Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-III Examination December 2009

Subject code: 130902

Subject Name: Analog and Digital Electronics

Date: 21 / 12 / 2009 **Time: 11.00 am – 1.30 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)** (i) Define the following parameters as applied to an OP-AMP **04**
a. CMMR b. PSRR c. Slew Rate d. Input Offset Voltage
(ii) Explain the frequency response and UGB of an OP-AMP **03**

(b) Do as directed **07**
(i) Encode the decimal number 46 to Gray code.
(ii) Covert 0.8125 decimal number to its binary equivalent
(iii) Convert decimal number 214 to its octal equivalent
(iv) Obtain 2's complement of $(10111011)_2$
(v) Implement Boolean expression for 2 input AND gate using NAND gate.
(vi) Prove that $A + \bar{A}B = A + B$
(vii) Define Fan-in and Fan-out

Q.2 **(a)** (i) Compare the astable, monostable and bistable multi vibrator **04**
(ii) To shift hexadecimal number D into 4 flip-flop serial shift register, calculate time if clock frequency is 10 MHz and 7 MHZ. **03**

(b) What is an active integrator ? With neat circuit diagram explain the working of an active integrator. **07**

OR

(b) Explain the full adder with help of circuit diagram using NAND gate write the truth table. **07**

Q.3 **(a)** Explain the working of Master-Slave J-K flip-flop **07**

(b) With sketch realize the expression X = AB + CD using **07**
(i) NAND gates only and (ii) NOR gates only.

OR

Q.3 **(a)** Using K-map realize the following expression using minimum number of gates **07**

$$Y = \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}CD + \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}\bar{C}D +$$

$$A\bar{B}CD + AB\bar{C}D + ABCD$$

(b) Convert SR flip-flop to T and JK flip-flop **07**

Q.4 **(a)** List various specification of ADC and Explain the dual slope A/D converter technique with the help of block diagram. **07**

(b) Draw and explain the basic CMOS inverter circuits **07**

OR

Q.4	**(a)**	Explain the working of PLL using appropriate block diagram and explain any one application of the same.	**07**
	(b)	With help of circuit diagram explain the working of Schmitt trigger, what are its applications ?	**07**
Q.5	**(a)**	Write short notes on (i) Parallel in Serial out shift register (ii) Emitter Coupled Logic	**10**
	(b)	Explain the De-Morgan's Theorem	**04**
		OR	
Q.5	**(a)**	Write short notes on (i) Multiplexer and De multiplexer (ii) LM 317 Voltage Regulator	**10**
	(b)	Compare the CMOS and TTL logic.	**04**

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