Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) EXAMINATION – WINTER 2017

Subject Code: 2131004 Date:21/11/2017

Subject Name: Digital Electronics

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.**

Q.1	**(a)**	Define: 1) Fan in 2) Noise Margin 3) Propagation Delay	**03**
	(b)	State and prove De'Morgan theorem.	**04**
	(c)	Discuss Universal gates. Obtain AND, OR gate using NAND and NOR gates.	**07**
Q.2	**(a)**	Perform following subtraction using 2's complement method. $(11010)_2 - (10000)_2$	**03**
	(b)	Converts the following nos. (i) $(52)_{10} = (\ )_2$ (ii) $(436)_8 = (\ )_{16}$ (iii) $(5C7)_{16} = (\ )_{10}$ (iv) $(11011.101)_2 = (\ )_{10}$	**04**
	(c)	Draw the truth table of full adder and implement using minimum number of logic gates.	**07**
		OR	
	(c)	Explain Excess-3 code and Gray Code.	**07**
Q-3	**(a)**	Show that AB'C + B + BD' + ABD' + A'C = B + C	**03**
	(b)	Express the Boolean function F = AB + A'C in a product of maxterm.	**04**
	(c)	Reduce the expression in SOP and POS form using K-map. $F(A,B,C,D) = \sum_m (1,5,6,12,13,14) + d(2,4)$	**07**
		OR	
Q-3	**(a)**	Explain briefly 3 to 8 line decoder.	**03**
	(b)	What is multiplexer? With logic circuit and function table explain the working of 4 to 1 line multiplexer.	**04**
	(c)	Simplify the following Boolean function by means of the Tabulation Method. $F(A,B,C,D) = \sum(1,2,3,5,6,7,8,9,12,13,15)$	**07**

Q-4	**(a)**	Give comparison of TTL and CMOS family.	**03**
	(b)	Give the comparison between synchronous and asynchronous counters.	**04**
	(c)	Explain working of master-slave JK flip-flop with necessary logic diagram, state equation and state diagram.	**07**
		OR	
Q-4	**(a)**	Draw logic diagram, graphical symbol and Characteristic table for clocked D flip-flop.	**03**
	(b)	Design 4-bit ripple counter using negative edge triggered JK flip flop.	**04**
	(c)	With necessary sketch explain Bidirectional Shift Register with parallel load.	**07**
Q-5	**(a)**	Distinguish between combinational and sequential logic circuits.	**03**
	(b)	Explain Moore machine.	**04**
	(c)	Compare ROM, PLA and PAL.	**07**
		OR	
Q-5	**(a)**	Describe magnitude comparator.	**03**
	(b)	Explain the types of finite state machines.	**04**
	(c)	Explain the problem associate of an asynchronous state machine with the help of one example.	**07**

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