GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–III (New) EXAMINATION – WINTER 2018
Subject Code: 2130306   **Date: 12/12/2018**
Subject Name: Fundamentals of Digital Design
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)**	Perform BCD addition: 456.7 + 123.4	**03**
	(b)	$(89.75)_{10} = ($_____$)_2 = ($_____$)_{16}$	**04**
	(c)	(1) What is difference between Latch and Flip-flop? Distinguish Combinational & Sequential circuits. (2) Draw truth table & symbol for NAND, NOR, EX-OR gate.	**07**
Q.2	**(a)**	Define Fan-in, Fan-out & Noise margin.	**03**
	(b)	State & Prove De-Morgan's theorem.	**04**
	(c)	Reduce the expression $F(A,B,C,D) = \sum m(0,2,6,10,11,12,13) + d(3,4,5,14,15)$ using K-map and implement the real minimal expression in universal logic.	**07**
		OR	
	(c)	Reduce the expression $F(A,B,C,D) = \pi M(3,4,5,7,11,13,15).d(6,8,10,12)$ using K-map and implement the real minimal expression in AOI logic.	**07**
Q.3	**(a)**	What is comparator? Design 1-bit magnitude comparator.	**03**
	(b)	Design 3 to 8 decoder using basic gates.	**04**
	(c)	What is full adder? Draw truth table & design full adder circuit.	**07**
		OR	
Q.3	**(a)**	Design Half Subtractor using logic gates.	**03**
	(b)	Design 8x1 multiplexer using basic gates.	**04**
	(c)	Define Code converter. Design 4-bit Binary to Gray code converter.	**07**
Q.4	**(a)**	Explain Edge triggered D- flip flop.	**03**
	(b)	Give the comparison between PROM, PLA & PAL.	**04**
	(c)	Implement the following Boolean functions using PAL with four inputs and 3-wide AND-OR structure. Also write PAL programming table. $$F1(A,B,C,D) = \Sigma m(2,12,13)$$ $$F2(A,B,C,D) = \Sigma m(7,8,9,10,11,12,13,14,15)$$ $$F3(A,B,C,D) = \Sigma m(0,2,3,4,5,6,7,8,10,11,15)$$	**07**
		OR	
Q.4	**(a)**	Explain Edge triggered T- flip flop.	**03**
	(b)	Design a combinational circuit using a PROM. The circuit accepts a 3-bit binary number and generates its equivalent XS-3 code.	**04**
	(c)	Implement the following Boolean functions using PLA. Also write PLA programming table. $$F1(X,Y,Z) = \Sigma m(0,1,2,4) \ \& \ F2(X,Y,Z) = \Sigma m(0,5,6,7)$$	**07**
Q.5	**(a)**	What is Race around condition? Give its solution.	**03**
	(b)	Explain operation of Edge triggered SR- flip flop with the help of truth table.	**04**
	(c)	Enlist the types of D to A converter & explain any one in detail.	**07**
		OR	

Q.5 **(a)** What is VHDL & ABEL? **03**

(b) Explain operation of Edge triggered JK- flip flop with the help of truth table. **04**

(c) Enlist the types of A to D converter & explain any one in detail. **07**

****