Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) EXAMINATION – WINTER 2021

Subject Code:3130704 **Date:23-02-2022**

Subject Name:Digital Fundamentals

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Implement EX-NOR using NAND gate.	**03**
	(b)	Convert the decimal number 225.225 to octal and hexadecimal.	**04**
	(c)	Give classification of logic families and compare CMOS and TTL.	**07**
Q.2	**(a)**	Convert F(A,B,C) = BC+A into standard minterm form.	**03**
	(b)	With logic diagram and truth table, explain the working of 3 line to 8 line decoder.	**04**
	(c)	Explain Successive Approximation A/D converter in detail.	**07**
		OR	
	(c)	A combinational logic 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 3 inputs, 4 product terms & 2 outputs.	**07**
Q.3	**(a)**	Simplify the Boolean expression: $F(x,y,z) = \sum m(0,1,3,4,5,7)$	**03**
	(b)	Explain S-R clocked flip flop.	**04**
	(c)	Design full adder circuit using decoder and multiplexer.	**07**
		OR	
Q.3	**(a)**	Generate AND & EX-OR gates using NOR gate.	**03**
	(b)	Implement D flip flop using JK flip flop.	**04**
	(c)	Design a counter to generate the repetitive sequence 0,4,2,1,6.	**07**
Q.4	**(a)**	What is race around condition in JK flip flop.	**03**
	(b)	Construct a ring counter with five timing signals.	**04**
	(c)	Design BCD to Excess 3 code converter using minimum number of NAND gates.	**07**
		OR	
Q.4	**(a)**	Explain 2-bit comparator circuit.	**03**
	(b)	Write a short note on FPGA.	**04**
	(c)	What is Digital to Analog converter? Draw and Explain R-2R DAC.	**07**
Q.5	**(a)**	Perform following operation using 2's complement method. $(11010)_2 - (1000)_2$	**03**
	(b)	Write a short note on Read Only Memory (ROM).	**04**
	(c)	Explain the working of 4 bit binary ripple counter.	**07**
		OR	
Q.5	**(a)**	Obtain the truth table of the function: F = xy+yz+zx .	**03**
	(b)	Implement following functions using ROM. $F_1 = \sum m(1,3,4,6)$ and $F_2 = \sum m(0,1,5,7)$.	**04**
	(c)	Explain in detail Dual Slope A/D converter.	**07**

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