Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(New) EXAMINATION – SUMMER 2016

Subject Code:2141706 **Date:06/06/2016**

Subject Name:Analog Signal Processing

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		**Short Questions**	**14**
	1	Define CMRR.	
	2	Which type of feedback is used in inverting op-amp?	
	3	What is the purpose of differential amplifier stage in internal circuit of Op-	
	4	What is the basic difference between comparator and Schmitt Trigger circuit?	
	5	What is the name of the circuit that is used to detect the peak Value of non-sinusoidal input waveform?	
	6	What are the two requirements for oscillation?	
	7	What is VCO?	
	8	Define slew rate.	
	9	What is the offset-minimizing resistor R_{OM}?	
	10	In op-amp if (+) terminal is grounded (-) terminal also acts as ground. Why?	
	11	The voltage required to force the differential output to zero is called _____.	
	12	Calculate the cutoff frequency of a first-order low-pass filter for R1=2.5kΩ andC1=0.05μF	
	13	What is the voltage gain of voltage follower circuit?	
	14	Input impedance of the ideal operational amplifier is _____.	
Q.2	**(a)**	Explain Positive clipper with necessary waveform for +Vref and -Vref.	**03**
	(b)	Derive exact expressions for voltage gain of inverting amplifier. Also explain its application as an inverter.	**04**
	(c)	Explain Instrumentation amplifier and derive formula for voltage gain.	**07**
		OR	
	(c)	Draw op-amp based full wave rectifier (absolute-value output) circuit. Explain its working with necessary input/output waveforms.	**07**
Q.3	**(a)**	Explain positive small signal half wave rectifier circuit.	**03**
	(b)	Design first order High pass filter at a cut-off frequency of 1KHz with a passband gain of 2. Assume C=0.01μf.	**04**
	(c)	Explain operation of Binary weighted resistor type DAC. Enlist advantages & disadvantages.	**07**
		OR	
Q.3	**(a)**	Draw an op-amp based differential amplifier circuit and obtain expression for its differential gain.	**03**
	(b)	Explain wide band-pass filter with necessary diagrams.	**04**
	(c)	What is ADC? Explain SAR type ADC.	**07**
Q.4	**(a)**	Explain Logarithmic amplifier with its circuit diagram.	**03**
	(b)	What is I_B? What is cause of I_B? Explain technique to reduce effect of offset voltage due to I_B.	**04**
	(c)	Explain Timer IC 555 as Astable multivibrator. Enlist application and explain any one in detail.	**07**

OR

Q.4	**(a)**	Explain summing amplifier using non- inverting configuration of op-amp.	**03**
	(b)	Draw AC amplifiers with a single supply voltage. also draw input output waveforms.	**04**
	(c)	Explain block diagram of IC 555 timer.	**07**
Q.5	**(a)**	Explain voltage to current converter with floating load.	**03**
	(b)	Sketch op-amp based basic integrator circuit. Derive expression for output voltage to justify its operation of integration.	**04**
	(c)	Explain RC Phase shift (Constant frequency low audio frequency) oscillator with necessary waveforms. Enlist advantages, disadvantages and applications it.	**07**

OR

Q.5	**(a)**	Explain voltage follower and its application.	**03**
	(b)	Explain how op-amp can be used as a differentiator.	**04**
	(c)	Explain working of op-amp based Schmitt trigger circuit along with schematic and input/output waveforms.	**07**

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