

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– III (New) EXAMINATION – WINTER 2019****Subject Code: 3131704****Date: 26/11/2019****Subject Name: Digital Electronics****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	(a) Give the comparison of 1's and 2's complements.	03
	(b) Explain De Morgan's theorem with suitable example.	04
	(c) Explain the commutative law, associative law, and distributive law in Boolean algebra with example	07
Q.2	(a) Convert $(163.875)_{10}$ to binary.	03
	(b) Design Full Adder using two Half Adder and one two input OR gate.	04
	(c) Implement the following function with 8:1 multiplexer: $F(A, B, C, D) = \sum(0, 1, 3, 4, 8, 9, 15)$	07
OR		
	(c) Explain the working of 4:1 multiplexer.	07
Q.3	(a) What do you mean by universal gates? Implement NOT, AND, OR with any one universal gate.	03
	(b) Implement 4 bit Shift Register for 1010 binary pattern.	04
	(c) A combinational circuit is defined by functions: $F_1(A, B, C) = \sum m(3, 5, 6, 7)$ $F_2(A, B, C) = \sum m(0, 2, 4, 7)$ Implement the circuit with PLA having three inputs, four product terms and two outputs.	07
OR		
Q.3	(a) Explain the operation of master slave J-K flip flop.	03
	(b) Explain gray code in detail.	04
	(c) Design a type T counter for given state diagram	07
<pre> graph TD 0((0)) --> 3((3)) 3 --> 5((5)) 5 --> 6((6)) 6 --> 0 </pre>		
Q.4	(a) Describe Fan In, Noise Margin and Propagation Delay parameters for digital IC.	03
	(b) Explain ROM with block diagram. Give classification of ROM.	04
	(c) Design 3 to 8 line decoder with neat sketch and truth table.	07
OR		
Q.4	(a) Simplify Boolean function $F = A'B'C' + B'CD' + A'BCD' + AB'C'$ using K map.	03
	(b) Explain TTL gate with Totem pole output.	04

- (c) Explain 4 bit magnitude comparator with necessary Boolean expression. **07**
- Q.5** (a) Explain D flip-flop. **03**
 (b) Explain arithmetic ,logic micro operation. **04**
 (c) Minimize the following function using tabulation method: **07**
 $F(w, x, y, z) = \sum (1, 4, 6, 7, 8, 9, 10, 11, 15)$
- OR**
- Q.5** (a) Design full subtracter with necessary derivation of functions. **03**
 (b) Explain the following register transfer operation with the help of necessary diagram **04**
 T1: C ← A
 T2: C ← B
 Assume A, B and C are 4 – bit registers.
- (c) Simplify the Boolean expression $F(A,B,C,D) = \sum(2,3,6,7,8,10,11,13,14)$ using K Map. **07**

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