Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (New) EXAMINATION – WINTER 2015

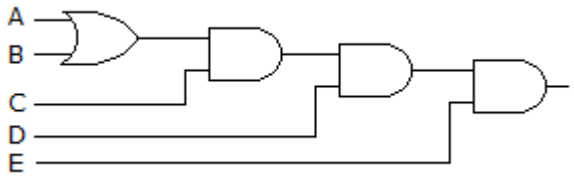
Subject Code:2131704 Date:18/12/2015

Subject Name: Digital Logic Circuits

Time: 2:30pm to 5:00pm 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	Convert $(B65F)_{16}$ to decimal	1
	2	F= x y + x' y' + y' z implement with gates	1
	3	Draw vein diagram for AND gate	1
	4	Determine the values of A, B, C, and D that make the sum $\overline{A} + B + \overline{C} + D$	1
	5	Derive the Boolean expression for the logic circuit shown below: 	1
	6	From the truth table below, determine the standard SOP expression.	1

Inputs			Output
A	B	C	X
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0

	7	Convert the binary number 1001.0010_2 to decimal.	1
	8	Define Flip Flop	1
	9	Applying DeMorgan's theorem to the expression $\overline{ABC}$, we get _____.	1
	10	An AND gate with schematic "bubbles" on its inputs performs the same function as a(n)_____ gate.	1
	11	A truth table for the SOP $A B \overline{C} + A \overline{B} C + \overline{A} \overline{B} C$ expression has how any input combinations?	1
	12	AC + ABC = AC, say whether True or False	1
	13	Converting the Boolean expression LM + M(NO + PQ) to SOP form, we get _____	1
	14	Prove x+x=x using theorems and postulates	
Q.2	**(a)**	Simplify: A'B + A'BC' + A'BCD + A'BC'D'E	**03**

	(b)	Implement F= A (B +CD) +BC' with NOR gate	**04**
	(c)	Simplify the following Boolean function in a) Sum of Products and b) Product of Sums: $F(A,B,C,D) = \sum(0,1,2,5,8,9,10)$	**07**
		OR	
	(c)	Prove that: 1. $((AB'+ABC)' + A(B+AB'))' = 0$ 2. $AB'C + A'BC + ABC = AC + AB$	**07**
Q.3	**(a)**	State and prove De-Morgan's theorem	**03**
	(b)	Explain Half adder	**04**
	(c)	Construct 4x16 decoder with two 3x8 decoders.	**07**
		OR	
Q.3	**(a)**	Express following Function in Product of Maxterms $F(x,y,z)= (xy + z) (y + xz)$	**03**
	(b)	Explain Master Slave Flip Flop using J.K Flip Flop	**04**
	(c)	Simplify the Boolean Function: $F(w,x,y,z) = \Sigma(1,3,7,11,15)$ and the Don't care conditions : $d(w,x,y,z) = \Sigma(0,2,5)$	**07**
Q.4	**(a)**	Explain combinational logic circuit and sequential logic circuit.	**03**
	(b)	Write a note on clocked RS flip flop	**04**
	(c)	Simplify the Boolean function using the tabulation method $F(A,B,C,D,E,F,G)=\sum(20,28,38,39,52,60,102,103,127)$	**07**
		OR	
Q.4	**(a)**	Explain TTL circuit in detail	**03**
	(b)	List and explain at least two characteristics of Logic families in detail.	**04**
	(c)	With block diagram explain Successive approximation ADC.	**07**
Q.5	**(a)**	Explain ALU	**03**
	(b)	Explain Registers.	**04**
	(c)	With logic circuit explain the working of 4-bit magnitude comparator.	**07**
		OR	
Q.5	**(a)**	Realize AND and NOT gate using NOR gate	**03**
	(b)	Explain state table, state diagram with example	**04**
	(c)	Design a 3-bit binary counter using JK Flip-Flop	**07**

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