-CR transformation for filter designing in detail.	**07**

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