Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–III (NEW) EXAMINATION – WINTER 2020

Subject Code:3130704 Date:05/03/2021

Subject Name:Digital Fundamentals

Time:10:30 AM TO 12:30 PM Total Marks:56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Realize AND, OR and NOT gate using NAND gates only.	**03**
	(b)	State and prove De-Morgan's theorems using truth-tables.	**04**
	(c)	Do as directed: (a) $(1111.11)_2 = (\ ?\ )_8 = (\ ?\ )_{10}$ (b) 23 – 48 using 2's complement method (c) $(396)_{10} = (\ ?\ )_{BCD} = (\ ?\ )_{EX-3}$ (d) $(11111)_2 = (\ ?\ )_{Gray}$	**07**
Q.2	**(a)**	Define following: Figure of merit, Noise margin, and Power dissipation.	**03**
	(b)	Construct Hamming code for BCD 0110. Use even parity.	**04**
	(c)	Given a logic function: Z = ABC + BC'D + A'BC. (i) Make a truth table. (ii) Simplify using K-map. (iii)Realize simplified function using NAND gates only.	**07**
Q.3	**(a)**	Draw the logic diagram of 1-digit BCD adder.	**03**
	(b)	Minimize following Boolean function using K-map: $Y(A,B,C,D) = \Sigma\, m(0, 1, 2, 3, 5, 7, 8, 9, 11, 14)$	**04**
	(c)	Write a brief note on race around condition and its solution. Draw & explain the logic diagram of master-slave JK flip-flop.	**07**
Q.4	**(a)**	Draw truth table of 2-bit digital comparator.	**03**
	(b)	Minimize following Boolean function using K-map: $F(A,B,C,D) = \Sigma\, m(1, 3, 7, 11, 15) + d(0, 2, 5)$	**04**
	(c)	Design a 4-bit synchronous down counter using T flip-flops.	**07**
Q.5	**(a)**	Design D FF using SR FF. Write truth table of D FF.	**03**
	(b)	Draw & explain in brief the logic diagram of 4-bit bidirectional shift register.	**04**
	(c)	List out various commonly used D/A converters. Draw & explain any one D/A converter.	**07**
Q.6	**(a)**	List out and explain any one application of the register.	**03**
	(b)	Design a 4-bit ripple up counter using JK flip-flops.	**04**
	(c)	List out various commonly used A/D converters. Draw & explain any one A/D converter.	**07**
Q.7	**(a)**	Draw internal organization of a 16 x 4 memory chip.	**03**
	(b)	Write a brief note on quantization and encoding.	**04**
	(c)	Write a detailed note on various types of memories.	**07**

Q.8	**(a)**	List out various characteristics of a D/A converter. Discuss any one.	**03**
	(b)	Obtain 2048 x 8 memory using 256 x 8 memory chips.	**04**
	(c)	Draw and explain in detail the block diagram of CPLD.	**07**

****