Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(New) • EXAMINATION – WINTER 2016

Subject Code:2142405 Date:19/11/2016

Subject Name:Analog Electronics and Its Applications

Time:02:30 PM to 05:00 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 static and dynamic resistance of the diode.	
	2	What is zener breakdown?	
	3	Define Q-Point w.r.t. transistor.	
	4	Define Noise figure of an amplifier.	
	5	Draw 1-phase full wave rectifier circuit.	
	6	Define Load Regulation w.r.t. Power supply.	
	7	What do you understand by OP-AMP?	
	8	What is utility of Active filter.	
	9	Draw the block diagram of PLL.	
	10	Define Ripple factor w.r.t. Power supply.	
	11	Enlist types of A/D converters.	
	12	Draw the OP-AMP based zero crossing detector circuit	
	13	What is a Noise immunity w.r.t. logic gate?	
	14	Enlist types of Logic families.	
Q.2	**(a)**	Enlist Ideal OP-AMP Characteristics.	**03**
	(b)	Explain virtual ground concept w.r.t. OP-AMP. A silicon diode operating at a temperature of 25°C and a forward biased voltage of 0.6V has a forward current of 0.8A flowing through it. Find the current $I_{0.}$	**04**
	(c)	Explain Summing, Scaling and Averaging Amplifier circuit with necessary equation and neat sketches.	**07**
		OR	
	(c)	Draw & explain Schmitt Trigger circuit with necessary waveforms and equations.	**07**
Q.3	**(a)**	Calculate the values of R for 100 Hz output in a wien bridge oscillator if C=0.001µF. Why it is necessary to have an amplifier section with a very high input impedance.	**03**
	(b)	What do you understand by current mirror? Draw & Explain Block diagram of typical OP-AMP.	**04**
	(c)	Derive the equation of closed loop voltage gain of voltage series feedback amplifier w.r.t. OP-AMP.	**07**
		OR	
Q.3	**(a)**	Explain bootstrapping circuit with proper sketches.	**03**
	(b)	Derive the equation of efficiency of Class-C amplifier.	**04**
	(c)	Draw the block diagram of a regulated DC power supply and explain the function of each block.	**07**
Q.4	**(a)**	Compare DTL, TTL & RTL in tabular forms.	**03**
	(b)	Explain the design of a series regulated power supply.	**04**
	(c)	Explain the OP-AMP based Precision Rectifier circuit.	**07**
		OR	

Q.4	**(a)**	Draw the circuit and waveform for Square wave generator using OP-AMP.	**03**
	(b)	Explain the following terms related to the OP-AMP: (1) Input Bias current (2) SVRR (3) CMRR (4) Offset voltage adjustment range	**04**
	(c)	Explain with neat sketches F/V converter.	**07**
Q.5	**(a)**	What is Barkhausen criterion? If the feedback network of a certain oscillator provides 1% positive feedback, what should be the minimum gain for an amplifier section of the oscillator for sustained oscillation?	**03**
	(b)	Draw sample-and-hold circuit with input and output waveforms.	**04**
	(c)	Define the Active and Passive Filter and Explain the OP-AMP based band Pass Filter circuit.	**07**

OR

Q.5	**(a)**	Define Slew rate. What is the Utility of h-Parameters?	**03**
	(b)	Explain Switched Capacitor Filter circuit in detail.	**04**
	(c)	Explain the construction of AND, OR and NOT logic gates using discrete components like diode, resistor, Transistor etc.	**07**

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