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		GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-V- EXAMINATION - SUMMER 2016	
Subj	ect C	ode: 151003 Date: 21/0	)5/2016
Subject Name: Integrated Circuits and Applications Time: 02:30 PM to 05:00 PM T		ame: Integrated Circuits and Applications 30 PM to 05:00 PM Total Ma	arks: 70
mstru	1. A 2. N 3. H	Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
Q.1	(a)	Draw and explain block diagram of Operational amplifier. Write ideal characteristics of op-amp.	07
	( <b>b</b> )	Design summing, scaling and averaging circuit using Operational amplifier in Inverting configuration	07
Q.2	(a)	Derive the expression for voltage gain , input resistance, output resistance and bandwidth of an inverting amplifier using op-amp with negative voltage shunt feedback	07
	(b)	Explain working of astable multivibrator using IC 555 with internal blocks. write applications of it	07
		OR	
	( <b>b</b> )	State the applications of operational transconductance amplifier and explain any one with necessary circuit and derivation	07
Q.3	(a)	Design basic integrator circuit using an op-amp. What are the problems associated with this configuration? How they are overcome?	07
	(b)	Draw and explain Triangular and Sawtooth wave generator circuit using op-amp.	07
Q.3	(a)	<b>OR</b> (i) List three open loop op-amp configurations. Why open loop op- amp configurations are not used in linear applications? (03)	07
		the following electrical parameters of op-amp: Input offset voltage, Output offset voltage (04) Input bias current, CMRR	
	(b)	Design an adjustable voltage regulator using LM317 to satisfy the following specification: Output voltage Vo = 5 to 12 V Output current $Io = 1 A$	07

Q.4 (a) What is PLL? Explain operation of PLL with basic blocks and mention 07 any four applications of it in radio communication.

(b) Explain wide band-pass filter with necessary circuit, derivation and 07 waveforms

## OR

- Q.4 (a) Design a differentiator to differentiate an input signal that varies in 07 frequency from 10 Hz to about 1 KHz. Draw its frequency response.
  - (b) Draw the circuit of Peaking amplifier. If the gain is 10 at peak 07 frequency of 16 KHz then calculate the values of all components of the circuit.
- Q.5 (a) Design first order low pass Butterworth filter at cut-off frequency of 1 07 KHz with pass band gain of 2. Convert the 1 KHz cut-of frequency to cut-of frequency of 1.6 KHz using the frequency scaling technique.
  - (b) Design a wide band-reject filter having law cut off frequency of 200 07 Hz and high cut off frequency of 1 KHz. Calculate the value of Q for this filter.

## OR

- Q.5 (a) Draw and explain circuit diagram of instrumentation amplifier using 07 op-amp.
  - (b) Write short note on:
    (i) Schmitt trigger circuit using op-amp
    (ii) clipper circuit
    (iii) using

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