

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER- III EXAMINATION – SUMMER 2020

Subject Code: 3131704

Date: 02/11/2020

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) Design a logic circuits for AND, OR and NOT gate using only NAND gates.	03
	(b) What is the difference between demultiplexer and multiplexer ? Explain with necessary diagram and truth table.	04
	(c) Explain D flip flop in detail with circuit diagram and truth table	07
Q.2	(a) Derive the SOP expression for following term $AB'C' + ABC' + AB'CD + A'BC' + AB$	03
	(b) Explain binary to gray and gray to binary conversion with circuit diagram and truth table.	04
	(c) Minimize the following function using tabulation method: $F(w, x, y, z) = \sum (0, 1, 2, 8, 10, 14, 15)$	07
	OR	
	(c) Design a logic circuit for half and full subtraction circuits with K-map equations and truth table.	07
Q.3	(a) Convert the following numbers to decimal: $(10101.101)_2$, $(330.4)_8$, $(A325)_{16}$	03
	(b) Construct 3x8 decoders with diagram and necessary truth table.	04
	(c) Explain following terms with example 1) Inter register-transfer operation 2) Arithmetic micro operation 3) Shift micro operation 4) Logic micro operation	07
	OR	
Q.3	(a) Draw the circuit of 3 input TTL (Transistor Transistor Logic) NAND gate and explain its operation.	03
	(b) Explain working of 4-bit binary ripple counter.	04
	(c) Simplify the following equation using K-map and implement using logic gates: $F(A, B, C, D) = \sum (0, 1, 2, 3, 5, 7, 8, 9, 10, 12, 13)$	07
Q.4	(a) Explain BCD adder with diagram and truth table	03
	(b) Explain 1's and 2's complement with example	04
	(c) Explain 2-bit UP synchronous counter with K-map equations and circuit diagram	07
	OR	
Q.4	(a) Write short note on PLA.	03
	(b) Reduce the expression $A + B[AC + (B + C')D] = A + BD$	04
	(c) With neat sketch explain the operation of clocked RS flip flop with NAND and NOR gates.	07

- Q.5 (a) Represent the decimal number 8620 in BCD, Excess-3, and Gray code. **03**
- (b) Explain 2 bit magnitude comparator with necessary diagram and equation. **04**
- (c) List out different types of memories used in digital logic circuits and define them. **07**

OR

- Q.5 (a) Explain meaning of following micro operations **03**
- 1) $T_1 : A+B'+1$
- 2) $T_2 : A \wedge B$
- 3) $T_3 : \text{shr } A$
- (b) Explain BUS transfer logic for two registers **04**
- (c) Design a logic circuit with JK flip-flop flip flop for the given state sequence with necessary K-map equation **07**

Present state	Next state
000	001
001	010
010	011
011	100
100	101
101	000

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