Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III (NEW) EXAMINATION – SUMMER 2022

Subject Code:3130306 Date:18-07-2022

Subject Name:Fundamentals of 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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Convert binary number $(10110)_2$ to Decimal, Hexadecimal and octal number.	**03**
	(b)	Subtract binary number $(101010)_2$ from $(110110)_2$ using 2's complement method.	**04**
	(c)	Draw symbol and truth table of below digital logic Gates: 1. AND Gate, 2. OR Gate, 3. NOT Gate, 4. X-OR Gate, 5. X-NOR Gate, 6. NAND Gate 7. NOR Gate.	**07**
Q.2	**(a)**	Explain Gray code and covert binary number $(1111)_2$ to Gray code.	**03**
	(b)	Convert Decimal No. $(19)_{10}$ to BCD code and XS-3 code.	**04**
	(c)	Construct 4x16 decoder with two 3x8 decoders.	**07**
		OR	
	(c)	Design a combinational circuit for 4 bit Magnitude Comparator.	**07**
Q.3	**(a)**	Write a brief note on Programmable Array logic (PAL).	**03**
	(b)	Realize Ex-OR gate and NOT gate using NOR gate.	**04**
	(c)	Design full subtractor using K map and realize using logic gates.	**07**
		OR	
Q.3	**(a)**	Write a brief note on PLA (Programmable Logic Array).	**03**
	(b)	Simplify the Boolean function using K-map: $F(w,x,y,z) = \sum m(0,1,2,4,5,6,8,9,12,13,14)$.	**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)**	Draw symbol and truth table of D flipflop.	**03**
	(b)	Minimize the following four variable logic function using K- map: f(A, B, C, D) = (A+B+C'+D') . (A'+C+D') . (A'+B+C'+D') . (B'+C) . (B' + C') (A + B') + (B' + D'). Realize the circuit using logic gates.	**04**
	(c)	Draw and explain 4 bit Binary parallel adder in detail.	**07**
		OR	
Q.4	**(a)**	Reduce the expression: 1. A+AB+ABC+ABCD 2. A+A'BC+ABD+1 3. A+A'B	**03**
	(b)	Explain the operation of master slave J-K flip flop.	**04**

	(c)	Simplify the Boolean function using the tabulation method F(A,B,C,D,E,F,G)=∑(20,28,38,39,52,60,102,103,127).	**07**
Q.5	**(a)**	Convert SR flip-flop into T flip-flop.	**03**
	(b)	Write a short note on shift register.	**04**
	(c)	Design circuit for 4-bit ring counter.	**07**
		OR	
Q.5	**(a)**	Explain 2 bit binary UP counter using JK flip-flops	**03**
	(b)	Explain the working of 4-bit Jhonson counter. Write the count sequence obtained at the output.	**04**
	(c)	Explain with logic diagram of 4-bit serial-in serial-out shift register.	**07**

****